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# Hitachi Application Server V10 Definition Reference Guide (For UNIX® Systems)

Reference

3021-3-421-11(E)

# Notices

## ■ Relevant program products

Applicable OSs: Red Hat Enterprise Linux 5 Advanced Platform (AMD/Intel 64), Red Hat Enterprise Linux 5 (AMD/Intel 64), Red Hat Enterprise Linux Server 6 (64-bit x86_64)

P-9W43-5KA2 Hitachi Application Server 10-10

Note that OSs other than those listed above in "Applicable OSs" might become usable. For details, see the *Release Notes*.

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# Preface

## ■ Purpose of this manual

This manual describes the definition methods and formats of the properties, DD, and definition files that are used in the configuration of the system infrastructure of Application Server. By using this manual, users are able to configure and design in detail the system infrastructure of Application Server.

## ■ Intended readers

The intended readers of this manual are as follows:

- For systems engineer

The prerequisite is as follows:

- For systems engineer
  - Information related to the operations of Windows or UNIX.
  - Information related to the Application Server development.
  - Information related to the Java EE Standard specifications.
  - Information related to the peripheral environment (such as database, network, and job management, and so on) used in the system development.

## ■ Related manuals

The following table shows the titles of related manuals, and related manuals used in this manual.

Application Server related manuals

| Abbreviation | Formal name | Reference number |
|---|---|---|
| *User's Guide* | *Hitachi Application Server V10 User's Guide* (For UNIX® Systems) | 3021-3-415(E) |
| *GUI Reference* | *Hitachi Application Server V10 GUI Reference Guide* (For UNIX® Systems) | 3021-3-417(E) |
| *Command Reference* | *Hitachi Application Server V10 Command Reference Guide* (For UNIX® Systems) | 3021-3-419(E) |
| *Definition Reference* | *Hitachi Application Server V10 Definition Reference Guide* (For UNIX® Systems) | 3021-3-421(E) |
| *Messages* | *Hitachi Application Server V10 Messages* | 3021-3-422(E) |
| *API Reference* | *Hitachi Application Server V10 API Reference Guide* | 3021-3-423(E) |

## ■ Abbreviations for products and functions

This manual uses the following abbreviations for product names and function name:

| Abbreviations | | Product name and function name |
|---|---|---|
| Application Server | | Hitachi Application Server |
| Application Server - Base | | Hitachi Application Server - Base |
| Application Server - Optional License for Java | | Hitachi Application Server - Optional License for Java |
| Application Server for Developers | | Hitachi Application Server for Developers |
| APV | | IBM Advanced POWER Virtualization |
| DAS | | Domain Administration Server |
| domain administration server | | |
| Developer's Kit for Java | | Hitachi Developer's Kit for Java |
| Excel | | Microsoft® Excel |
| Firefox | | Firefox® |
| HiRDB | HiRDB Version 9 | HiRDB Server Version 9 |
| | HiRDB/Single Server | HiRDB/Single Server Version 9 |
| HWS | | Hitachi Web Server |
| Web Server | | |
| Internet Explorer | | Windows® Internet Explorer® |
| Java EE Server | | Hitachi Java EE Server |
| JP1/AJS3 | | Job Management Partner 1 Version 10 Job Management Partner 1/Automatic Job Management System 3 - Agent |
| | | Job Management Partner 1 Version 10 Job Management Partner 1/Automatic Job Management System 3 - Manager |
| | | Job Management Partner 1 Version 10 Job Management Partner 1/Automatic Job Management System 3 - View |
| JP1/IM | | Job Management Partner 1 Version 10 Job Management Partner 1/Integrated Management - Manager |
| | | Job Management Partner 1 Version 10 Job Management Partner 1/Integrated Management - View |
| Microsoft IIS | Microsoft IIS 7.5 | Microsoft® Internet Information Services 7.5 |
| | Microsoft IIS 8.0 | Microsoft® Internet Information Services 8.0 |
| | Microsoft IIS 8.5 | Microsoft® Internet Information Services 8.5 |
| Microsoft Visual C++ | | Microsoft® Visual C++® |
| Oracle | Oracle 11g | Oracle Database 11g |
| | | Oracle Database 11g R2 |
| | Oracle 12c | Oracle Database 12c |
| performance tracer | | Performance Tracer |
| SQL Server | | Microsoft® SQL Server |
| UNIX | AIX | AIX V6.1 |

| Abbreviations | | | Product name and function name |
|---|---|---|---|
| | | | AIX V7.1 |
| | Linux | Linux (x86/AMD64 & Intel EM64T) | Red Hat Enterprise Linux® 5 Advanced Platform (AMD/Intel 64) |
| | | | Red Hat Enterprise Linux® 5 (AMD/Intel 64) |
| | | | Red Hat Enterprise Linux® Server 6 (64-bit x86_64) |
| Virtage | | | Hitachi Virtage |
| VMware ESX | | | VMware vSphere ESX |
| VMware vSphere ESXi | | | VMware vSphere ESXi |
| Windows | Windows Server 2008 R2 | | Microsoft® Windows Server® 2008 R2 Standard |
| | | | Microsoft® Windows Server® 2008 R2 Enterprise |
| | | | Microsoft® Windows Server® 2008 R2 Datacenter |
| | Windows Server 2012 | | Microsoft® Windows Server® 2012 Standard |
| | | | Microsoft® Windows Server® 2012 Datacenter |
| | Windows Server 2012 R2 | | Microsoft® Windows Server® 2012 R2 Standard |
| | | | Microsoft® Windows Server® 2012 R2 Datacenter |
| | Windows 7 | Windows 7 x86 | Microsoft® Windows® 7 Professional (32 bit) |
| | | | Microsoft® Windows® 7 Enterprise (32 bit) |
| | | | Microsoft® Windows® 7 Ultimate (32 bit) |
| | | Windows 7 x64 | Microsoft® Windows® 7 Professional (64 bit) |
| | | | Microsoft® Windows® 7 Enterprise (64 bit) |
| | | | Microsoft® Windows® 7 Ultimate (64 bit) |
| | Windows 8 | Windows 8 x86 | Windows® 8 Pro (32 bit) |
| | | | Windows® 8 Enterprise (32 bit) |
| | | Windows 8 x64 | Windows® 8 Pro (64 bit) |
| | | | Windows® 8 Enterprise (64 bit) |
| | | Windows 8.1 x86 | Windows® 8.1 Pro (32 bit) |
| | | | Windows® 8.1 Enterprise (32 bit) |
| | | Windows 8.1 x64 | Windows® 8.1 Pro (64 bit) |
| | | | Windows® 8.1 Enterprise (64 bit) |
| Windows Server Failover Cluster | | | Windows Server® Failover Cluster |
| Class-wise statistics | | | Hitachi Class-wise statistics |

For each version of Linux, the following abbreviations might be used.

| Abbreviation | | OS |
|---|---|---|
| Red Hat Enterprise Linux 5 | Red Hat Enterprise Linux 5 Advanced Platform (AMD/Intel 64) | Red Hat Enterprise Linux® 5 Advanced Platform (AMD/Intel 64) |
| | Red Hat Enterprise Linux 5 (AMD/Intel 64) | Red Hat Enterprise Linux® 5 (AMD/Intel 64) |
| Red Hat Enterprise Linux Server 6 | Red Hat Enterprise Linux Server 6 (64-bit x86_64) | Red Hat Enterprise Linux® Server 6 (64-bit x86_64) |

## ■ Conventions: Acronyms

This manual also uses the following acronyms:

| Acronym | Full name or meaning |
|---|---|
| ACC | Application Client Cotainer |
| ACL | Access Control List |
| AES | Advanced Encryption Standard |
| API | Application Programming Interface |
| ASCII | American Standard Code for Information Interchange |
| BLOB | Binary Large Object |
| CA | Certificate Authority |
| CDI | Contexts and Dependency Injection |
| CGI | Common Gateway Interface |
| CMP | Container-Managed Persistence |
| CMT | Container-Managed Transaction |
| CopyGC | Copy Garbage Collection |
| CORBA | Common Object Request Broker Architecture |
| | CORBA® |
| CPU | Central Processing Unit |
| CRL | Certificate Revocation List |
| CSR | Certificate Signing Request |
| CSV | Comma Separated Value |
| CVS | Concurrent Versions System |
| DBMS | Database Management System |
| DCOM | Distributed Component Object Model |
| DD | Deployment Descriptor |
| DDE | Dynamic Data Exchange |
| DER | Distinguished Encoding Rules |
| DES | Data Encryption Standard |

| Acronym | Full name or meaning |
|---|---|
| DI | Dependency Injection |
| DLL | Dynamic Link Library |
| DMZ | Demilitarized Zone |
| DN | Distinguished Name |
| DNS | Domain Name System |
| DoS | Denial of Service |
| DSO | Dynamic Shared Object |
| DTD | Document Type Definition |
| EAR | Enterprise Archive |
| ear | |
| EIS | Enterprise Information System |
| EJB | Enterprise JavaBeans™ |
| EJB QL | EJB™ Query Language |
| EL | Expression Language |
| EUC | Extended UNIX Code |
| FQDN | Fully Qualified Domain Name |
| FullGC | Full Garbage Collection |
| G1GC | Garbage First Garbage Collection |
| GC | Garbage Collection |
| GMS | Group Management Service |
| GMT | Greenwich Mean Time |
| GUI | Graphical User Interface |
| HA | High Availability |
| HTML | Hyper Text Markup Language |
| HTTP | Hyper Text Transfer Protocol |
| HTTPS | Hyper Text Transfer Protocol Security |
| I/O | Input/Output |
| ID | Identifier |
| IDE | Integrated Development Environment |
| IEC | International Electrotechnical Commission |
| IIOP | IIOP™ |
| | Internet Inter-Orb Protocol |
| IIS | Internet Information Services |

| Acronym | Full name or meaning |
|---|---|
| IMAP | Internet Message Access Protocol |
| IP | Internet Protocol |
| IPv6 | Internet Protocol Version 6 |
| ISO | International Organization for Standardization |
| J2EE | J2EE™ |
| | Java™ 2 Platform, Enterprise Edition |
| JAAS | Java™ Authentication and Authorization Service |
| JACC | Java™ Authorization Service Provider Contract for Containers |
| JAF | JavaBeans™ Activation Framework Specification |
| JAR | Java™ Archive |
| jar | |
| JASPIC | Java™ Authentication Service Provider Interface for Containers |
| Java | Java™ |
| Java EE | Java™ Platform, Enterprise Edition |
| Java EE RI | Java EE Reference Implementation |
| Java HotSpot Client VM | Java HotSpot™ Client Virtual Machine |
| Java Platform Debugger Architecture | Java™ Platform Debugger Architecture |
| JPDA | |
| Java SE | Java™ Platform, Standard Edition |
| Java VM | Java™ Virtual Machine |
| JVM | |
| JavaMail | JavaMail™ |
| JAX-RPC | Java™ API for XML-based RPC |
| JAX-RS | Java™ API for RESTful Web Services |
| JAX-WS | Java™ API for XML-based Web Services |
| JAXB | Java™ Architecture for XML Binding |
| JAXP | Java™ API for XML Processing |
| JAXR | Java™ API for XML Registries |
| JCA | J2EE™ Connector Architecture |
| JDBC | Java™ Database Connectivity |
| | JDBC™ |
| JDK | Java™ Development Kit |
| | JDK™ |

| Acronym | Full name or meaning |
|---|---|
| JIS | Japanese Industrial Standards |
| JMS | Java™ Message Service |
| JMX | Java™ Management Extensions |
| JNDI | Java Naming and Directory Interface™ |
| JNI | Java™ Native Interface |
| JPA | Java™ Persistence API |
| JSF | JavaServer™ Faces |
| | JavaServer™ Faces Reference Implementation (RI) Version: 1.1_01 FCS |
| JSON-P | Java™ API for JSON Processing |
| JSP | JavaServer Pages™ |
| | JSP™ |
| JST | Japan Standard Time |
| JSTL | JavaServer Pages™ Standard Tag Library |
| JTA | Java™ Transaction API |
| JVMPI | Java™ Virtual Machine Profiler Interface |
| JVMTI | Java™ Virtual Machine Tool Interface |
| KVM | Kernel-based Virtual Machine |
| LAN | Local Area Network |
| LDAP | Lightweight Directory Access Protocol |
| MAC | Message Authentication Code |
| MIME | Multipurpose Internet Mail Extensions |
| OASIS | Organization for the Advancement of Structured Information Standards |
| OMG | Object Management Group |
| ORB | Object Request Broker |
| OS | Operating System |
| OTS | Object Transaction Service |
| QNAME | Qualified Name |
| REST | Representational State Transfer |
| RMI | Remote Method Invocation |
| RPC | Remote Procedure Call |
| RSA | Rivest, Shamir and Adleman |
| SAAJ | SOAP with Attachments API for Java™ |
| SAX | Simple API for XML |

| Acronym | Full name or meaning |
|---|---|
| SEI | Service Endpoint Interface |
| Servlet | Java™ Servlet |
| SHA | Secure Hash Algorithm |
| SMAP | Source Map |
| SMTP | Simple Mail Transfer Protocol |
| SOAP | Simple Object Access Protocol |
| SSH | Secure Shell |
| ssh | |
| SSL | Secure Sockets Layer |
| StAX | Streaming API for XML |
| TCP | Transmission Control Protocol |
| TLD | Tag Library Descriptor |
| TLS | Transport Layer Security |
| UCS | Universal multi-octet coded Character Set |
| UDP | User Datagram Protocol |
| URI | Uniform Resource Identifier |
| URL | Uniform Resource Locator |
| URN | Uniform Resource Name |
| UTC | Coordinated Universal Time |
| UTF | UCS Transformation Format |
| UTF-8 | 8-bit UCS Transformation Format |
| VM | Virtual Machine |
| VTL | Velocity Template Language |
| W3C | World Wide Web Consortium |
| WAR | Web Archive |
| war | |
| WBEM | Web-Based Enterprise Management |
| WSDL | Web Services Description Language |
| XML | Extensible Markup Language |

## ■ Conventions: KB, MB, GB, TB, and PB

This manual uses the following conventions:

- 1 KB (kilobyte) is 1,024 bytes.

- 1 MB (megabyte) is $1{,}024^2$ bytes.
- 1 GB (gigabyte) is $1{,}024^3$ bytes.
- 1 TB (terabyte) is $1{,}024^4$ bytes.
- 1 PB (petabyte) is $1{,}024^5$ bytes.

# Contents

# 1 How to read the Definition Reference

This chapter provides information required for reading the Definition Reference.

# 1.1 Format of explanations in the definition reference

This topic explains the format of the explanations in the definition reference.

## Items used in explanations

The items below are used in the explanations in the definition reference. Note that each explanation includes only the relevant items.

Description
: Describes the functionality.

Schema
: Describes the `schemaLocation` attribute of the DD file or the `DOCTYPE` declaration.

Syntax
: Describes how to specify a file or an item.

Storage location
: Describes the location where a file is to be stored.

Element hierarchy
: Describes the hierarchy of elements that can be specified by using the DD file.

Files to which this parameter applies
: Describes the files in which a particular parameter can be specified.

Elements to which this parameter applies
: Describes the elements for which a particular parameter can be specified.

Specifiable values
: Describes the types and range of values that can be specified.

Initial value
: Describes the value that was predefined in the system.

Default value
: Describes the value that is used by the system when no definition item or value is specified.

Dependencies of elements and attributes
: Lists the elements and attributes (if any) that depend on a particular element or attribute in the DD file.

Locations where it can be written
: Describes the location where a directive can be written. Such locations include the following:

  - `httpsd.conf`
    `VirtualHost` block, `httpsd.conf` file except the `Directory` block.
  - `<VirtualHost>`
    `VirtualHost` block of the `httpsd.conf` file.
  - `<Directory>`
    `Directory` block, `Location` block, `Files` block of the `httpsd.conf` file.
  - `.htaccess`
    Access control file specified by the `AccessFileName` directive
  - `<Location>`

Location block of the httpsd.conf file.

Additionally, a directive is referred to in the following order:

1. VirtualHost block, httpsd.conf file except the Directory block.
2. VirtualHost block of the httpsd.conf file.
3. Directory block of the httpsd.conf file.
4. Access control file.
5. Files block of the httpsd.conf file.
6. Location block of the httpsd.conf file.

By the definition (overwrite permission level) of the AllowOverride directive of a Directory block, the directive defined by the access control file can be made effective or invalid.

Overwrite permission

Describes the permission levels when overwriting by using the AllowOverride directive is enabled. The permission levels are AuthConfig, FileInfo, Indexes, Limit, Options, All, and None. For a directive for which .htaccess can be specified but no overwrite permission level is specified in the explanation of the directive, the permission level is All.

Repetition pattern

Describes whether a definition item can be repeated (specified multiple times) and, if so, how many times.

Specifiable subelements

Describes the subelements that can be specified for an element. The specifiable values, default value, dependencies, and occurrence pattern are explained for each subelement.

Specifiable attributes

Describes the attributes that can be specified for an element. The specifiable values, default value, dependencies, and occurrence pattern are explained for each attribute.

About the name and value attributes of the property element

Specify the name and value attributes of the property element in the following format:

```
<property name="property_name" value=property_value>
```

For details on the property name and value, see the description in "Specifiable properties" or the standard specifications for Java EE.

If the same property name is specified more than once, the last specified property value is set as the valid value.

Specifiable properties

Describes the properties that can be specified for an element attribute. The specifiable values, default value, dependencies, and occurrence pattern are explained for each property.

Examples

Provides output examples or examples of how to specify files or items.

Notes

Provides cautionary notes on defining files or items.

## 1.2 Symbols used in the Definition Reference

This section describes the meaning of symbols used in the Definition Reference.

The following table describes the various symbols used in the *Definition Reference*.

| Symbols | Meaning |
|---|---|
| `\|` | Indicates that items are separate, when multiple items are arranged side-by-side. This symbol means OR.<br>Example: `A\|B`<br>This example indicates that you need to specify either A or B. |
| `{ }` | Indicates that you need to select one of the items from among the multiple items enclosed within these symbols. If the items are listed side-by-side and separated by the symbol `\|`, you can select one of the listed items.<br>Example: `{A\|B\|C}`<br>This example indicates that you need to specify A or B or C. |
| `[ ]` | Indicates that the items enclosed in the symbols can be omitted. If multiple items enclosed within these symbols are written horizontally, you can ignore all the items or select one of them (the same as with the symbols `{ }`).<br>Example 1: `[A]`<br>This example indicates that you do not need to specify anything, or you can specify `A`.<br>Example 2: `[B\|C]`<br>This example indicates that you do not need to specify anything, or you can specify `B` or `C`. |
| `...` | Indicates that description is omitted. Alternatively, it indicates that the item specified before "..." can be specified multiple times.<br>Example 1: `ABC...`<br>This example indicates that there is a description after `ABC`, and the description is omitted.<br>Example 2: `A, B, B, ...`<br>This example indicates that, after you specify `A`, `B`, you can specify `B` as many times as necessary. |
| *item* | Items that are in italics indicate corresponding files or elements that are specified or the corresponding elements that are displayed.<br>Example 1: *`property`*<br>This example indicates that a property is to be written here, or a property is displayed here.<br>Example 2: *`file-name`*<br>This example indicates that a file name here is specified here. |

## 1.3 Syntax elements used in the Definition Reference

This section describes the meaning of syntax elements used in the Definition Reference.

The following table describes the syntax elements used in the *Definition Reference*.

| Syntax element | Definition |
|---|---|
| Numbers | `0` to `9` |
| Alphanumeric characters | `A` to `Z`, `a` to `z`, `0` to `9` |

Note:

Make sure that you use half-width characters.

# 2 Definition files and items used on the web servers

This chapter describes the definition files and items used to configure the operating environment of the web server.

# 2.1 List of definition files and definition items used by the web server

This topic provides a summary of the definition files and definition items used to configure the operating environment of the web server.

## Definition files used by the web server

| Definition file | Overview | Details |
|---|---|---|
| 2.2 httpsd.conf | File for configuring the operating environment of the web server | Defines the operating environment of the web server by the multiple directives. The system administrator manages these directives. |
| 2.4 mime.types | File for defining the relationship between file extensions and content types | Defines the relationship between file extensions and content types (MIME types). This file is managed by the system administrator. |
| 2.5 Access control file | File for defining access control | Defines access control. By creating the access control file (`.htaccess`) in a specific directory, you can specify an access permission for the directory. |

## Definition items (directives) used by the web server

| Definition item (directive) | Overview | Details |
|---|---|---|
| 2.3.1 <Directory> | Definition of the directives that are applied only for a specific directory | Specifies directives that are applied only for a specific directory. |
| 2.3.2 <DirectoryMatch> | Definition of the directives that are applied only for directories that meet conditions specified by using regular expressions | Specifies directives that are applied only for directories that meet conditions specified by using regular expressions. |
| 2.3.3 <Files> | Definition of the directives that are applied only for a specific file | Specifies directives that are applied only for a specific file. |
| 2.3.4 <FilesMatch> | Definition of the directives that are applied only for files that meet conditions specified by using regular expressions | Specifies directives that are applied only for files that meet conditions specified by using regular expressions. |
| 2.3.5 <IfModule> | Definition of the directives that are applied only if the specified module is embedded. | If the specified module is embedded, the directive specified within the block are applied. If `!` is added before the module name, when the specified module is not embedded, the directive specified within the block are applied. No restriction exists on the directive that can be specified within the block. |
| 2.3.6 <Limit> | Definition of the directives that are applied only for specific HTTP protocol methods | Specifies directives for access control that are applied only for specific HTTP protocol methods. |
| 2.3.7 <Location> | Definition of the directives that are applied only for a specific URL | Specifies directives that are applied only for a request sent to a specific URL. |
| 2.3.8 <LocationMatch> | Definition of the directives that are applied only for the requests sent to the URLs that meet conditions specified by using regular expressions | Specifies directives that are applied only for the requests sent to the URLs that meet conditions specified by using regular expressions. |
| 2.3.9 <Proxy> | Definition of the allocation destination used in a load balancer configuration | Specifies directives that define the `BalancerMember` directive, if you are using a reverse proxy in a load balancer configuration by using `mod_proxy_balancer`. |

| Definition item (directive) | Overview | Details |
|---|---|---|
| 2.3.10 <VirtualHost> | Definition of the directives that are applied only for a specific host or IP address | Specifies directives that are applied only for requests sent to the host specified in *host_name* or in *IP_address*[:*port_number*]. |
| 2.3.11 AccessFileName | Definition of the name of the file that defines the access control directives (access control file) | Specifies the name of the file that defines the access control directives (access control file). |
| 2.3.12 Action | Execution of a CGI script on the content specified by a specific MIME type or handler | Specifies the CGI script name of the script to be executed when the content specified in the MIME type or the handler is requested from the web browser. |
| 2.3.13 AddAlt | Specification of the character string associated with the file extension to be displayed instead of the icon when the directory index is displayed | To be specified when you want to display character strings associated with the file specified by the extension when the directory index is displayed. |
| 2.3.14 AddAltByEncoding | Specification of the character string associated with the MIME encoding to be displayed instead of the icon when the directory index is displayed | To be specified when you want to display character strings associated with the MIME encoding (for example, `x-compress`) when the directory index is displayed in an environment where icons cannot be displayed. |
| 2.3.15 AddAltByType | Specification of the character string associated with the MIME type to be displayed instead of the icon when the directory index is displayed | To be specified when you want to display character strings associated with the MIME type (for example, `text/html`) when the directory index is displayed in an environment where icons cannot be displayed. |
| 2.3.16 AddCharset | Specification of a character set for a file extension | Specifies a character set for a file extension. |
| 2.3.17 AddDefaultCharset | Specification of the default character set for a file extension | Specifies the default character set for a file extension, when Content-Type is `text/plain` or text `html`. |
| 2.3.18 AddDescription | Specification the description of a file to be displayed when the directory index is displayed and formatted | To be specified when you want to display a descriptive character string for one of the following items specified by the file name when the directory index is displayed and formatted: a file extension, a file name using wildcards, or a full file name without path information |
| 2.3.19 AddEncoding | Specification of the association between the compression format and the extension necessary for the web browser to display the compressed data on the web server | Specifies the association between the compression format and the extension necessary for the web browser to display the compressed data on the web server. |
| 2.3.20 AddHandler | Definition of the association between a handler and the file extensions to be processed by the handler | Defines the association between a handler and the file extensions to be processed by the handler. |
| 2.3.21 AddIcon | Display of the icon associated with the extension when the directory index is displayed and formatted. | To be specified when you want to display the directory index icon associated with the extension |
| 2.3.22 AddIconByEncoding | Display of the icon associated with a MIME encoding when the directory index is displayed and formatted. | To be specified when you want to display an icon associated with a MIME encoding when the directory index is displayed and formatted. |
| 2.3.23 AddIconByType | Display of the icon associated with a MIME type when the directory index is displayed and formatted. | To be specified when you want to display an icon associated with a MIME type when the directory index is displayed and formatted. |
| 2.3.24 AddLanguage | Specification of the language to be used in documents | Specifies the language to be used in documents. |

| Definition item (directive) | Overview | Details |
|---|---|---|
| 2.3.25 AddType | Association between the extension and the MIME type of the content that is not defined in the file specified in the `TypesConfig` directive. | To be specified when you want to associate the extension and the MIME type of the content that is not defined in the file specified in the `TypesConfig` directive. |
| 2.3.26 Alias | Specification of another name to replace a URL to a file system path | Specifies another name to replace the specific URL requested from a web browser. |
| 2.3.27 AliasMatch | Specification of a regular expression to replace the URL to a file system path | Specifies the new path to replace the URL requested from a web browser. |
| 2.3.28 Allow | Specification of the clients who are permitted to access the web server | To be specified when you want to restrict the clients who can access the web server.<br>You can specify the domain name, IP address, subnet, and netmask of the hosts that are permitted access for the host |
| 2.3.29 AllowOverride | Specification of whether to overwrite the access information definitions in the file specified in the `AccessFileName` directive | Specifies specifies the file specified in the `AccessFileName` directive has permission to overwrite the access information definition. |
| 2.3.30 AuthBasicAuthoritative | Specification of the control method when user authentication is performed | Specifies the control method when user authentication is performed. |
| 2.3.31 AuthGroupFile | Specification of the name of the file that stores the list of groups to be authenticated when user authentication is performed by groups | Specifies the name of file that stores the list of groups to be authenticated when user authentication is performed by groups |
| 2.3.32 AuthName | Specification of the realm name when user authentication is performed | Specifies the realm name (which is displayed in the user authentication window for the web browser) when user authentication is performed. |
| 2.3.33 AuthType | Specification of the authentication control type when user authentication is performed. | Specifies the authentication control type when user authentication is performed. |
| 2.3.34 AuthUserFile | Specification of the name of the file that stores the list of user names and passwords to be authenticated when user authentication is performed by user names | If you want to authenticate users by their user names, specify the name of the file that stores the list of user names and passwords to be authenticated. |
| 2.3.35 BalancerMember | Specification of the URL of the forwarding destination when using the reverse proxy in a load balancer configuration | Specifies the URL of the forwarding destination if you want to use the reverse proxy in a load balancer configuration by using `mod_proxy_balancer`. |
| 2.3.36 BrowserMatch | Setting of the environment variables for each web browser | Sets the environment variables for each web browser. |
| 2.3.37 BrowserMatchNoCase | Setting of the environment variables for each web browser | Sets the environment variables for each web browser. |
| 2.3.38 CacheNegotiatedDocs | Specification of whether to enable the cache on the client side by using a request for content negotiation | Specifies whether to enable the cache on the client side by using a request for content negotiation. |
| 2.3.39 CoreDumpDirectory | Specification of the directory for dumping cores | Specifies the directory for dumping cores. |
| 2.3.40 CustomLog | Specification of the output format of the access log | Specifies for the log to be output to a file in the specified format. |

| Definition item (directive) | Overview | Details |
|---|---|---|
| 2.3.41 DefaultIcon | Specification of the icon to be displayed when no specific icon is set in the directory index | Specifies the icon to be displayed in the directory index. |
| 2.3.42 DefaultLanguage | Specification of the default language to be used in the document | Specifies the default language to be used in the document. |
| 2.3.43 Deny | Specification of the clients who are prohibited to access the web server | Specifies this directive when you want to restrict the clients who can access the web server.<br>You can specify the domain name, IP address, subnet, and netmask of the hosts that are permitted access for the host |
| 2.3.44 DirectoryIndex | Specification of the content file that is to be sent to the client by default | Specifies the file name of the content to be sent to the client by default when no specific content is specified in the request from the web browser. |
| 2.3.45 DocumentRoot | Specification of the document root directory for storing the content | Specifies the absolute path of the document root directory for storing the content. |
| 2.3.46 ErrorDocument | Customization of the message to be displayed in the web browser when an error occurs | To be specified when you want to customize the message to be displayed in the web browser when an error occurs. |
| 2.3.47 ErrorLog | Specification of the output destination of error logs | Specifies the name of the file to which the error log is to be output. The content of the output logs can be selected by using the `LogLevel` directive. |
| 2.3.48 ExpiresActive | Specification of whether to add a response header related to the expiration date functionality | Specifies whether to add the Expires header or the Cache-Control header to the response. |
| 2.3.49 ExpiresByType | Specification of the expiration date for MIME-type documents | Specifies the expiration date for documents of the specified MIME type when the Expires header or the Cache-Control header is added to the response. |
| 2.3.50 ExpiresDefault | Specification of the default expiration date | Specifies the default expiration date when the Expires header or the Cache-Control header is added to the response. |
| 2.3.51 ExtendedStatus | Specification of whether to display the extended status information of each request when the status information is displayed | Specifies whether to display the extended status information in the status display format used by the `server-status` handler. |
| 2.3.52 FileETag | Specification of the attribute value of the file used for creating the `ETag` response header field | Specifies the file attribute value to be used for creating the `ETag` response header field. |
| 2.3.53 ForceType | Specification of the MIME type used for all content under a specific directory | Specifies the MIME type to be defined for the `<Directory>` block or the access control file, and to be used for all content under a specific directory. |
| 2.3.54 Group | Specification of the group name to be used when the server process is running | Specifies the group name to be used when the server process is running. |
| 2.3.55 Header | Customization of the response header for responses to a 200-series status code | To be specified when you want to customize the response header for responses to a 200-series status code. When the backend web server is used as a reverse proxy, the response header is customized regardless of the value of the status code returned by the backend web server. |
| 2.3.56 HeaderName | Specification of the file containing the comments to be appended to the header when the directory index is displayed | Specifies the name (without path information) of the file containing the comments to be appended to the header when the directory index is displayed. |

| Definition item (directive) | Overview | Details |
|---|---|---|
| 2.3.57 HostnameLookups | Specification of whether to perform reverse DNS lookup to look up host names | Specifies whether to perform reverse DNS lookup to convert the IP address of the client that is output to the `REMOTE_HOST` environment variable and CGI log file, to a host name. |
| 2.3.58 HWSErrorLogClientAddr | Changing of the client address that is output to the error log, to the value of the X-Forwarded-For header | To be specified on the backend server when you want the message text "[client client_address:port_number]" that is output to the error log, to be changed to "[X-Forwarded-For X-Forwarded-For header_value]". |
| 2.3.59 HWSGracefulStopLog | Specification of whether information about the requests that were forcibly stopped during scheduled downtime, is to be output to the error log file | Specifies whether information about the requests that were forcibly stopped after the forced-stop wait time elapsed during scheduled downtime, is to be output to the error log file. |
| 2.3.60 HWSGracefulStopTimeout | Specification of the wait time before the requests being executed are forcibly stopped during scheduled downtime | Specifies the forced-stop wait time (in seconds), before the requests being executed are stopped, during scheduled downtime. |
| 2.3.61 HWSImapMenuCharset | Specification of the character set for the menu display | Specifies the character set for the menu display. |
| 2.3.62 HWSKeepStartServers | Specification of whether to maintain the number of running server processes as specified in the `StartServers` directive | Specifies whether to maintain the number of running server processes as specified in the `StartServers` directive. |
| 2.3.63 HWSLogSSLVerbose | Specification of whether to display the detailed information for errors output to the log during the SSL handshake processing | Specifies whether to display the detailed information for `info`-level and `error`-level errors that are output to the log during the SSL handshake processing between the client and the server. If you want to enable SSL, we recommend that you set this directive to `On`. |
| 2.3.64 HWSLogTimeVerbose | Specification of whether to display the time to the millisecond when information is output to the log | Specifies whether to display, to the millisecond, the timestamps of the error log and the request log, the access time of the access log, the time taken for the request processing (`%T`), and the time when the request processing was started (`%t`). |
| 2.3.65 HWSPrfId | Specification of the character string that was specified in the PRF identifier when the PRF daemon started | Specifies the character string that was specified in the PRF identifier when the PRF daemon started. |
| 2.3.66 HWSProxyPassReverseCookie | Conversion of the Set-Cookie header that was received from the backend server when a reverse proxy is used | When a reverse proxy is being used, the reverse proxy converts the Set-Cookie header that was received from the backend server. After the web browser receives the Set-Cookie header, the header must be converted to enable cookies to be sent, for requests to the backend server via the reverse proxy. |
| 2.3.67 HWSRequestLog | Specification of the output destination of the request log | Specifies the name of the file to which the request log is to be output. |
| 2.3.68 HWSRequestLogType | Specification of the trace type to be output to the request log | Specifies the trace type to be output to the request log that is set in the `HWSRequestLog` directive. |
| 2.3.69 HWSSetEnvIfIPv6 | Setting of an environment variable by using the *IPv6_address* of the client or server | Defines an environment variable by using the *IPv6_address* of the client or the server. |
| 2.3.70 HWSSuppressModuleTrace | Suppression of the output of the module trace | Specifies the module file name and function type that suppress the output of module trace. |
| 2.3.71 HWSTraceIdFile | Specification of the name of the file that stores the shared memory ID for collecting the trace | Specifies the name of the file that stores the shared memory ID for collecting the trace. |

| Definition item (directive) | Overview | Details |
|---|---|---|
| 2.3.72 HWSTraceLogFile | Specification of the name of the file where the trace collected to the shared memory is output when the server process ends abnormally | Specifies the name of the file where the trace collected to the shared memory is output when the server process ends abnormally. |
| 2.3.73 IdentityCheck | Specification of whether to check the client by using the `identd` daemon of the client host | Specifies whether to check the client by using the `identd` daemon of the client host. |
| 2.3.74 ImapBase | Specification of the default value for the base line of the image map file | Specifies the default value for the base line of the image map file. |
| 2.3.75 ImapDefault | Specification of the default value for the default line of the image map file | Specifies the default value for the default line of the image map file. |
| 2.3.76 ImapMenu | Specification of the menu display | Specifies the menu display when `map` is specified for the value of the image map file or when the mouse is pointing to the coordinate (0,0) in the image map file. This item also defines the menu display when the image map file is requested without any coordinate specification. |
| 2.3.77 Include | Specification of the file that is to be used as a configuration file | Enables the file specified in *file_name* to be used as a configuration file. |
| 2.3.78 IndexIgnore | Specification of the file names that are not to be displayed in the web browser when the directory index is displayed | Specifies the file names that are not to be displayed in the web browser when the directory index is displayed. This item can also be specified by using regular expressions. |
| 2.3.79 IndexOptions | Setting of the option of the function that formats and displays the directory index | Sets the option of the function that formats and displays the directory index |
| 2.3.80 IndexOrderDefault | Specification of the default order in which files are displayed in the directory index | Specifies the default order in which files are displayed in the directory index. |
| 2.3.81 KeepAlive | Specification of whether to enable KeepAlive connections | Specifies whether to enable KeepAlive connections. |
| 2.3.82 KeepAliveTimeout | Specification of the request wait time when using a KeepAlive connection | Specifies the request wait time (in seconds) when using a KeepAlive connection. |
| 2.3.83 LanguagePriority | Specification of the order of priority when the client does not specify the priority of the language to be used | Specifies the languages to be used, in order of priority starting from those of high priority. |
| 2.3.84 LimitRequestBody | Specification of the upper limit on the size of the object body that the server can receive | Specifies the upper limit on the size of the body (data) when the server receives a request sent from the web browser via HTTP communication. |
| 2.3.85 LimitRequestFields | Specification of the upper limit on the number of the HTTP headers that the server can receive | Specifies the upper limit on the number of the HTTP headers when the server receives a request sent from the web browser via HTTP communication. |
| 2.3.86 LimitRequestFieldsize | Specification of the upper limit on the size of a single HTTP header that the server can receive | Specifies the upper limit on the size of a single HTTP header when the server receives a request sent from the web browser via HTTP communication. |
| 2.3.87 LimitRequestLine | Specification of the upper limit on the length of the request line that the server can receive | Specifies the upper limit on the length of the request line (method, URI including the inquiry string, and HTTP version) when the server receives a request sent from the web browser via HTTP communication. |
| 2.3.88 Listen | Specification of the IP address and port number that accept the request | Specifies the IP address and the port number that accept the request. |

| Definition item (directive) | Overview | Details |
|---|---|---|
| 2.3.89 ListenBacklog | Specification of the upper limit on the number of connection requests from the client that can be kept in the queue | Specifies the upper limit on the number of connection requests from the client that can be kept in the queue. |
| 2.3.90 LoadFile | Specification of the object file or library that contains a code referenced by a module embedded by DSO | Specifies the object file or library that contains a code referenced by a module embedded by DSO. |
| 2.3.91 LoadModule | Specification of the module that is dynamically embedded into the web server | Specifies the module to be dynamically embedded into the web server. |
| 2.3.92 LogFormat | Definition of a label name for the log format | Defines a label name for the log format. The label name defined by this item can be specified in the `CustomLog` directive. |
| 2.3.93 LogLevel | Specification of the level of the errors to be output to the error log | Specifies the level of the errors to be output to the error log Errors of levels higher than the specified level will be output to the log. |
| 2.3.94 MaxConnectionsPerChild | Specification of the number of times that request processing is to be performed by the server process | Specifies the number of times that request processing is to be performed by the server process. The server process performs request processing no more than number of the times specified by this item, and then ends the processing. |
| 2.3.95 MaxKeepAliveRequests | Specification of the upper limit on the number of continuous KeepAlive connections | Specifies the upper limit on the number of continuous KeepAlive connections |
| 2.3.96 MaxRequestWorkers | Specification of the upper limit on the number of clients that can be connected at the same time | Specifies the upper limit on the number of clients that can be connected at the same time. |
| 2.3.97 MaxSpareServers | Specification of the upper limit on the number of server processes that can be running in the request waiting status | Specifies the upper limit on the number of server processes that can be running in the request waiting status. |
| 2.3.98 MinSpareServers | Specification of the lower limit on the number of server processes that must be running in the request waiting status | Specifies the lower limit on the number of server processes that must be running in the request waiting status. When the number of server processes falls below this value, a new process is generated. |
| 2.3.99 MultiviewsMatch | Specification of the type of extension that is the target of content negotiation | Specifies the type of extension that is the target of content negotiation. |
| 2.3.100 Options | Restrictions on the functions that users can use | To be specified when you want to restrict the functions that the users can use. |
| 2.3.101 Order | Specification of the order in which the specifications of the `Allow` directive and the `Deny` directive are evaluated | Specifies the order in which the specifications of the `Allow` directive and the `Deny` directive are evaluated. |
| 2.3.102 PassEnv | Specification of the environment variable to be passed to the CGI script | Specifies an environment variable to be passed to the CGI script. |
| 2.3.103 PidFile | Specification of the file for storing the control process ID | Specifies the file for storing the control process ID. |
| 2.3.104 ProxyErrorOverride | Specification of whether to overwrite the response from the backend server if the response is an error status code | Overrides the response header and response body when the backend server returns a 400-series or 500-series status code. As a result, the reverse proxy generates and returns a response to the client, instead of returning the response from the backend server. |
| 2.3.105 ProxyPass | Specification of the request and address to be transferred to the backend server | Specifies the request from the web browser and the address from which the request was sent, when a reverse proxy is used. |
| 2.3.106 ProxyPassReverse | Change of the URL in the Location header received from the backend server | Changes the URL indicated by the Location header in the redirect response from the backend server, when a reverse proxy is used. |

| Definition item (directive) | Overview | Details |
|---|---|---|
| 2.3.107 ProxyPreserveHost | Specification of whether the value of the Host header received from the client is to be transferred to the backend server | Specifies whether the value of the Host header received from the client is to be transferred to the backend server, when a reverse proxy is used. |
| 2.3.108 ProxyTimeout | Specification of the wait time for transmission to or from the backend server | Specifies the wait time (in seconds) for transmission to or from the backend server. |
| 2.3.109 ProxyVia | Control of the use of the Via header | To be specified when you want to control the use of the Via header on the proxy. |
| 2.3.110 QOSCookieDomain | Specification of the domain where the cookie used by the flow control functionality is enabled | Specifies the domain where the cookie used by the flow control functionality is enabled. This value is used in HWS creation mode but not in user creation mode. |
| 2.3.111 QOSCookieExpires | Specification of the amount of time for which the cookie used by the flow control functionality is enabled | Specifies the amount of time (in seconds) for which the cookie used by the flow control functionality is enabled. The value specified in this directive is used in HWS creation mode, but not in user creation mode. |
| 2.3.112 QOSCookieName | Specification of the name of the cookie used by the flow control functionality | Specifies the name of the cookie used by the flow control functionality. |
| 2.3.113 QOSCookieSecure | Specification of whether to send a cookie only when SSL access occurs | Specifies whether to send a cookie to the client only when SSL access occurs. This value is used in HWS creation mode but not in user creation mode. |
| 2.3.114 QOSCookieServers | Specification of the number of server processes when only the requests that send cookies are being processed | Specifies the number of server processes when only the requests that send cookies are being processed, if the number of server processes in the request waiting status decreases. |
| 2.3.115 QOSRedirect | Redirection of requests rejected by the flow control functionality | To be specified when requests from the client are to be redirected to the specified path when request processing is rejected by the flow control functionality. |
| 2.3.116 QOSRejectionServers | Specification of the number of server processes when all received requests are being rejected | Specifies the number of server processes when the number of server processes in the request waiting status decreases and all received requests are being rejected. |
| 2.3.117 QOSResponse | Specification of the content to be returned as the response when processing is rejected by the flow control functionality | Specifies the content to be returned with the status code 503 when processing is rejected by the flow control functionality. |
| 2.3.118 ReadmeName | Specification of the file containing the comments to be appended as Readme when the directory index is displayed | Specifies the name (without path information) of the file containing the comments to be appended as Readme when the directory index is displayed. |
| 2.3.119 Redirect | Specification for redirecting requests from clients | To be specified when the requests sent from clients to the old path are to be redirected to a new path. |
| 2.3.120 RedirectMatch | Specification for redirecting requests from clients that meet conditions specified by using regular expressions | To be specified when the requests sent from clients to paths that meet conditions specified by using regular expressions are to be redirected to a new path. |
| 2.3.121 RequestHeader | Customization of the request header | To be specified when you want to customize the header value received from the client. |
| 2.3.122 RequestReadTimeout | Specification of the timeout time from the start of the reception of the request, to the end of the reception of the request header, and from the start of the reception of the request body to the end | Specifies the timeout time (in seconds) from the start of reception of requests to the end of reception of the request header, and from the start of reception of the request body to the end. |

| Definition item (directive) | Overview | Details |
|---|---|---|
| 2.3.123 Require | Definitions for access restriction | Defines access restriction. This item is to be specified with the following directives: `AuthName`, `AuthType`, and `AuthUserFile` (or `AuthGroupFile`). |
| 2.3.124 Satisfy | Specification of the conditions for access when access to content is restricted both by user authentication, and by host name or IP address | Specifies the conditions for access when access to content is restricted both by user authentication (for example, by specifying the `AuthUserFile` or `Require` directive) and by host name or IP address (for example, by specifying the `Allow from` or `Deny from` directive). |
| 2.3.125 Script | Execution of a CGI script for a specific method | Executes the script specified by *cgi_script_name* when a request is made by using the specified method. |
| 2.3.126 ScriptAlias | Specification of the URL for executing a CGI program and the name of the directory where the CGI program is located | Specifies the name of the directory containing the CGI program to be executed for requests to execute the CGI program specified by URL, that are received from the web browser. |
| 2.3.127 ScriptAliasMatch | Specification of a regular expression for the URL for executing a CGI program and the name of the directory where the CGI program is located | Executes the CGI program in the specified new path when the URL of a request to execute the CGI program specified from the web browser meets conditions specified by using regular expressions. |
| 2.3.128 ScriptLog | Specification of the output destination of the error log for the CGI script | Specifies the file to which the error log for the CGI script is output. |
| 2.3.129 ScriptLogBuffer | Specification of the maximum value when the log for the request body is obtained | Specifies the maximum value (in bytes) when the log for the body of a request made by the `PUT` or `POST` method is obtained. This specification applies only when the `ScriptLog` directive is used to specify the file to which the error log is output. |
| 2.3.130 ScriptLogLength | Specification of the maximum size of the error log file for the CGI script | Specifies the maximum size (in bytes) of the error log file for the CGI script. This specification applies only when the `ScriptLog` directive is used to specify the file to which the error log is output. |
| 2.3.131 SendBufferSize | Specification of the TCP transmission buffer size of the web server | Specifies the TCP transmission buffer size (in bytes) of the web server. |
| 2.3.132 ServerAdmin | Specification of the email address of the server administrator | Specifies the email address of the server administrator. Be sure to specify this if you want to specify the email address in the `ServerSignature` directive. |
| 2.3.133 ServerAlias | Specification of the alias for the host name to be used by the virtual host based on the server name | Specifies the alias for the host name to be used by the virtual host based on the server name (`ServerName`). You can also specify a host name corresponding to an IPv6 address. |
| 2.3.134 ServerName | Specification of the server name and port number of the web server | Specifies the server name and the port number of the web server. |
| 2.3.135 ServerPath | Specification of the path name to connect to each host by using the path name instead of the Host header, for the virtual host based on the server name | To be specified when you want to connect to each host by using the path name instead of the Host header for the virtual host based on the server name. |
| 2.3.136 ServerRoot | Specification of the root directory of the server | Specifies the absolute path of the root directory of the server. |
| 2.3.137 ServerSignature | Specification of whether to add a signature to the footer of content such as error messages created by the web server | Specifies whether to add a signature to the footer of content such as error messages created by the web server. |
| 2.3.138 ServerTokens | Specification of the format of the Server header | Specifies the format of the Server header of the HTTP response header. |

| Definition item (directive) | Overview | Details |
|---|---|---|
| 2.3.139 SetEnv | Specification of the values of the environment variables to be passed to the CGI script | Specifies values for the environment variables to be passed to the CGI script. If you specify this directive more than once, you cannot specify different values for the same environment variable. |
| 2.3.140 SetEnvIf | Definition of an environment variable based on a request from the client | Sets the specified environment variable when the value of the request from the client meets conditions specified by using regular expressions. |
| 2.3.141 SetEnvIfNoCase | Definition of an environment variable based on a request from the client | Sets the specified environment variable when the value of the request from the client meets conditions specified by using regular expressions. |
| 2.3.142 SetHandler | Specification of the name of the handler to which requests are to be associated | Specifies the name of the handler to which all requests within the scope of the specified `<Directory>` or the access control file are to be associated. |
| 2.3.143 SSLBanCipher | Specification to reject access of the specified encryption type and to send the status code "403 Forbidden" | Rejects access of the specified encryption type and sends the status code "403 Forbidden" to the client. |
| 2.3.144 SSLCACertificateFile | Specification of the CA certificate file | Specifies the name of the public key file (in PEM format) of the CA (certificate authority) when SSL is used to authenticate the server and the client. You can concatenate multiple certificate files so that one file contains multiple certificates. |
| 2.3.145 SSLCACertificatePath | Specification of the directory containing the hash link to the certificate of the CA | Specifies the directory containing the hash link to the certificate (in PEM format) of the CA when SSL is used to authenticate the server and the client. |
| 2.3.146 SSLCacheServerPath | Specification of the path name to the SSL session management cache server "gcache" | Specifies the path name to the SSL session management cache server "gcache". |
| 2.3.147 SSLCacheServerPort | Specification of the port number or path name for exchanging data between the web server and the SSL session management cache server "gcache" | Specifies the port number or path name for exchanging data between the web server and the SSL session management cache server "gcache". |
| 2.3.148 SSLCacheServerRunDir | Specification of the path name on which the SSL session management cache server "gcache" is running | Specifies the path name on which the SSL session management cache server "gcache" is running. |
| 2.3.149 SSLCertificateFile | Specification of the web server certificate file for SSL authentication | Specifies the name of the web server certificate file (in PEM format) for SSL authentication. |
| 2.3.150 SSLCertificateKeyFile | Specification of the public key file on the web server for SSL authentication | Specifies the name of the public key file on the web server for SSL authentication. |
| 2.3.151 SSLCertificateKeyPassword | Specification of the file for storing the passwords of password-protected server public keys | Specifies the path name of the file for storing the passwords of password-protected server public keys. |
| 2.3.152 SSLCRLAuthoritative | Specification of the operation when the date of the next CRL issuance passes | Specifies how to handle the next issuance date of the CRL to be used for SSL client authentication. |
| 2.3.153 SSLCRLDERPath | Specification of the directory that contains CRLs in DER format | Specifies the absolute path of the directory that contains CRLs in DER format. If you store the required CRLs in the specified directory and then start or restart the web server, the CRLs can be used for SSL client authentication. If the directory contains multiple CRLs issued by the same CA (including the CRLs in the directory specified in the `SSLCRLPEMPath` directive), the CRL that has the most recent issuance date is used. |

| Definition item (directive) | Overview | Details |
|---|---|---|
| 2.3.154 SSLCRLPEMPath | Specification of the directory that contains CRLs in PEM format | Specifies the absolute path of the directory that contains CRLs in PEM format. If you store the required CRLs in the specified directory and then start or restart the web server, the CRLs can be used for SSL client authentication. If the directory contains multiple CRLs issued by the same CA (including the CRLs in the directory specified in the `SSLCRLDERPath` directive), the CRL that has the most recent issuance date is used. |
| 2.3.155 SSLDenySSL | Prohibition of access by SSL | To be specified to prohibit access by SSL. If this directive is specified, the status code "403 Forbidden" is issued and access by https is rejected even if the `SSLEnable` directive is used to enable SSL. This item is the opposite of the `SSLRequireSSL` directive. |
| 2.3.156 SSLDisable | Specification to disable SSL | Disables SSL. SSL is enabled by default (or by specification of the `SSLEnable` directive). This item is to be specified, for example, to disable SSL on a specific host on a virtual host. |
| 2.3.157 SSLEnable | Specification to enable SSL | Enables SSL. SSL is enabled by default (unless the `SSLDisable` directive is specified, SSL is enabled). |
| 2.3.158 SSLExportCertChainDepth | Specification for the certificates from the CA that issued the client certificate, to those from the root CA, to be set for the environment variable `SSL_CLIENT_CERT_CHAIN_`*n* | Specifies for the certificates from the CA that issued the client certificate to those from the root CA, to be set for the environment variable `SSL_CLIENT_CERT_CHAIN_`*n* for SSL client authentication. |
| 2.3.159 SSLExportClientCertificates | Specification to set a client certificate for the environment variable `SSL_CLIENT_CERT` | Specifies for a client certificate to be set for the environment variable `SSL_CLIENT_CERT` for SSL client authentication. Set the value derived by changing the DER certificate to Base64 encoding, for the environment variable `SSL_CLIENT_CERT`. |
| 2.3.160 SSLFakeBasicAuth | Basic authentication using a client certificate | Along with SSL client authentication, this item enables Basic authentication by using only the client certificate, even if the user ID and the password are not entered in the web browser. The file specified in the `AuthUserFile` directive must contain the `Subject` and the password for the X509 client certificate. |
| 2.3.161 SSLProtocol | Specification of the SSL protocol version to be used | Specifies the SSL protocol version to be used. |
| 2.3.162 SSLRequireCipher | Specification to reject access of all encryption types other than the specified type and to send the status code "403 Forbidden" | Rejects access of all encryption types other than the specified type, and sends the status code "403 Forbidden" to the client. |
| 2.3.163 SSLRequiredCiphers | Specification of the encryption types that can be used for SSL communication | Specifies the encryption types that can be used for SSL communication. If one of the encryption types specified in this directive matches one of the encryption types that can be used by the client, SSL communication can be established and HTTP requests can be received. If none of these encryption types match, SSL communication cannot be established and HTTP requests cannot be received. |
| 2.3.164 SSLRequireSSL | Prohibition of non-SSL access | To be specified to prohibit non-SSL access. If this directive is specified, the status code "403 Forbidden" is issued and http access is rejected, even when SSL is disabled by the `SSLDisable` directive. This item prevents the inadvertent disabling of SSL and inadvertent disclosure of content that might occur if other directives are incorrectly specified. |
| 2.3.165 SSLSessionCacheSize | Specification of the maximum session cache size | Specifies the maximum memory size (in bytes) for data, such as session ID information, that is to be cached in the memory in the SSL |

| Definition item (directive) | Overview | Details |
|---|---|---|
| | | session management cache server "gcache". If 0 is specified, the gcache server does not start, and no session caching is performed. |
| 2.3.166 SSLSessionCacheSizePerChild | Specification of the maximum cache size for sessions to be cached in the server process | Specifies the maximum memory size (in bytes) for data, such as session ID information, that is to be cached in the memory in the server process. |
| 2.3.167 SSLSessionCacheTimeout | Specification of the amount of time for which SSL sessions are enabled | Specifies the amount of time (in seconds) for which data, such as session ID information, that is retained on the web server or on the SSL session management cache server "gcache" is enabled. |
| 2.3.168 SSLVerifyClient | Settings related to the certificates for client authentication | Specifies the settings related to the certificates for client authentication. |
| 2.3.169 SSLVerifyDepth | Specification of the level to which certificate chains are to be tracked | Specifies the level to which certificate chains are to be tracked. |
| 2.3.170 StartServers | Specification of the number of server processes created when the web server is started | Specifies the number of server processes created when the web server is started |
| 2.3.171 Timeout | Specification of the wait time for web server transmission | Specifies the wait time (in seconds) for web server transmission. |
| 2.3.172 TraceEnable | Specification of whether to reject requests made by the `TRACE` method | Specifies whether to reject requests made by the `TRACE` method. |
| 2.3.173 TransferLog | Output of the access log in the format specified in the `LogFormat` directive without specifying the label name | Specifies the file that contains the log or the program that outputs the log. The log format can be specified in the `LogFormat` directive without the label name specification.<br>If the log format is specified in the `LogFormat` directive, IPv6 addresses and host names corresponding to IPv6 addresses can be output.<br>If the log format is not specified in the `LogFormat` directive, the log is output in the standard log format. |
| 2.3.174 TypesConfig | Specification of the configuration file that defines the relationships between file extensions and content types | Specifies the configuration file that defines the relationships between file extensions and the content types (MIME types). |
| 2.3.175 UnsetEnv | Specification to delete the environment variable specified in the `SetEnv` directive or the `PassEnv` directive, from the environment variables to be passed to the CGI script | To be specified when the environment variable specified in the `SetEnv` directive or in the `PassEnv` directive are to be deleted from the environment variables to be passed to the CGI script. |
| 2.3.176 UseCanonicalName | Specification of how to generate the formal name of the server | Specifies how to generate the formal name of the server. The formal name of the server is set to the URL that references the local server and the environment variables `SERVER_NAME` and `SERVER_PORT`. IPv6 addresses are supported for all of the following: `On`, `Off`, and `dns`. |
| 2.3.177 User | Specification of the user name when the server process is running | Specifies the user name when the server process is running. |
| 2.3.178 UserDir | Specification of the location on the server to be disclosed when the web browser issues a request to `/~user_name/` | Specifies the directory name of the location on the server to be disclosed when the web browser issues a request to `/~user_name/`. |

## Definition items (utilities) used by the web server

| Definition item (utility) | Overview | Details |
|---|---|---|
| 2.6.1 rotatelogs | Splitting the log by time | You can split the access log or the error log by time and output them to multiple files. |
| 2.6.2 rotatelogs2 | Splitting the log by file size | You can split the access log or the error log by log file size and output them to multiple files by using the "wraparound" method. |

# 2.2 httpsd.conf

`httpsd.conf` sets up the operating environment of the web server.

## Description

`httpsd.conf` defines the operating environment of the web server by the multiple directives. The system administrator manages these directives.

The definitions and directives that can be specified in the file are as follows:

| Setting details | Directive name | Can be specified multiple times |
|---|---|---|
| Definition of a block within the `httpsd.conf` file | `<Directory>` | Y |
| | `<DirectoryMatch>` | Y |
| | `<Files>` | Y |
| | `<FilesMatch>` | Y |
| | `<IfModule>` | Y |
| | `<Limit>` | Y |
| | `<Location>` | Y |
| | `<LocationMatch>` | Y |
| | `<Proxy>` | Y |
| | `<VirtualHost>` | Y |
| Basic definition of the server | `ServerName`[#1, #2] | N |
| | `User`[#1, #2] | N |
| | `Group`[#1, #2] | N |
| | `ServerAdmin` | N |
| | `ServerRoot` | N |
| | `ServerSignature` | N |
| | `Listen` | Y |
| | `LoadModule` | Y |
| | `LoadFile` | Y |
| | `Include` | Y |
| | `ExtendedStatus` | N |
| | `ServerTokens` | N |
| | `CoreDumpDirectory` | N |
| | `FileETag` | Y |
| Definition for managing content | `UserDir` | Y |

| Setting details | Directive name | Can be specified multiple times |
|---|---|---|
| | DocumentRoot | N |
| | ErrorDocument | Y |
| Definition of requests from the web browser (Alias) | Alias | Y |
| | AliasMatch | Y |
| | Redirect | Y |
| | RedirectMatch | Y |
| Definition of the MIME type | TypesConfig | N |
| | AddCharset | Y |
| | AddDefaultCharset | N |
| | AddType | Y |
| | ForceType | N |
| Definition of the content negotiation | LanguagePriority | Y |
| | AddEncoding | Y |
| | AddLanguage | Y |
| | DefaultLanguage | N |
| | CacheNegotiatedDocs | N |
| | MultiviewsMatch | N |
| Definition of the handler | AddHandler | Y |
| | SetHandler | N |
| Definition of the web server performance | StartServers | N |
| | MinSpareServers | N |
| | MaxSpareServers | N |
| | MaxRequestWorkers | N |
| | MaxConnectionsPerChild | N |
| | Timeout | N |
| | RequestReadTimeout | N |
| | ListenBacklog | N |
| | HWSKeepStartServers | N |
| | SendBufferSize | N |
| Definition of KeepAlive | KeepAlive | N |
| | MaxKeepAliveRequests | N |
| | KeepAliveTimeout | N |
| Definition of limiting requests | LimitRequestBody | N |

| Setting details | Directive name | Can be specified multiple times |
|---|---|---|
| | LimitRequestFields | N |
| | LimitRequestFieldsize | N |
| | LimitRequestLine | N |
| Definition of CGI and environment variables | ScriptAlias | Y |
| | ScriptAliasMatch | Y |
| | UseCanonicalName | N |
| | BrowserMatch | Y |
| | BrowserMatchNoCase | Y |
| | PassEnv | Y |
| | SetEnv | Y |
| | UnsetEnv | Y |
| | SetEnvIf | Y |
| | SetEnvIfNoCase | Y |
| | Action | Y |
| | Script | Y |
| | HWSSetEnvIfIPv6 | Y |
| Definition of the displayed content of the directory index | DirectoryIndex | N |
| | AddIconByEncoding | Y |
| | AddIconByType | Y |
| | AddIcon | Y |
| | DefaultIcon | N |
| | ReadmeName | N |
| | HeaderName | N |
| | IndexIgnore | Y |
| | IndexOrderDefault | N |
| | AddAltByEncoding | Y |
| | AddAltByType | Y |
| | AddAlt | Y |
| | AddDescription | Y |
| | IndexOptions | Y |
| Definition of access controls for the web browser | AccessFileName | N |
| | AllowOverride | N |
| | AuthName | N |

| Setting details | Directive name | Can be specified multiple times |
|---|---|---|
| | AuthType | N |
| | AuthGroupFile | N |
| | AuthUserFile | N |
| | AuthBasicAuthoritative | N |
| | Require | Y |
| | Options | N |
| | Order | N |
| | Allow from | Y |
| | Deny from | Y |
| | Satisfy | N |
| | TraceEnable | N |
| | IdentityCheck | N |
| Definition of encryption and authentication by SSL | SSLRequireSSL | N |
| | SSLEnable | N |
| | SSLDisable[#1] | N |
| | SSLCertificateFile[#2] | N |
| | SSLCertificateKeyFile[#2] | N |
| | SSLCACertificatePath | N |
| | SSLCACertificateFile | N |
| | SSLVerifyClient | N |
| | SSLVerifyDepth | N |
| | SSLRequiredCiphers | N |
| | SSLRequireCipher | Y |
| | SSLBanCipher | Y |
| | SSLDenySSL | N |
| | SSLFakeBasicAuth | N |
| | SSLCacheServerPort | N |
| | SSLSessionCacheTimeout | N |
| | SSLCacheServerPath | N |
| | SSLCacheServerRunDir | N |
| | SSLSessionCacheSize | N |
| | SSLSessionCacheSizePerChild | N |
| | SSLCRLAuthoritative | N |

| Setting details | Directive name | Can be specified multiple times |
|---|---|---|
| | SSLCRLDERPath | N |
| | SSLCRLPEMPath | N |
| | SSLExportCertChainDepth | N |
| | SSLExportClientCertificates | N |
| | SSLCertificateKeyPassword | N |
| | SSLProtocol | N |
| Definition for showing the web server information to multiple hosts according to the operation mode | ServerAlias | Y |
| | ServerPath | N |
| Definition of image map files | ImapDefault | N |
| | ImapBase | N |
| | ImapMenu | N |
| | HWSImapMenuCharset | N |
| Definition of the logs to be collected | HostnameLookups | N |
| | ErrorLog | N |
| | LogLevel | N |
| | LogFormat | Y |
| | CustomLog | Y |
| | TransferLog | Y |
| | PidFile | N |
| | ScriptLog | N |
| | ScriptLogBuffer | N |
| | ScriptLogLength | N |
| | HWSLogSSLVerbose | N |
| | HWSLogTimeVerbose | N |
| | HWSRequestLog | N |
| | HWSRequestLogType | N |
| | HWSSuppressModuleTrace | Y |
| | HWSErrorLogClientAddr | N |
| Definition of the traces to be collected | HWSTraceIdFile | N |
| | HWSTraceLogFile | N |
| | HWSPrfId | N |
| Definition of the reverse proxy | ProxyPass | Y |
| | ProxyPassReverse | Y |

| Setting details | Directive name | Can be specified multiple times |
|---|---|---|
| | ProxyVia | N |
| | ProxyErrorOverride | N |
| | ProxyPreserveHost | N |
| | ProxyTimeout | N |
| | HWSProxyPassReverseCookie | Y |
| | BalancerMember | Y |
| Definition of the flow restriction functionality | QOSCookieDomain | N |
| | QOSCookieExpires | N |
| | QOSCookieName | Y |
| | QOSCookieSecure | N |
| | QOSCookieServers | N |
| | QOSRedirect | Y |
| | QOSRejectionServers | N |
| | QOSResponse | N |
| Definition of the header customization functionality | Header | Y |
| | RequestHeader | Y |
| Definition of the expiration date setting functionality | ExpiresActive | N |
| | ExpiresByType | Y |
| | ExpiresDefault | N |
| Definition of planned termination | HWSGracefulStopLog | N |
| | HWSGracefulStopTimeout | N |

(Legend)

Y: Can be specified multiple times

N: Cannot be specified multiple times

#1

This directive requires a minimum value set in order to activate the web server (when not using SSL).

#2

This directive requires a minimum value set in order to activate the web server (when using SSL).

Some directives have restrictions on the locations where they can be written. The locations where each directive can be specified are indicated in "Locations where it can be written". In addition, when you want to allow directives to be overwritten, you must define the overwrite permission level in the AllowOverride directive. The overwrite permission level for each directive is indicated in "Overwrite permissions".

The following shows the content described in "Locations where it can be written" and "Overwrite permissions" for each directive:

Content described in "Locations where it can be written":

The location where each directive can be specified is given in the following format:

| Specifiable locations | Description |
|---|---|
| `httpsd.conf` | The `httpsd.conf` file, except for the `VirtualHost` block and the `Directory` block |
| `<VirtualHost>` | The `VirtualHost` block in the `httpsd.conf` file |
| `<Directory>` | The `Directory` block, `Location` block, and `Files` block in the `httpsd.conf` file |
| `.htaccess` | The access control file specified in the `AccessFileName` directive |
| `<Location>` | The `Location` block in the `httpsd.conf` file |

In addition, the directives are referenced in the following order:

1. The `httpsd.conf` file, except for the `VirtualHost` block and the `Directory` block
2. The `VirtualHost` block in the `httpsd.conf` file
3. The `Directory` block in the `httpsd.conf` file
4. The access control file
5. The `Files` block in the `httpsd.conf` file
6. The `Location` block in the `httpsd.conf` file

Depending on the definition (the overwrite permission level) of the `AllowOverride` directive in the `Directory` block, the directive defined in the access control file can be enabled or disabled.

Content described in "Overwrite permissions":

When you want the `AllowOverride` directive to allow overwrites, define the permission level.

The details of the permission levels are as follows:

- `AuthConfig` level

  Allow directives related to the access controls to the server to be overwritten. The directives that are related to the access control to the server are the `AuthGroupFile`, `AuthName`, `AuthType`, `AuthUserFile`, and `Require` directives.

- `FileInfo` level

  Allow directives related to file information (such as content management, MIME type, and encryption) to be overwritten. The directives that are related to file information are the `AddType`, `AddEncoding`, and `AddLanguage` directives.

- `Indexes` level

  Allow directives related to the directory index to be overwritten. The directives that are related to the directive index are the `FancyIndexing`, `AddIcon`, and `AddDescription` directives.

- `Limit` level

  Allow directives for access controls that use the host name or an IP address to be overwritten. The directives that are related to access controls that use the host name or an IP address are the `Allow from`, `Deny from`, and `Order` directives.

- `Options` level

  Allow the `Options` directive to be overwritten.

- `All` level

  Allow all overwrites.

- `None` level

  Prohibit all overwrites.

Note that when the description in each directive indicates that `.htaccess` is specifiable but the overwrite permission is not given, the permission level will be `All`.

## Syntax

The syntax of the directive is as follows.

Regular expression:

The following are the regular expressions that can be used for defining the directive:

| Code | Functionality | Usage example | Meaning of the usage example |
|---|---|---|---|
| `.` | Any single character | `a...c` | `a` is followed by any 3 characters, and then `c`. For example, `abcdc` matches this code. |
| `*` | The character right before this code is repeated zero or more times | `ab*cd*` | For example, `ac`, `abbbbc`, and `abbbbcd` match this code. |
| `+` | The character right before this code is repeated one or more times | `ab*c+` | For example, `abbbc` matches this code, but `abbb` does not. |
| `?` | Whether a character right before this code exists | `abbbc?` | For example, `abbbc` and `abbb` match this code. |
| `\|` | A delimiter for options | `a\|bc\|d` | `a`, `bc`, or `d` |
| `\` | A special character (`. ^$*+?\|\[]()\{\}`) comes right after this code. However, `\\\` is used to express `\`. | `\.` | For example, `.` matches this code. |
| | | `\\\` | For example, a single character `\` matches this code. |
| `^` | The characters are at the beginning of the line | `^ab` | For example, `abcde` matches this code. |
| `$` | The characters are at the end of the line | `abc$` | For example, `aaabc` matches this code. |
| `{`*m*`}` | The regular expression right before this code is repeated *m* times | `a{5}` | For example, `aaaaa` matches this code. |
| `{`*m*`,}` | The regular expression right before this code is repeated *m* or more times | `a{3,}` | For example, `aaa` and `aaaa` match this code, but `aa` does not. |
| `{`*m*`,`*n*`}` | The regular expression right before this code is repeated *m* or more times, and *n* or less times | `a{3,5}` | For example, `aaa`, `aaaa`, and `aaaaa` match this code. `aa` and `aaaaaa` do not match this code. |
| `[`*character_string*`]` | The character is in the character string# | `[abc]*` or `[a-c]*` | For example, `aaa`, `bbb`, `ccc`, `cba`, and `aab` match this code. |
| `[^`*character_string*`]` | The character is not in the character string | `[^0-9]` | Any single character other than a numerical character matches this code. |
| `(`*character_string*`)` | The character string is grouped | `(ab)+` | For example, `ababab` matches this code, but `ababb` does not. |
| | | `aa(xx\|yy)bb` | For example, `aaxxbb`, and `aayybb` match this code. |

#

The following three characters have special meanings in `[`*character_string*`]`.

^: Specify this character after the opening square bracket ([) to indicate characters that are not included in the character string.

]: This character is used to indicate the end of the character string.

-: This character is used specify a range.

In addition, backslashes (\) used before these special characters are omitted.

To use characters that have special meanings in [*character_string*] as normal characters, specify the character as below. Note that special characters other than the following four characters are treated as normal characters.

^: Specify this character anywhere except at the beginning of the character string. Example: [ab^yz]

]: Specify this character at the beginning of the character string. Example: []abxy]

-: Specify this character at the end of the character string. Example: [abxy-]

\: Specify \\\. Example: [\\\abxy]

Path information to be specified in the directive:

For directives that specify the directory name, file name, or path name, the path information that can be specified differs depending on the types of directives.

The following are the types of paths. The path information for each directive is explained in each directive.

- Absolute path.
- Relative path from the value specified in the ServerRoot directive (however, note that the ServerRoot directive must be specified in advance).

In addition, you cannot specify directories or files on the network in the path information. You cannot specify directories or files on the file system that uses the network either.

Comment line:

In the configuration file, add a hash mark (#) to the beginning of the line to make a comment line. However, if you write a character string that begins with a hash mark after the directive is specified, the characters after the hash mark will not be treated as comments.

The following shows an example of specifying a comment line:

- Correct example:

```
#Deny from all
```

The line beginning with the hash mark is treated as a comment line.

- Incorrect example:

```
Deny from all    #comment
```

The #comment part will be treated as a value specified for the directive. This will not be treated as a comment.

## Storage location

/opt/hitachi/APServer/httpsd/conf/httpsd.conf

## Example

The installation directory in the examples is /opt/hitachi/APServer/httpsd.

```
##############################################################################
##
## httpsd.conf - Hitachi Web Server configuration file
```

```
##
##  All Rights Reserved. Copyright (C) 2000, 2014, Hitachi, Ltd.
##############################################################################

Listen 80
StartServers 5
MinSpareServers 5
MaxSpareServers 10
MaxRequestWorkers 150
MaxConnectionsPerChild 10000
Timeout 60
KeepAlive On
MaxKeepAliveRequests 100
KeepAliveTimeout 3
HostnameLookups Off

User nobody
Group nogroup

ServerRoot "/opt/hitachi/APServer/httpsd"

ServerName www.example.com
DocumentRoot "/opt/hitachi/APServer/httpsd/htdocs"
#ScriptAlias /cgi-bin/ "/opt/hitachi/APServer/httpsd/cgi-bin/"
DirectoryIndex index.html
UseCanonicalName Off
ServerSignature Off
ServerTokens ProductOnly
TraceEnable Off

LogLevel info
ErrorLog "|/opt/hitachi/APServer/httpsd/sbin/rotatelogs2
 /opt/hitachi/APServer/httpsd/logs/error 8192 5"
#ErrorLog logs/error_log
HWSRequestLog "|/opt/hitachi/APServer/httpsd/sbin/rotatelogs
 /opt/hitachi/APServer/httpsd/logs/hwsrequest 86400 -fnum 8 -diff 540"
#HWSRequestLog logs/hwsrequest_log
LogFormat "%h %l %u %t \"%r\" %>s %b \"%{Referer}i\" \"%{User-Agent}i\" %I %O"
 combinedio
LogFormat "%h %l %u %t \"%r\" %>s %b \"%{Referer}i\" \"%{User-Agent}i\""
 combined
LogFormat "%h %l %u %t \"%r\" %>s %b" common
LogFormat "%{Referer}i -> %U" referer
LogFormat "%{User-agent}i" agent
LogFormat "%h %l %u %t \"%r\" %>s %b %P %{hws_ap_root}n %I %O %X %D
 \"%{Referer}i\" \"%{User-Agent}i\"" hws_trace
LogFormat "%h %l %u %t \"%r\" %>s %b %T %P %{hws_ap_root}n" hws_std
HWSLogTimeVerbose On
CustomLog "|/opt/hitachi/APServer/httpsd/sbin/rotatelogs
 /opt/hitachi/APServer/httpsd/logs/access 86400 -fnum 8 -diff 540" hws_std
#CustomLog logs/access_log hws_std
PidFile logs/httpd.pid
HWSTraceIdFile logs/hws.trcid
HWSTraceLogFile logs/hws.trclog

SSLDisable
#SSLEnable
#SSLCertificateFile "/opt/hitachi/APServer/httpsd/conf/ssl/server/httpsd.pem"
#SSLCertificateKeyFile
 "/opt/hitachi/APServer/httpsd/conf/ssl/server/httpsdkey.pem"
#SSLCertificateKeyPassword
 "/opt/hitachi/APServer/httpsd/conf/ssl/server/.keypasswd"
#SSLCACertificateFile
 "/opt/hitachi/APServer/httpsd/conf/ssl/cacert/anycert.pem"
```

```
#SSLProtocol SSLv3 TLSv1
#SSLRequiredCiphers RC4-MD5:RC4-SHA:DES-CBC3-SHA:AES128-SHA:AES256-SHA
#SSLVerifyClient 0
#SSLVerifyDepth 3
#SSLCacheServerPath sbin/gcache
#SSLCacheServerPort logs/gcache_port
#SSLSessionCacheTimeout 3600
#HWSLogSSLVerbose On

TypesConfig conf/mime.types
AddEncoding x-compress .Z
AddEncoding x-gzip .gz .tgz
AddLanguage ca .ca
AddLanguage cs .cz .cs
AddLanguage da .dk
AddLanguage de .de
AddLanguage el .el
AddLanguage en .en
AddLanguage eo .eo
AddLanguage es .es
AddLanguage et .et
AddLanguage fr .fr
AddLanguage he .he
AddLanguage hr .hr
AddLanguage it .it
AddLanguage ja .ja
AddLanguage ko .ko
AddLanguage ltz .ltz
AddLanguage nl .nl
AddLanguage nn .nn
AddLanguage no .no
AddLanguage pl .po
AddLanguage pt .pt
AddLanguage pt-BR .pt-br
AddLanguage ru .ru
AddLanguage sv .sv
AddLanguage tr .tr
AddLanguage zh-CN .zh-cn
AddLanguage zh-TW .zh-tw
#LanguagePriority ja en ca cs da de el eo es et fr he hr it ko ltz nl nn no pl
 pt pt-BR ru sv tr zh-CN zh-TW

BrowserMatch "Mozilla/2" nokeepalive
BrowserMatch "MSIE 4\.0b2;" nokeepalive downgrade-1.0 force-response-1.0
BrowserMatch "RealPlayer 4\.0" force-response-1.0
BrowserMatch "Java/1\.0" force-response-1.0
BrowserMatch "JDK/1\.0" force-response-1.0
BrowserMatch "Microsoft Data Access Internet Publishing Provider"
 redirect-carefully
BrowserMatch "MS FrontPage" redirect-carefully
BrowserMatch "^WebDrive" redirect-carefully
BrowserMatch "^WebDAVFS/1.[01234]" redirect-carefully
BrowserMatch "^gnome-vfs/1.0" redirect-carefully
BrowserMatch "^XML Spy" redirect-carefully
BrowserMatch "^Dreamweaver-WebDAV-SCM1" redirect-carefully
BrowserMatch " Konqueror/4" redirect-carefully

Alias /icons/ "/opt/hitachi/APServer/httpsd/icons/"
IndexOptions FancyIndexing
AddIconByEncoding (CMP,/icons/compressed.gif) x-compress x-gzip
AddIconByType (TXT,/icons/text.gif) text/*
AddIconByType (IMG,/icons/image2.gif) image/*
AddIconByType (SND,/icons/sound2.gif) audio/*
AddIconByType (VID,/icons/movie.gif) video/*
```

```
AddIcon /icons/binary.gif .bin .exe
AddIcon /icons/binhex.gif .hqx
AddIcon /icons/tar.gif .tar
AddIcon /icons/world2.gif .wrl .wrl.gz .vrml .vrm .iv
AddIcon /icons/compressed.gif .Z .z .tgz .gz .zip
AddIcon /icons/a.gif .ps .ai .eps
AddIcon /icons/layout.gif .html .shtml .htm .pdf
AddIcon /icons/text.gif .txt
AddIcon /icons/c.gif .c
AddIcon /icons/p.gif .pl .py
AddIcon /icons/f.gif .for
AddIcon /icons/dvi.gif .dvi
AddIcon /icons/uuencoded.gif .uu
AddIcon /icons/script.gif .conf .sh .shar .csh .ksh .tcl
AddIcon /icons/tex.gif .tex
AddIcon /icons/bomb.gif core
AddIcon /icons/back.gif ..
AddIcon /icons/hand.right.gif README
AddIcon /icons/folder.gif ^^DIRECTORY^^
AddIcon /icons/blank.gif ^^BLANKICON^^
DefaultIcon /icons/unknown.gif
ReadmeName README.html
HeaderName HEADER.html
IndexIgnore .??* *~ *# HEADER* README* RCS CVS *,v *,t

<Directory />
        Options None
        AllowOverride None
#       <Limit PUT DELETE>
#               Order deny,allow
#               Deny from all
#       </Limit>
#       SSLRequireSSL
</Directory>

<Directory "/opt/hitachi/APServer/httpsd/htdocs">
        Options None
        AllowOverride None
</Directory>

<FilesMatch "^\.(ht|key)">
        Order allow,deny
        Deny from all
</FilesMatch>

#<Location /server-status>
#       SetHandler server-status
#       Order deny,allow
#       Deny from all
#       Allow from example.com
#</Location>

#Include "/opt/hitachi/APServer/httpsd/conf/reverse_proxy.conf"
#Include "/opt/hitachi/APServer/httpsd/conf/proxy_balancer.conf"
```

## Note

To describe the IPv6 address in the directive, enclose the IPv6 address in square brackets ([ ]), such as [*IPv6_address*]. In addition, when writing both the IPv6 address and the port number in the directive, enclose the IPv6 address in square brackets, and specify the port number after a colon (:), such as [*IPv6_address*]:*port_number*.

However, do not enclose the IPv6 address in square brackets when writing the IPv6 address in the following directives:

- The `Allow from` directive
- The `Deny from` directive
- The `HWSSetEnvIfIPv6` directive

When you want to specify the IPv6 address for these directives, specify a global unicast address.

## 2.3 Details of the definition items set in httpsd.conf

This section describes the details of the definition items set in `httpsd.conf`.

### 2.3.1 <Directory>

`<Directory>` defines directives that are applied only for a specific directory.

#### Description

`<Directory>` defines directives that are applied only for a specific directory. You can specify a directory name in *directory_name* and then specify directives that are applied only for the specified directory and subdirectories.

Specify directory name as an absolute path.

#### Syntax

```
<Directory directory_name> directive [directive ...] </Directory>
```

#### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

#### Example

```
<Directory />                                              ...1.
     Options None                                          ...2.
     AllowOverride None                                    ...3.
</Directory>                                               ...4.

<Directory "installation_directory_for_Application_Server/httpsd/htdocs">  ...5.
     Options Indexes                                       ...6.
     AllowOverride None                                    ...7.
     Order allow,deny                                      ...8.
     Allow from all                                        ...9.
</Directory>                                               ...10.
```

1. Defines the root directory
2. Disables all functionalities
3. Prohibits all overwriting
4. End of the definition
5. Defines the directory *installation_directory_for_Application_Server*/httpsd/htdocs
6. Permits directory index to be displayed
7. Prohibits all overwriting
8. Evaluates the `Allow` directive specification before the `Deny` directive
9. Permits access from all hosts
10. End of the definition

## 2.3.2 <DirectoryMatch>

<DirectoryMatch> defines directives that are applied only for directories that meet conditions specified by using regular expressions.

### Description

<DirectoryMatch> defines directives that are applied only for a directory that meets conditions specified by using regular expressions. You can specify directory names by using regular expressions and then specify directives that are applied only for the specified directories and subdirectories.

Specify the directory name as an absolute path for *regular_expression*.

### Syntax

```
<DirectoryMatch regular_expression> directive [directive ...] </DirectoryMatch>
```

### Locations where it can be written

httpsd.conf and <VirtualHost>

## 2.3.3 <Files>

<Files> defines directives that are applied only for a specific file.

### Description

<Files> defines directives that are applied only for a specific file. You can specify a file name in *file_name* and then specify directives that are applied only for the specified file.

### Syntax

```
<Files file_name> directive [directive ...] </Files>
```

### Locations where it can be written

httpsd.conf, <VirtualHost>, <Directory>, and .htaccess

## 2.3.4 <FilesMatch>

<FilesMatch> defines directives that are applied only for files that meet conditions specified by using regular expressions.

### Description

<FilesMatch> defines directives that are applied only for files that meet conditions specified by using regular expressions. You can specify file names by using regular expressions and then specify directives that are applied only for the specified files.

### Syntax

```
<FilesMatch regular_expression> directive [directive ...] </FilesMatch>
```

### Locations where it can be written

httpsd.conf, <VirtualHost>, <Directory>, and .htaccess

## 2.3.5 <IfModule>

<IfModule> specifies directives that are applied only if the specified module is embedded.

### Description

If the specified module is embedded, the directive specified within the block are applied. If ! is added before the module name, when the specified module is not embedded, the directive specified within the block are applied. No restriction exists on the directive that can be specified within the block.

### Syntax

```
<IfModule !module_name> directive [directive ...] </IfModule>
```

### Locations where it can be written

httpsd.conf, <VirtualHost>, <Directory>, and .htaccess

## 2.3.6 <Limit>

<Limit> defines directives that are applied only for specific HTTP protocol methods.

### Description

<Limit> defines directives for access control that are applied only for specific HTTP protocol methods. You can specify multiple method names.

Specifiable method names:

GET, POST, PUT, DELETE, CONNECT, and OPTIONS

(HEAD is included in GET.)

Directives specifiable within the block:

- Allow from
- Deny from
- AuthName
- AuthType
- AuthUserFile
- AuthGroupFile

- Order
- Require
- Satisfy

### Syntax

```
<Limit method_name [method_name ...]> directive [directive ...] </Limit>
```

### Locations where it can be written

httpsd.conf, <VirtualHost>, and <Directory>, and .htaccess

### Example

```
<Directory />
  <Limit PUT DELETE>                    ...1.
    Order deny,allow                    ...2.
    Deny from all                       ...3.
    Allow from .your_domain.com         ...4.
  </Limit>                              ...5.
</Directory>
```

1. Definition for PUT and DELETE methods
2. Specification of the Deny directive is evaluated before that of the Allow directive.
3. Access by the PUT and DELETE methods from all hosts is not allowed.
4. Access by the PUT and DELETE methods from your_domain.com is allowed.
5. End of definition

## 2.3.7 <Location>

<Location> specifies directives that are applied only for a specific URL.

### Description

<Location> specifies directives that are applied only for a request sent to a specific URL. Note that for *URL*, you cannot specify the part after a question mark (?) (the query character string) of the URL.

### Syntax

```
<Location URL> directive [directive ...] </Location>
```

### Locations where it can be written

httpsd.conf and <VirtualHost>

### Example

```
  <Location /server-status>             ...1.
       SetHandler server-status         ...2.
```

```
    Order deny,allow                ...3.
    Deny from all                   ...4.
    Allow from .your_domain.com     ...5.
</Location>                         ...6.
```

1. Definition of `URL /server-status`
2. Associates the requests of this directory with the server-status handler
3. Evaluates the specification of the `Deny` directive earlier than the specification of the `Allow` directive
4. Does not allow access from all hosts
5. Allows access from `your_domain.com`
6. End of the definition

## 2.3.8 <LocationMatch>

`<LocationMatch>` specifies directives that are applied only for the requests sent to the URLs that meet conditions specified by using regular expressions.

### Description

`<LocationMatch>` specifies directives that are applied only for requests sent to the URLs that meet conditions specified by using regular expressions. Note that for the URL, you cannot specify the part after a question mark (`?`) (the query character string) of the URL.

### Syntax

```
<LocationMatch regular_expressions> directive [directive ...] </LocationMatch>
```

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

## 2.3.9 <Proxy>

`<Proxy>` defines the allocation destination used in a load balancer configuration.

### Description

`<Proxy>` specifies directives that define the `BalancerMember` directive, if you are using a reverse proxy in a load balancer configuration by using `mod_proxy_balancer`.

For the URL, specify the same value that begins with `balancer://` specified in the `ProxyPass` directive.

**Important note**

The following modules must be built-in to use this directive:

- `mod_proxy` module

```
LoadModule proxy_module modules/mod_proxy.so
```

- `mod_proxy_http` module
  ```
  LoadModule proxy_http_module modules/mod_proxy_http.so
  ```
- `mod_proxy_balancer` module
  ```
  LoadModule proxy_balancer_module modules/mod_proxy_balancer.so
  ```
- `mod_lbmethod_byrequests` module
  ```
  LoadModule lbmethod_byrequests_module modules/
  mod_lbmethod_byrequests.so
  ```
- `mod_slotmem_shm` module
  ```
  LoadModule slotmem_shm_module modules/mod_slotmem_shm.so
  ```

### Syntax

```
<Proxy URL> directive [directive ...] </Proxy>
```

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

### Example

```
ProxyPass /examples/ balancer://cluster1/
<Proxy balancer://cluster1/>
        BalancerMember http://IP_address_A/examples/
        BalancerMember http://IP_address_B/examples/
</Proxy>
```

## 2.3.10 <VirtualHost>

`<VirtualHost>` defines directives that are applied only for a specific host or IP address.

### Description

`<VirtualHost>` defines directives that are applied only for requests sent to the host specified in *host_name* or in *IP_address*`[:`*port_number*`]`.

Note that you can also specify a host name that corresponds to an IPv6 address. When specifying an IPv6 address for the IP address, enclose the IPv6 address in `[ ]`.

### Syntax

```
<VirtualHost {host_name|IP_address[:port_number]}
 [{host_name|IP_address[:port_number]} ...]>
 directive [directive ...] </VirtualHost>
```

### Location where it can be written

`httpsd.conf`

### Example

```
<VirtualHost 172.17.40.30:80>
    :
</VirtualHost>
<VirtualHost [2001::123:4567:89ab:cdef]:80>
    :
</VirtualHost>
```

## 2.3.11 AccessFileName

`AccessFileName` defines the name of the file that defines the access control directives (access control file).

### Description

`AccessFileName` defines the name of the file that defines the access control directives (access control file). If allowed by the `AllowOverride` directive, this file is referred to and the access control is checked whenever a contest request is made.

### Syntax

```
AccessFileName file_name [file_name ...]
```

### Default value

If the definition item is omitted

`.htaccess`

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

### Example

```
AccessFileName .htaccess
```

The name of the access control file is `.htaccess`.

## 2.3.12 Action

`Action` specifies to run a CGI script on the content specified by a specific MIME type or handler.

### Description

`Action` specifies the CGI script name of the script to be executed when the content specified in the MIME type or the handler is requested from the web browser. Specify the CGI script name by using the URL. If you specify this directive more than once, you cannot specify different CGI scripts for the same MIME type.

### Syntax

```
Action {MIME_type|handler} CGI_script_name
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

FileInfo level

### Example

```
Action image/gif /cgi-bin/images.cgi
```

## 2.3.13 AddAlt

`AddAlt` specifies a character string associated with the file extension to be displayed instead of the icon when the directory index is displayed.

### Description

`AddAlt` displays character strings associated with the file specified by the extension when the directory index is displayed. You can specify multiple extensions for one character string. You can use this to display a file attribute or some other information if icons cannot be displayed (for example, if text-based web browsers are used).

You can specify one of the following in the extension:

- File extension
- File name or file extension using wildcards
- File name

If you specify this directive more than once, you cannot specify different character strings for the same extension.

### Syntax

```
AddAlt character_string extension [extension ...]
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

Indexes level

### Examples

```
AddAlt "HTML" htm html
```

If the file extension is `htm` or `html`, the character string "`HTML`" is displayed.

## 2.3.14 AddAltByEncoding

`AddAltByEncoding` specifies a character string associated with the MIME encoding to be displayed instead of the icon when the directory index is displayed.

### Description

`AddAltByEncoding` displays character strings associated with the MIME encoding (for example, `x-compress`) when the directory index is displayed in an environment where icons cannot be displayed. You can specify multiple MIME encodings for one *character_string*. If you specify this directive more than once, you cannot specify different character strings for the same MIME type.

### Syntax

```
AddAltByEncoding character_string MIME_encoding [MIME_encoding ...]
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

Indexes level

### Example

```
AddAltByEncoding "gzip" x-gzip
```

## 2.3.15 AddAltByType

`AddAltByType` specifies a character string associated with the MIME type to be displayed instead of the icon when the directory index is displayed.

### Description

`AddAltByType` displays character strings associated with the MIME type (for example, `text/html`) when the directory index is displayed in an environment where icons cannot be displayed. You can specify multiple MIME types for one *character_string*. If you specify this directive more than once, you cannot specify different character strings for the same MIME type.

### Syntax

```
AddAltByType character_string MIME_type [MIME_type ...]
```

### Locations where it can be written

httpsd.conf, <VirtualHost>, <Directory>, and .htaccess

### Overwrite permission

Indexes level

### Example

```
AddAltByType "plain text" text/plain
```

## 2.3.16 AddCharset

AddCharset specifies a character set for a file extension.

### Description

AddCharset specifies a character set for a file extension. The specified character set is set to the value of charset= in the Content-Type header. Use this directive if the character set needs to be explicitly indicated for the client. If you specify this directive more than once, you cannot specify different character strings for the same extension. The specified extension must be associated with a MIME type by the AddType directive or by the file specified in the TypesConfig directive.

### Syntax

```
AddCharset character_set extension [extension ...]
```

### Locations where it can be written

httpsd.conf, <VirtualHost>, <Directory>, and .htaccess

### Overwrite permission

FileInfo level

### Example

```
AddCharset EUC-JP .euc
AddCharset ISO-2022-JP .jis
AddCharset SHIFT_JIS .sjis
```

## 2.3.17 AddDefaultCharset

AddDefaultCharset specifies the default character set for a file extension.

### Description

`AddDefaultCharset` specifies the default character set (*character_set*) for a file extension. This becomes the default value for the `AddCharset` directive setting and is when Content-Type is `text/plain` or `text/html`.

### Syntax

```
AddDefaultCharset [On|Off|character_set]
```

### Specifiable values

`On`

Specifies ISO-8859-1 as the default character set.

`Off`

Does not specify any character set.

*character_set*

Uses the specified character set as the default character set.

### Default value

If the definition item is omitted:

`Off`

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

FileInfo level

### Example

```
AddDefaultCharset ISO-2022-JP
```

## 2.3.18 AddDescription

`AddDescription` specifies the description of a file to be displayed when the directory index is displayed and formatted.

### Description

`AddDescription` displays a descriptive character string for one of the following items specified by the file name when the directory index is displayed and formatted: a file extension, a file name using wildcards, or a full file name without path information. If the specified file name is a character string ending with a slash, an asterisk (`*`) is appended and the use of a wildcard is assumed.

You can specify one of the following in the file name:

- File extension
- File name using wildcards
- File name

If you specify this directive more than once, you cannot specify different character strings for the same file name.

### Syntax

```
AddDescription "character_string" file_name [file_name ...]
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

Indexes level

### Example

```
AddDescription "The planet Mars" /web/pics/mars.gif
```

## 2.3.19 AddEncoding

`AddEncoding` specifies the association between the compression format and the extension necessary for the web browser to display the compressed data on the web server.

### Description

`AddEncoding` specifies the association between the compression format and the extension necessary for the web browser to display the compressed data on the web server. Specify this directive to send the Content-Encoding header, which contains information about decompression of the compressed file, from the web server to the web browser. The use of this header depends on the web browser implementation. If you specify this directive more than once, you cannot specify different compression formats for the same extension.

### Syntax

```
AddEncoding compression_format extension
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

FileInfo level

### Example

```
AddEncoding x-compress Z      ...1.
AddEncoding x-gzip gz         ...2.
```

1. If the file extension is `Z`, the compression format is x-compress.
2. If the file extension is `gz`, the compression format is x-gzip.

## 2.3.20 AddHandler

`AddHandler` defines the association between a handler and the file extensions to be processed by the handler.

### Description

`AddHandler` defines the association between a handler and the file extensions to be processed by the handler.

You can specify the handler names shown below. If you specify this directive more than once, you cannot specify different handler names for the same extension.

`cgi-script`
: Executes CGI scripts

`imap-file`
: Performs image map processing

`server-status`
: Displays the status

### Syntax

```
AddHandler handler_name extension [extension ...]
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

FileInfo level

### Example

```
AddHandler cgi-script .cgi      ...1.
AddHandler imap-file map        ...2.
```

1. The extension `.cgi` is associated with the `cgi-script` handler.
2. The extension `map` is associated with the `imap-file` handler.

## 2.3.21 AddIcon

`AddIcon` displays an icon associated with the extension when the directory index is displayed and formatted.

### Description

`AddIcon` displays the directory index icon associated with the extension, etc. In *character_string*, specify the characters that you want to display in web browsers that cannot display images. In *URL*, specify the URL of the image file containing the icon. If the image file is on your local host, you can omit `http://`*`IP_address`* in the URL. If you specify an IPv6 address without omitting `http://`*`IP_address`* in the URL, you must enclose the IPv6 address in square brackets (`[ ]`).

You can specify the following in *extension*:

- File extension
- File extension or file name using wildcards
- File name

If you specify `^^DIRECTORY^^` in *extension*, you can specify an icon for directories. If you specify `^^BLANKICON^^`, you can specify an icon to adjust the indentation of the header of the displayed content when the directory index is displayed.

If you specify this directive more than once, you cannot specify different character strings or URLs for the same extension.

### Syntax

```
AddIcon {(character_string, URL)|URL} extension [extension ...]
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

Indexes level

### Examples

This example defines an icon for the *extension* `.tar`.

```
AddIcon /icons/tar.gif .tar
```

This example defines an icon for the *extension*s `.html`, `.shtml`, `.htm`, and `.pdf`.

```
AddIcon /icons/layout.gif .html .shtml .htm .pdf
```

This example defines an icon for the *extension* `.txt`.

```
AddIcon /icons/text.gif .txt
```

This example defines an icon for the parent directory.

```
AddIcon /icons/back.gif ..
```

This example defines an icon for the README file.

```
AddIcon /icons/hand.right.gif README
```

This example defines an icon for directories.

```
AddIcon /icons/folder.gif ^^DIRECTORY^^
```

This example defines an icon to be used to indent the header of the directory index.

```
AddIcon /icons/blank.gif ^^BLANKICON^^
```

This example defines an icon and specifies an *ipv6_address*.

```
AddIcon http://[2001::123:4567:89ab:cdef]/icons/text.gif .txt
```

## 2.3.22 AddIconByEncoding

`AddIconByEncoding` displays an icon associated with a MIME encoding when the directory index is displayed and formatted.

### Description

`AddIconByEncoding` displays an icon associated with a MIME encoding when the directory index is displayed and formatted. In *character_string*, specify the characters that you want to display in web browsers that cannot display images. In *URL*, specify the URL of the image file containing the icon. If the image file is on your local host, you can omit `http//`*`IP_address`* in the URL. If you specify an IPv6 address without omitting `http//`*`IP_address`* in the URL, you must enclose the IPv6 address in square brackets `[ ]`.

If you specify this directive more than once, you cannot specify different character strings or URLs to the same MIME type.

### Syntax

```
AddIconByEncoding {(character_string,URL)|URL} MIME_encoding [MIME_encoding ...]
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

Indexes level

### Example

This example defines an icon for MIME encoding: `x-compress` and `x-gzip`.

```
AddIconByEncoding (CMP,/icons/compressed.gif) x-compress x-gzip
```

## 2.3.23 AddIconByType

`AddIconByType` displays an icon associated with a MIME type when the directory index is displayed and formatted.

### Description

`AddIconByType` displays an icon associated with a MIME type when the directory index is displayed and formatted. In *character_string*, you can specify the characters to be displayed in web browsers that cannot display images. In *URL*, you can specify the location of the image file containing the icon to be displayed. If you specify an IPv6 address without omitting `http//`*`IP_address`* in *URL*, you must enclose the IPv6 address in square brackets `[ ]`.

If you specify this directive more than once, you cannot specify different file names to the same MIME type.

### Syntax

```
AddIconByType {(character_string, URL)|URL} MIME_type [MIME_type ...]
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

Indexes level

### Examples

This example defines an icon for the *MIME_type* `text/*`.

```
AddIconByType (TXT, /icons/text.gif) text/*
```

This example defines an icon for the *MIME_type* `image/*`.

```
AddIconByType (IMG, /icons/image2.gif) image/*
```

This example defines an icon for the *MIME_type* `audio/*`.

```
AddIconByType (SND, /icons/sound2.gif) audio/*
```

This example defines an icon for the *MIME_type* `video/*`.

```
AddIconByType (VID, /icons/movie.gif) video/*
```

## 2.3.24 AddLanguage

`AddLanguage` specifies the language to be used in documents.

### Description

`AddLanguage` specifies the language to be used in documents. The language code is to be set to the Content-Language response header. When this directive is specified, if the priority of the language code (the Accept-Language header) is set to requests according to the language settings of the web browser, content negotiation can be performed to select the content to be sent from the web server. The language code depends on the header information to be sent from the web browser. Basically, the language code is specified in accordance with the language codes defined in ISO639. To enable

content negotiation, you must set the `MultiViews` option in the `Options` directive. If you specify this directive more than once, you cannot specify different language codes to the same extension.

### Syntax

```
AddLanguage language_code extension
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

FileInfo level

### Example

```
AddLanguage ja .ja                  Japanese
AddLanguage en .en                  English
AddLanguage fr .fr                  French
AddLanguage de .de                  German
AddLanguage da .da                  Danish
AddLanguage el .el                  Greek
AddLanguage it .it                  Italian
```

## 2.3.25 AddType

`AddType` associates the extension and the MIME type of the content that is not defined in the file specified in the `TypesConfig` directive.

### Description

`AddType` associates the extension and the MIME type of the content that is not defined in the file specified in the `TypesConfig` directive. If you specify this directive more than once, you cannot specify different MIME types to the same extension.

### Syntax

```
AddType MIME_type extension [extension ...]
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

FileInfo level

### Example

```
AddType text/html .shtml
```

This example associates the *MIME_type* `text/html` and the *extension* `.shtml`.

## 2.3.26 Alias

`Alias` specifies another name to replace a URL to a file system path.

### Description

`Alias` specifies another name to replace the specific URL requested from a web browser. However, you cannot specify anything (query string) after the question mark (`?`) in *URL*. The directory specified in *URL* is replaced with the directory specified in *directory_name*, and is displayed on the web browser.

A URL that is the same as the following directive value cannot be specified.

- *path_name_specified_for_ProxyPass*

For example, the following specification is not possible:

```
Alias /aaa/bbb/ C:/alias/
ProxyPass /aaa/ http://aaa.example.com/
```

Specify the directory name using an absolute path.

### Syntax

```
Alias URL directory_name
```

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

### Example

```
Alias /icons/ "installation_directory_for_Application_Server/httpsd/icons/"
```

`/icons/` is replaced with *`installation_directory_for_Application_Server`*`/httpsd/icons/`.

## 2.3.27 AliasMatch

`AliasMatch` uses a regular expression to replace the URL to a file system path.

### Description

`AliasMatch` specifies the new path to replace the URL requested from a web browser. However, you cannot specify anything (query string) after the question mark (`?`) in *URL*.

When a URL that satisfies the conditions described with a regular expression is requested from the web browser, the content of the specified new path is displayed in the web browser. When the regular expression in *regular_expression* is surrounded by parentheses (`()`), you can specify `$`*`n`* (where *n* is a number from 1 to 9) which indicate the character

string matching the *n*th regular expression in the *regular_expression*. For example, `$1` indicates the first group, and `$2` indicates the second group.

A regular expression that is the same as the following directive value cannot be specified.

- *path_name_specified_for_ProxyPass*

For example, the following specification is not possible:

```
AliasMatch ^/aaa/bbb/(.*) C:/alias/$1
ProxyPass /aaa/ http://aaa.example.com/
```

Specify the new path as an absolute path. In addition, if you want to include a dollar sign (`$`) or an ampersand (`&`) in the new path, add a backslash (`\`) before that character. Note that you do not need to add a backslash before the dollar sign when specifying `$i`.

### Syntax

```
AliasMatch regular_expression new_path
```

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

### Example

```
AliasMatch ^/html/(.*) "C:/htdocs/html/$1"
```

For a request that begins with `/html/`, the `/html/` part is replaced with `C:/htdocs/html/`. For example, `/html/index.html` is replaced with `C:/htdocs/html/index.html`.

## 2.3.28 Allow

`Allow` restricts the clients that can access the web server.

### Description

`Allow` specifies to restrict the clients that can access the web server. You can specify the domain name, IP address, subnet, and netmask of the hosts that are permitted access in *host*. To permit access from all hosts, specify `all`.

In addition, the domain name, address, and prefix length that are related to the IPv6 address can be specified in *host*. When you specify an IPv6 address, do not enclose the IPv6 address in square brackets (`[ ]`). Specify the prefix length in the format *`IPv6_address/prefix_length`*. Specify the prefix length as a decimal.

If `env=`*`environment_variable`* is specified, access to the web server can be controlled by using the environment variable. If `env=`*`environment_variable`* is used together with the `BrowserMatch`, `BrowserMatchNoCase`, `SetEnvIf`, and `SetEnvIfNoCase` directives, the access to the web server can be restricted based on the HTTP request header field.

The `Allow` directive (access permitted) and the `Deny` directive (access restricted) can specify the order of evaluation by using the `Order` directive.

| *Host* | Meaning |
|---|---|
| Domain name | Permits access from the host specified for the domain name. |
| IP address | Permits access from the host specified for the IP address. |
| Subnet | Permits access from the host specified for the subnet (the first 3 bytes of the IP address). |
| Netmask | Permits access from the host specified for the netmask notation (Example: `10.1.0.0/255.255.0.0`).<br>When specified in the format `10.1.0.0/16`, it is the same meaning as `10.1.0.0/255.255.0.0`. |

### Syntax

```
Allow from {host|all|env=environment_variable} [{host|env=environment_variable} ...]
```

### Locations where it can be written

`<Directory>` and `.htaccess`

### Overwrite permission

Limit level

### Examples

Example 1:

```
SetEnvIf User-Agent Mozilla.* access_ok
<Directory /docroot>
    Order deny,allow
    Deny from all
    Allow from env=access_ok
</Directory>
```

In this case, only requests from browsers that include `Mozilla` in the character string of `User-Agent` are permitted, and other requests are refused.

Example 2:

To specify the IPv6 address in *host*:

```
allow from 2001::123:4567:89ab:cdef
```

In addition, when specifying the prefix length, all of the following specifications have the same meaning.

```
allow from 2001:0:0:89ab::/64
allow from 2001:0:0:89AB::/64
allow from 2001::89ab:0:0:0:0/64
allow from 2001:0000:0000:89ab:0000:0000:0000:0000/64
```

## 2.3.29 AllowOverride

`AllowOverride` specifies whether the file specified in the `AccessFileName` directive has permission to overwrite the access information definition.

### Description

`AllowOverride` specifies the file specified in the `AccessFileName` directive has permission to overwrite the access information definition. For directives that can be controlled by every directive, see the description for overwrite permissions of each directive.

### Syntax

```
AllowOverride directive [directive ...]
```

### Specifiable values

`AuthConfig`

Permit overwriting of the directives related to the access controls for the server. The directives that are related to the access controls for the servers are the `AuthGroupFile`, `AuthName`, `AuthType`, `AuthUserFile`, and `Require` directives.

`FileInfo`

Permit overwriting of the directives related to file information such as content management, MIME type, and encryption. The directives that are related to file information are the `AddType`, `AddEncoding`, and `AddLanguage` directives.

`Indexes`

Permit overwriting of the directives related to the directory index. The directives that are related to the directory index are the `FancyIndexing`, `AddIcon`, and `AddDescription` directives.

`Limit`

Permit overwriting of the directives for access controls that use the host name or an IP address. The directives that are related to access controls that use the host name or an IP address are the `Allow from`, `Deny from`, and `Order` directives.

`Options`

Permit overwriting of the `Options` directive.

`All`

Permit all overwrites.

`None`

Prohibit all overwrites.

### Default value

If the definition item is omitted:

`None`

### Location where it can be written

`<Directory>`

## 2.3.30 AuthBasicAuthoritative

`AuthBasicAuthoritative` specifies the control method when user authentication is performed.

### Description

AuthBasicAuthoritative specifies the control method when user authentication is performed.

### Syntax

```
AuthBasicAuthoritative {On|Off}
```

### Specifiable values

On

Perform user authentication according to the settings of the AuthUserFile, AuthGroupFile, and Require directives. When the user is not registered, or if a password inconsistency occurs, the 401 error status is displayed in the web browser.

Off

Perform user authentication according to the settings of the AuthUserFile, AuthGroupFile, and Require directives. If a password inconsistency occurs, the 401 error status is displayed in the web browser. In addition, when the user is not registered, the user authentication is performed by a module (functionality) of another product.

### Default value

If the definition item is omitted:

On

### Locations where it can be written

<Directory> and .htaccess

### Overwrite permission

AuthConfig level

## 2.3.31 AuthGroupFile

AuthGroupFile specifies the name of the file that stores the list of groups to be authenticated when user authentication is performed by groups.

### Description

AuthGroupFile specifies the name of file that stores the list of groups to be authenticated when user authentication is performed by groups. For *file_name*, specify an absolute path, or a relative path from the value specified in the ServerRoot directive.

Create a group file by using a text editor in the following format:

```
group_name:user_name[ user_name ...]
```

For any *group_name*, define the user name that is registered in the password file for user authentication. Specify one group per line. More than one group can be defined in a group file. If multiple lines of the same group name are specified, a single group containing all user names that are registered in the same group name is defined.

### Syntax

```
AuthGroupFile file_name
```

### Locations where it can be written

<Directory> and .htaccess

### Overwrite permission

AuthConfig level

## 2.3.32 AuthName

AuthName specifies the realm name (which is displayed in the user authentication window for the web browser) when user authentication is performed.

### Description

AuthName specifies the realm name (which is displayed in the user authentication window for the web browser) when user authentication is performed. When this directive is specified, the AuthType, Require, and AuthUserFile (or AuthGroupFile) directives must be specified. However, when performing user authentication by using the directory service, specifying the AuthUserFile (or AuthGroupFile) directive is not necessary.

### Syntax

```
AuthName realm_name
```

### Locations where it can be written

<Directory> and .htaccess

### Overwrite permission

AuthConfig level

## 2.3.33 AuthType

AuthType specifies the authentication control type when user authentication is performed.

### Description

AuthType specifies the authentication control type when user authentication is performed. Basic can be specified as *authentication_type_name*. When this directive is specified, the AuthName, Require, and AuthUserFile (or AuthGroupFile) directives must be specified. However, when performing user authentication by using the directory service, specifying the AuthUserFile (or AuthGroupFile) directive is not necessary.

### Syntax

```
AuthType authentication_type_name
```

### Specifiable value

`Basic`

Perform Base64 code change.

### Locations where it can be written

`<Directory>` and `.htaccess`

### Overwrite permission

AuthConfig level

## 2.3.34 AuthUserFile

`AuthUserFile` specifies the name of the file that stores the list of user names and passwords to be authenticated when user authentication is performed by user names.

### Description

`AuthUserFile` specifies the file name that stores the list of user names and passwords to be authenticated when user authentication is performed by user names.

For *file_name*, specify an absolute path, or a relative path from the value specified in the `ServerRoot` directive.

### Syntax

```
AuthUserFile file_name
```

### Locations where it can be written

`<Directory>` and `.htaccess`

### Overwrite permission

AuthConfig level

## 2.3.35 BalancerMember

`BalancerMember` specifies the forwarding destination URL if you are using a reverse proxy in a load balancer configuration.

### Description

`BalancerMember` specifies the forwarding destination URL, if you are using a reverse proxy in a load balancer configuration by `mod_proxy_balancer`.

### Syntax

```
BalancerMember URL [key=value [key=value ...]]
```

### Specifiable values

*URL*

Specify the forwarding destination URL by using a format that includes `http://`*`IP_address`* or *`host_name`*`[:`*`port_number`*`]/`.

For the URL, you can specify an IPv6 address or a host name that corresponds to an IPv6 address.

*key*

You can specify the following keys:

| Key | Description |
|---|---|
| `loadfactor` | Specifies the requested load-balancing value. Specify the ratio to be distributed to each forwarding destination as an integer from `1` to `100`.<br>If you omit this key, the default value is `1`. |
| `route` | Specifies a character string that is less than 64 bytes and that is used for identifying the distribution destination.<br>If you specify this key, you also need to specify the `stickysession` key for the `ProxyPass` directive. |
| `timeout` | Specifies the following wait times for transmission to and reception from the backend server:<br>• Wait time when data becomes unable to be transmitted during the request transmission to the backend server.<br>• Wait time after the request is transmitted to the backend server until the response is received.<br>• Wait time when data becomes unable to be received while the response is being received from the backend server.<br>You can specify a value from `1` to `65535`. If you omit this key, the default value is the value specified for the `ProxyTimeout` directive. |
| `connectiontimeout` | Specifies the wait time for connection with the backend server:<br>You can specify a value from `1` to `65535`. If you omit this key, the default value is the value of the `timeout` key. |

### Location where it can be written

`<Proxy>`

## 2.3.36 BrowserMatch

`BrowserMatch` sets up environment variables for each web browser.

## Description

BrowserMatch sets up environment variables for each web browser. The default value for each environment variable is 1. If you specify ! before *environment_variable*, the setup of the environment variable is canceled. You can use regular expressions to specify *browser_name*, which is case sensitive.

## Syntax

```
BrowserMatch "browser_name" environment_variable[=value]
[environment_variable[=value] ...]
```

## Locations where it can be written

httpsd.conf, <VirtualHost>, <Directory>, and .htaccess

## Example

```
BrowserMatch "Mozilla/2" nokeepalive
BrowserMatch "MSIE 4\.0b2;" nokeepalive downgrade-1.0 force-response-1.0
BrowserMatch "RealPlayer 4\.0" force-response-1.0
BrowserMatch "Java/1\.0" force-response-1.0
BrowserMatch "JDK/1\.0" force-response-1.0
BrowserMatch "Microsoft Data Access Internet Publishing Provider"
 redirect-carefully
BrowserMatch "^WebDrive" redirect-carefully
BrowserMatch "^WebDAVFS/1.[012]" redirect-carefully
BrowserMatch "^gnome-vfs" redirect-carefully
```

The following table provides descriptions of the variables (*environment_variable*) used in the example.

| *Environment variable* | Description |
|---|---|
| nokeepalive | Disables the KeepAlive connection. If the Via header is added to the request, the KeepAlive connection cannot be disabled. |
| downgrade-1.0 | Treats a request of HTTP/1.1 or later as a request of HTTP/1.0. |
| force-response-1.0 | Always sends a response of HTTP/1.0, in response to a request of HTTP/1.0. |
| redirect-carefully | If the URL used for accessing a directory does not end with a forward slash (/) and uses a method other than the GET method, redirection is not requested to the client. |

# 2.3.37 BrowserMatchNoCase

BrowserMatchNoCase sets up environment variables for each web browser.

## Description

BrowserMatchNoCase sets up environment variables for each web browser. The default value for each environment variable is 1. If you specify ! before *environment_variable*, the setup of the environment variable is canceled. You can use regular expressions to specify *browser_name*, which is not case sensitive.

### Syntax

```
BrowserMatchNoCase "browser_name" environment_variable[=value]
[environment_variable[=value] ...]
```

### Locations where it can be written

httpsd.conf, <VirtualHost>, <Directory>, and .htaccess

## 2.3.38 CacheNegotiatedDocs

CacheNegotiatedDocs specifies whether to enable the cache on the client by using a request for content negotiation.

### Description

CacheNegotiatedDocs specifies whether to enable the cache on the client by using a request for content negotiation. If you omit the argument of this directive, On is assumed. If you do not specify a value for this directive, Off is assumed. The value specified for this directive does not apply to HTTP/1.1 requests.

### Syntax

```
CacheNegotiatedDocs [{On|Off}]
```

### Specifiable values

On

Enables caching.

Off

Adds the Expires header and disables caching.

### Default value

If the definition item is omitted:

Off

If the value is omitted:

On

### Locations where it can be written

httpsd.conf

## 2.3.39 CoreDumpDirectory

CoreDumpDirectory specifies the directory to be used for dumping the core.

### Description

CoreDumpDirectory specifies the directory to be used for dumping the core. Specify the absolute path or the relative path from the value specified in the ServerRoot directive. The write permission must be assigned to the specified directory so that the user and the group specified in the User and Group directives can write to the directory. In Linux, this is enabled only when the directive is specified in the configuration file.

### Syntax

```
CoreDumpDirectory directory_name
```

### Default value

If the definition item is omitted:

*value_specified_in_the_ServerRoot_directive*

### Location where it can be written

httpsd.conf

## 2.3.40 CustomLog

CustomLog is specified to output the log to a file in a given format.

### Description

CustomLog is specified to output the log to a file in a given format, which is the same format as specified in the LogFormat directive.

If you specify this directive more than once, you cannot specify the same file name more than once.

### Syntax

```
CustomLog {file_name|pipe} {"format"|label_name} [env=[!]environment_variable]
```

### Specifiable values

*file_name*

Specify the file to which the log is to be output. In *file_name*, you can specify the absolute path or the relative path from the value specified in the ServerRoot directive.

*pipe*

Specify the program that is to receive log information from the standard input, using the format "| *program_name*". The web server delivers log information including line feed codes (CRLF).

*format*

Specify the log format. The following format names can be specified:

Table 2-1: List of formats

| Format | Meaning |
|---|---|
| %A[#1] | IP address of the web server |
| %a[#1] | IP address of the client |
| %B | Number of bytes sent (excluding data added by the HTTP header and the chunked encoding) |
| %b | Number of bytes sent (excluding data added by the HTTP header and the chunked encoding). If the number is 0, a hyphen (-) is output. |
| %{*cookie_name*}C | Value of the Cookie name *cookie_name* included in the Cookie header value. If multiple *cookie_name*s are found in the Cookie header value, all values are output. |
| %D | Displays the time taken for processing the request. |
| %{*env_name*}e | Displays the value for the environment variable set in *env_name*. |
| %f | Directory or file name requested by the client |
| %H | Request protocol (for example, HTTP/1.0) |
| %h[#2] | Host name of the client |
| %I | Number of all the bytes received, including the request and the header |
| %{*header_name*}i | Value of the request header specified in *header_name* |
| %l | Client identification information (if the IdentityCheck directive is On and identd is running on the client) |
| %m | Request method (for example, GET or POST) |
| %{*note_name*}n | Value of the note specified in *note_name* in a module in the web server<br>• hws_ap_root: root application information<br>• hws_ap_client: client application information |
| %O | Number of all the bytes sent, including the header |
| %{*header_name*}o | Value of the response header specified in *header_name* |
| %P | ID of the process that processes the HTTP request |
| %p | Port number of the server specified in accordance with the specified ServerName or <VirtualHost> directive |
| %q | Query string |
| %r | First line of the HTTP request |
| %s | Status (indicates the original status if an internal redirection occurs) |
| %T | Time taken for the request processing (in seconds). The time is displayed in milliseconds if the HWSLogTimeVerbose directive is On. |
| %t | Time when the request processing was started. The time is displayed to the millisecond if the HWSLogTimeVerbose directive is On. |
| %{*format*}t | Time when the request processing was started. In *format*, specify the format defined by strftime(). |
| %U | URL |
| %u | Client user name (if user authentication was performed) |
| %V[#2] | Value specified in the ServerName directive, server name, or IP address in accordance with the specified UseCanonicalName directive |
| %v | Server name |

| Format | Meaning |
|---|---|
| %X | Status of the connection when the response is finished<br>• +: The connection will be maintained after the response is sent.<br>• -: The connection will be disconnected after the response is sent.<br>• X: The connection will be disconnected before the response is finished. |
| %>s | Final status |

Note:

In the formats, the curly brackets { } do not mean "selection". Italic text indicates a variable name of which logs to be collected, while non-italic text indicates the text to be typed as is.

#1

If %A or %a is specified in the format, IPv6 addresses can also be output.

#2

If %h or %V is specified in the format, IPv6 addresses or host names corresponding to IPv6 addresses can be output.

Table 2-2: List of SSL-related log formats

| Format | Meaning |
|---|---|
| %{version}c | SSL version |
| %{cipher}c | Cipher type used for the current communication |
| %{clientcert}c | Distinguished Name in the subject of the SSL client certificate |

In the formats, you can add status codes after the percent sign (%).

Example: This example collects the log of the User-Agent request header value if the error status codes are 400 and 501.

```
%400,501{User-Agent}i
```

Example: This example collects the log of the Referer request header value if the error status code is other than 200, 304, or 302.

```
%!200,304,302{Referer}i
```

Use env= if you want to split the log and output the parts to different files according to the settings on the specified environment variables.

Example: This example outputs the access log for gif to gif.log, and the access log for anything other than gif to nongif.log.

```
SetEnvIf Request-URI \.gif$ gif-image
CustomLog logs/gif.log common env=gif-image
CustomLog logs/nongif.log common env=!gif-image
```

*label_name*

Specifies the label name defined in the LogFormat directive

env=*environment_variable*

Collects the log if the specified environment variable is set

env=!*environment_variable*

Collects the log if the specified environment variable is not set

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

### Example

```
CustomLog logs/access.log common
CustomLog logs/ssl.log "%t %{version}c %{cipher}c %{clientcert}c"
```

## 2.3.41 DefaultIcon

`DefaultIcon` specifies the icon to be displayed if no specific icon is set in the directory index.

### Description

`DefaultIcon` specifies the icon to be displayed in the directory index. Specify the URL of the icon to be displayed when none of the following directives is applicable: `AddIcon`, `AddIconByType`, and `AddIconByEncoding`. If you specify an IPv6 address for URL (without omitting `http://`*`IP_address`*), you must enclose the IPv6 address in square brackets (`[ ]`).

### Syntax

```
DefaultIcon URL
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

Indexes level

### Example

```
DefaultIcon /icons/unknown.gif
```

## 2.3.42 DefaultLanguage

`DefaultLanguage` specifies the default language to be used in documents.

### Description

`DefaultLanguage` specifies the default language to be used in documents. The specified language code is set in the `Content-Language` response header. This becomes the default value of the `AddLanguage` directive. If no default value is set, the `Content-Language` response header will not be transmitted.

### Syntax

```
DefaultLanguage language_code
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

FileInfo level

## 2.3.43 Deny

`Deny` restricts the clients who can access the web server.

### Description

`Deny` restricts the clients who can access the web server. For *host*, you can specify the domain name, IP address, subnet, or netmask of the host for which access to the web server is to be prohibited. To prohibit access from all hosts to the web server, specify `all`.

In addition, for *host*, you can also specify the domain name related to an IPv6 address, address, or prefix length. If you specify *IPv6_address*, do not enclose the IPv6 address in square brackets (`[ ]`). Specify *prefix_length* by using the *`IPv6_address/prefix_length`* format. For *prefix_length*, specify a decimal number.

If you specify `env=`*`environment_variable`*, you can restrict access to the web server by using the environment variable. If you specify this directive with the `BrowserMatch`, `BrowserMatchNoCase`, `SetEnvIf`, or `SetEnvIfNoCase` directive, you can restrict access based on the HTTP request header field.

You can specify the `Order` directive to set the order in which the `Allow` directive (which permits access) and the `Deny` directive (which restricts access) are evaluated.

| *host* | Description |
|---|---|
| *domain_name* | Prohibits access from the host specified by the domain name. |
| *IP_address* | Prohibits access from the host specified by the IP address. |
| *subnet* | Prohibits access from the host specified by the subnet (first 3 bytes of the IP address). |
| *netmask* | Prohibits access from the host specified by using the netmask notation (example: `10.1.0.0/255.255.0.0`).<br>The netmask specified by using the 10.1.0.0/16 format is the same as `10.1.0.0/255.255.0.0`. |

### Syntax

```
Deny from {host|all|env=environment_variable} [{host|env=environment_variable} ...]
```

### Locations where it can be written

`<Directory>` and `.htaccess`

### Overwrite permission

Limit level

## 2.3.44 DirectoryIndex

`DirectoryIndex` specifies the file containing the content that is to be sent to the client by default, when the request from the web browser does not specify specific content.

### Description

`DirectoryIndex` specifies the name of the file containing the content that is to be sent to the client by default, when the request from the web browser does not specify specific content. If multiple file names are specified, the file name that was specified first takes priority and is sent to the client.

If the file specified for this item does not exist in the requested directory, the display of the web browser changes according to the specification of the `Options` directive.

When `Indexes` is enabled:

Displays the directory index created on the web server, in the web browser.

When `Indexes` is disabled:

Responds by displaying the status code 403 Forbidden.

### Syntax

```
DirectoryIndex file_name [file_name ...]
```

### Default value

If the definition item is omitted:

`index.html`

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

Indexes level

### Example

```
DirectoryIndex index.html
```

In this case, as long as the directory contains `index.html`, the directory index is displayed even if the request does not specify the file name.

## 2.3.45 DocumentRoot

`DocumentRoot` specifies the document root directory for storing content.

### Description

`DocumentRoot` specifies the document root directory for storing content as an absolute path. Do not include a slash (`/`) at the end of the directory name.

Specify the directory name as an absolute path.

### Syntax

```
DocumentRoot directory_name
```

### Default value

If the definition item is omitted:
`/opt/hitachi/APServer/httpsd/htdocs`

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

### Example

```
DocumentRoot installation_directory_for_Application_Server/httpsd/htdocs
```

## 2.3.46 ErrorDocument

`ErrorDocument` customizes the message to be displayed on the web browser when an error occurs.

### Description

`ErrorDocument` is specified to customize the message to be displayed on the web browser when an error occurs.

*text*
Specify the character string by enclosing it in `""`.

*local_URL*
Enter `/` at the beginning to specify the content of the local site.

*full_URL*
Enter the URL starting with `http://` or `https://` to specify the content of another site.

The error status number, text, local URL, full URL, and whether they can be specified for this directive, is shown below:

| Error status number (meaning) | Text | Local URL | Full URL |
|---|---|---|---|
| `400 (Bad Request)` | Y | N | N |
| `401 (Authorization Required)` | Y | Y | N |
| `403 (Forbidden)` | Y | Y | Y |
| `404 (Not Found)` | Y | Y | Y |
| `405 (Method Not Allowed)` | Y | Y | Y |

| Error status number (meaning) | Text | Local URL | Full URL |
|---|---|---|---|
| 406 (Not Acceptable) | Y | Y | Y |
| 408 (Request Time-out) | N | N | N |
| 410 (Gone) | Y | Y | Y |
| 411 (Length Required) | Y | N | N |
| 412 (Precondition Failed) | Y | Y | Y |
| 413 (Request Entity Too Large) | Y | Y | Y |
| 414 (Request-URI Too Large) | Y | N | N |
| 416 (Requested Range Not Satisfiable) | Y | Y | Y |
| 417 (Expectation Failed) | Y | N | N |
| 500 (Internal Server Error) | Y | Y | Y |
| 501 (Method Not Implemented) | Y | Y | Y |
| 502 (Bad Gateway) | Y | Y | N |
| 503 (Service Temporarily Unavailable) | Y# | Y# | Y# |
| 506 (Variant Also Negotiates) | Y | Y | Y |

(Legend)

Y: Can be specified

N: Cannot be specified

#

To customize the message that was returned from the flow restriction functionality, use the `QOSResponse` directive or the `QOSRedirect` directive.

Be aware of the following points when using this directive:

- When this directive is specified multiple times, a different specification for the same error number cannot be specified.
- The message cannot be customized for the error status that is set within the CGI program.
- The message cannot be customized if an error exists in the specified destination in *local_URL* and *full_URL*.
- If a content negotiation occurs in the specified destination in *local_URL* and an error occurs, the message might not be able to be customized.
- For error status that is set within the dynamically connected module by using the `LoadModule` directive, the message might not be able to be customized depending on the method the module was implemented.
- When a full URL is specified, a response with a new path set to the status code 302 Found and to the location header is returned. Usually, the web browser that received the status code 302 is automatically redirected to the address specified in the location header.
- When full URL is specified, a host name that corresponds to IPv6 address or to IPv6 address can also be specified. When specifying IPv6 address, enclose IPv6 address in `[ ]`.

## Syntax

```
ErrorDocument error_status_number {text|local_URL|full_URL}
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

FileInfo level

### Example

```
ErrorDocument 500 "Server Error."
ErrorDocument 404 /missing.html
ErrorDocument 403 http://some.other_server.com/subscription_info.html
ErrorDocument 404 http://[2001::123:4567:89ab:cdef]/missing.html
```

## 2.3.47 ErrorLog

`ErrorLog` specifies the output destination of error logs.

### Description

`ErrorLog` specifies the name of the file to which the error log is to be output. The content of the logs to be output can be selected by using the `LogLevel` directive.

*file_name*

Specify the file name to store the error log. For *file_name*, you can specify an absolute path or a relative path from the value specified for the `ServerRoot` directive.

*pipe*

Specify the program that receives the error log information from the standard input in the `|`*`program_name`* format.

### Syntax

```
ErrorLog {file_name|pipe}
```

### Default value

If the definition item is omitted:

`logs/error.log`

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

### Example

```
ErrorLog logs/error.log
```

## 2.3.48 ExpiresActive

`ExpiresActive` specifies whether to add Expires and Cache-Control headers to responses.

### Description

`ExpiresActive` specifies whether to add Expires and Cache-Control headers to responses.

**Important note**

- You need to embed the `mod_expires` module to use this directive.
  `LoadModule expires_module modules/mod_expires.so`
- When the `ExpiresDefault` directive or the `ExpiresByType` directive is not specified, even if `On` is specified in the `ExpiresActive`, Expires and Cache-Control headers are not added.

### Syntax

```
ExpiresActive {On|Off}
```

### Specifiable values

`On`
Expires and Cache-Control headers are added.

`Off`
Expires and Cache-Control headers are not added.

### Default value

If the definition item is omitted
`Off`

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

Indexes level

## 2.3.49 ExpiresByType

`ExpiresByType` specifies expiration dates for MIME-type documents when Expires and Cache-Control headers are added to a response.

### Description

`ExpiresByType` specifies an expiration date for the MIME-type document to be specified when Expires and Cache-Control headers are added to a response. This directive is enabled when `On` is specified in the `ExpiresActive`

directive. The default expiration date that is specified in the ExpiresDefault directive is overwritten for each MIME type by the expiration date specified by ExpiresByType.

Specify a reference time by using A or M, and specify the length of time from the reference time to the expiration date in seconds. Do not insert blanks between A or M and the length of time.

A

The time when a client is accessed is set as the reference time.

M

The time when a file was last updated is set as the reference time.

**Important note**

- You need to embed the mod_expires module to use this directive.
  LoadModule expires_module modules/mod_expires.so
- Set an expiration date such that it is not after 3:14:7 a.m. on January 19, 2038 Greenwich Mean Time (GMT).

### Syntax

```
ExpiresByType MINE_type {A|M}length_of_time
```

### Specifiable values

0 to 2,147,483,647

### Locations where it can be written

httpsd.conf, <VirtualHost>, <Directory>, and .htaccess

### Overwrite permission

Indexes level

### Example

```
ExpiresByType text/html A604800
```

## 2.3.50 ExpiresDefault

ExpiresDefault specifies the default validity period when the Expires and Cache-Control headers are added to a response.

### Description

ExpiresDefault specifies the default validity period when the Expires and Cache-Control headers are added to a response. This directive is enabled when On is specified in the ExpiresActive directive. This setting is overwritten by the ExpiresByType directive for each MIME type.

Set the reference time by specifying A or M, and then specify the validity period (the amount of time from the reference time until the time of expiration) in seconds. Do not insert a space character between the reference time (A or M) and the validity period.

A

Sets the time when the client was accessed as the reference time.

M

Sets the time when the file was last updated as the reference time.

**Important note**

- To use this directive, you need to embed the mod_expires module.
  LoadModule expires_module modules/mod_expires.so
- Set a validity period that does not exceed 3:14:07 a.m. GMT (Greenwich Mean Time) on January 19, 2038.

### Syntax

```
ExpiresDefault {A|M}amount_of_time
```

### Specifiable values

0 to 2147483647

### Locations where it can be written

httpsd.conf, <VirtualHost>, <Directory>, and .htaccess

### Overwrite permission

Indexes level

### Example

```
ExpiresDefault A604800
```

## 2.3.51 ExtendedStatus

ExtendedStatus specifies whether the extended status information of each request is to be displayed in the status information display.

### Description

ExtendedStatus specifies whether to display the extended status information of each request in the status display format used by the server-status handler.

### Syntax

```
ExtendedStatus {On|Off}
```

### Specifiable values

`On`

The extended status information is displayed. In this case, even if the IP address of a client is an IPv6 address, the IP address is displayed. Note that the maximum number of characters to be displayed is 31 bytes.

`Off`

The extended status information is not displayed.

### Default value

If the definition item is omitted:

`On`

### Location where it can be written

`httpsd.conf`

## 2.3.52 FileETag

`FileETag` specifies the attribute value of the file to be used for creating the ETag response header field.

### Description

`FileETag` specifies the attribute value of the file to be used for creating the ETag response header field. If you do not specify this directive, the last updated time and number of bytes of the file are set in the ETag response header field.

If you do not specify `+-` for *option*, the attribute value specified for *option* is used.

If you specify `+-` for *option*, you can change the attribute value set by using the `FileETag` directive.

`+`

Adds the attribute value specified for the option to the set attribute value

`-`

Deletes the attribute value specified for the option from the set attribute value

The following shows a list of options that can be specified:

| *Option* | Description |
|---|---|
| `Inode` | The unique ID assigned to the file is included. |
| `Mtime` | The last updated time of the file is included. |
| `Size` | The number of bytes of the file is included. |
| `All` | All of the `Inode`, `Mtime`, and `Size` options are enabled. |
| `None` | An Etag header is not attached. |

### Important note

- If you enable the `Inode` option of the `FileETag` directive, a different IDEtag might be included in the header every time you request the same content in a web server environment that performs the load sharing activity. For this reason, the same contents might have different Etag header contents, causing inconvenience for caching in a browser or proxy. In this case, you can avoid this inconvenience by specifying settings so that the `FileETag` directive disables the `Inode` option.
- If you specify this directive for multiple times without using `+-`, only the last specified directive is enabled.
- If you only specify attribute values with `-` added, it is assumed that the `All` option is specified.
- For the `All` option and the `None` option, you cannot specify `+-`.
- If you specify `-Inode -Mtime -Size` for an option, it is assumed that this directive is not specified. For the ETag response header field, the inode number, last updated time, and number of bytes of the file are set.

## Syntax

```
FileETag [{+|-}]option [[{+|-}]option ...]
```

## Default value

If the definition item is omitted:

```
MTime Size
```

## Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

## Overwrite permission

FileInfo level

## Examples

Example 1:

```
FileETag Inode Mtime Size
FileETag -Inode
```

In this example, the last updated time and number of bytes of the file are used as attribute values.

Example 2:

```
FileETag Inode Mtime
FileETag Size
```

In this example, the number of bytes of the file is used as an attribute value.

Example 3:

```
FileETag All
FileETag -Inode -Mtime -Size
```

In this example, the unique ID, last updated time, and number of bytes of the file are used as attribute values.

## 2.3.53 ForceType

`ForceType` specifies the MIME type that is used for all content in the specific directories.

### Description

`ForceType` is defined in the `<Directory>` block or in the access control file. `ForceType` specifies the MIME type to be used for all content in the specific directory. If `none` is specified, the specification of the `ForceType` directive until that point becomes invalid.

### Syntax

```
ForceType MIME_type
```

### Locations where it can be written

`<Directory>` and `.htaccess`

### Overwrite permission

FileInfo level

## 2.3.54 Group

`Group` specifies the group name which is used to run the server processes.

### Description

`Group` specifies the group name which is used to run the server processes.

### Syntax

```
Group group_name
```

### Default value

If the definition item is omitted:

```
#-1
```

### Location where it can be written

`httpsd.conf`

### Example

```
Group nogroup
```

This example defines `nogroup` as a group name

## 2.3.55 Header

`Header` customizes the response header when responding to the status code of the 200 series.

### Description

`Header` customizes the response header when responding to the status code of the 200 series. When using this as a reverse proxy, the response header is customized regardless of the value of the status code returned from the backend web server.

Note that the `mod_headers` module needs to be implemented to customize the response header.

```
LoadModule headers_module modules/mod_headers.so
```

### Syntax

```
Header{{set|append|add}header header_value[env=[!]environment_variable]|unset header}
```

### Specifiable values

`set`

Set the header. If the header already exists, it will be replaced with the specified header value.

`append`

Add the header value to the existing header. A comma is placed to separate the headers. A header is set when no header exists.

`add`

Set the header to a new line even if the header exists. Use this value to set the same header in multiple lines.

`unset`

When a specified header exists, delete the entire header.

`env=`*`environment_variable`*

Execute the content specified in the `Header` directive when the specified environment variable is set.

`env=!`*`environment_variable`*

Execute the content specified in the `Header` directive when the specified environment variable is not set.

*header_value*

A character string composed of characters only, a character string composed of a format directive, or a character string composed of both can be specified.

The header value must be enclosed in double quotation marks (") when the header value contains a space.

The format directives are as follows:

| Format directive | Meaning |
|---|---|
| `%t` | Displays the time when the request was received, from the amount of time that has elapsed since midnight on January 1st, 1970 (GMT: Greenwich Mean Time). The units are in microseconds. `t=` is attached at the beginning. |
| `%D` | Displays the time taken for processing the request. The units are in microseconds. `D=` is attached at the beginning |
| `%{`*`env_name`*`}e` | Displays the value for the environment variable set in *env_name*. |

### Locations where it can be written

httpsd.conf, <VirtualHost>, <Directory>, and .htaccess

### Overwrite permission

FileInfo level

### Example

```
Header set Cache-Control no-cache
```

## 2.3.56 HeaderName

HeaderName specifies the file for which the comments to be attached to the header when the directory indexes are displayed are written.

### Description

HeaderName specifies the name of the file (without path information) for which the comments to be attached to the header when the directory indexes are displayed are written. The comments can be written in HTML or in plain text. However, the MIME type must be correctly defined in the file specified by the AddType directive or by the TypesConfig directive. If the comments are created in plain text, the <PRE> tag is added to the HTML when the directory index is displayed.

### Syntax

```
HeaderName file_name
```

### Locations where it can be written

httpsd.conf, <VirtualHost>, <Directory>, and .htaccess

### Overwrite permission

Indexes level

### Example

```
HeaderName HEADER.html
```

The content of HEADER.html in each directory is attached to the header.

## 2.3.57 HostnameLookups

HostnameLookups specifies whether reverse DNS lookup is to be performed to look up host names.

### Description

HostnameLookups specifies whether to perform reverse DNS lookup to look up host names to convert the IP address of the environment variable REMOTE_HOST of the CGI and the IP address of a client to be output to the log file, to host names. Note that if you use reverse DNS lookup, responses will be slow.

This directive supports IPv6 addresses.

### Syntax

```
HostnameLookups {On|Off|double}
```

### Specifiable values

On

The IP address is converted to a host name.

Off

The IP address is not converted to a host name.

double

The IP address is converted to a host name. Then, the host name is converted to the IP address again, and then the IP address is checked for whether the IP address is correct.

### Default value

If the definition item is omitted:

Off

### Locations where it can be written

httpsd.conf, <VirtualHost>, and <Directory>

### Example

```
HostnameLookups Off
```

The IP address is not converted to a host name.

## 2.3.58 HWSErrorLogClientAddr

HWSErrorLogClientAddr changes the client address that is output to the error log to the value of the X-Forwarded-For header.

### Description

On the back-end server, HWSErrorLogClientAddr changes [client *client_address*:*port_number*] in the message text that is output to the error log to [X-Forwarded-For *value_of_the_X-Forwarded-For_header*].

When the back-end server receives a request through the load balancer or proxy server, the [client *client_address*:*port_number*] that the back-end server outputs might be the IP address of the load balancer or proxy server, instead of the IP address of the client that sent the request. However, the load balancer or proxy server might add the client IP address to the X-Forwarded-For header. Change [client *client_address*:*port_number*] to [X-Forwarded-For *value_of_the_X-Forwarded-For_header*] so that the client IP address is output.

Notes

When an error occurs before receiving the X-Forwarded-For header, or in some messages, you cannot change [client *client_address*:*port_number*].

### Syntax

```
HWSErrorLogClientAddr X-Forwarded-For
```

### Specifiable value

X-Forwarded-For

Changes [client *client_address*:*port_number*] that is output to the error log to [X-Forwarded-For *value_of_the_X-Forwarded-For_header*].

### Location where it can be written

httpsd.conf

## 2.3.59 HWSGracefulStopLog

HWSGracefulStopLog specifies whether the information about the requests that were forcibly stopped during the planned termination is to be output to the error log file.

### Description

HWSGracefulStopLog specifies whether to output to the error log file the information about requests that were forcibly stopped after the forced-stop wait time elapsed during the planned termination.

### Syntax

```
HWSGracefulStopLog {On|Off}
```

### Specifiable values

On

The information about the requests that were forcibly terminated is output to the error log file.

Off

The information about the requests that were forcibly terminated is not output to the error log file.

### Default value

If the definition item is omitted:

`On`

### Location where it can be written

`httpsd.conf`

### Example

```
HWSGracefulStopLog On
```

## 2.3.60 HWSGracefulStopTimeout

`HWSGracefulStopTimeout` specifies the wait time until the requests being executed when the planned termination is performed are forcibly stopped.

### Description

`HWSGracefulStopTimeout` specifies the forced-stop wait time (in seconds), until the requests being executed when the planned termination is performed are immediately stopped. Note that if you specify `0`, the upper limit on the forced-stop wait time is not set.

### Syntax

```
HWSGracefulStopTimeout forced_stop_wait_time
```

### Specifiable values

`0` to `3600`

### Default value

If the definition item is omitted:

`300`

### Location where it can be written

`httpsd.conf`

### Example

```
HWSGracefulStopTimeout 600
```

## 2.3.61 HWSImapMenuCharset

`HWSImapMenuCharset` specifies the character set for displaying the menu.

### Description

HWSImapMenuCharset specifies the character set for displaying the menu in the following situations:

- When map is specified for the image map file setting
- When the mouse points to the coordinates (0, 0) in the image for the image map
- When the image map file is requested with no coordinates specified

The specified character set is set in the Content-Type header of the response, and is used as the value of charset=.

### Syntax

```
HWSImapMenuCharset character_set
```

### Default value

If the definition item is omitted:
ISO-8859-1

### Locations where it can be written

httpsd.conf, <VirtualHost>, <Directory>, and .htaccess

### Overwrite permission

Indexes level

### Example

```
HWSImapMenuCharset SHIFT_JIS
```

## 2.3.62 HWSKeepStartServers

HWSKeepStartServers specifies whether to maintain the number of running server processes as specified in the StartServers directive.

### Description

HWSKeepStartServers specifies whether to maintain the number of running server processes as specified in the StartServers directive.

### Syntax

```
HWSKeepStartServers {On|Off}
```

### Specifiable values

`On`

The number of running server processes is maintained as specified in the `StartServers` directive. New processes are created if the number of server processes is smaller than the value specified in the `StartServers` directive. This functionality is enabled only when the values of the each directive related to the number of processes meet the both conditions:

```
MinSpareServers < StartServers <= MaxRequestWorkers
```

```
MinSpareServers < MaxSpareServers <= MaxRequestWorkers
```

If the value of the `StartServers` directive is smaller than the value of the `MinSpareServers` directive, the number of server processes is maintained as specified in the `MinSpareServers` directive.

`Off`

The number of server processes is not maintained as specified in the `StartServers` directive.

### Default value

If the definition item is omitted:

`Off`

### Location where it can be written

`httpsd.conf`

## 2.3.63 HWSLogSSLVerbose

`HWSLogSSLVerbose` specifies whether to display the detailed error information that is output to the log during the SSL handshake processing.

### Description

`HWSLogSSLVerbose` specifies whether to display detailed information regarding `info`-level and `error`-level errors that are output to the log during the SSL handshake processing between clients and servers. If SSL is enabled, set this directive to `On`.

### Syntax

```
HWSLogSSLVerbose {On|Off}
```

### Specifiable values

`On`

Displays detailed information.

`Off`

Does not display detailed information.

### Default value

If the definition item is omitted
   Off

### Location where it can be written

httpsd.conf

## 2.3.64 HWSLogTimeVerbose

HWSLogTimeVerbose specifies whether to display the time to the millisecond when information is output to the log.

### Description

HWSLogTimeVerbose specifies whether to display, to the millisecond, the timestamps of the error log# and the request log, the access time of the access log, the time taken for the request processing (%T), and the time when the request processing was started (%t).

For messages output during a startup or restart, the time might not be displayed to the millisecond even if this directive is On.

#:
   This is the error log specified in the ErrorLog directive, not the error log of the CGI script specified in the ScriptLog directive.

### Syntax

```
HWSLogTimeVerbose {On|Off}
```

### Specifiable values

On
   Displays the time to the millisecond.

Off
   Displays the time to the second.

### Default value

If the definition item is omitted:
   Off

### Location where it can be written

httpsd.conf

## 2.3.65 HWSPrfId

HWSPrfId specifies the character string that was specified in the PRF identifier when the PRF daemon started.

### Description

HWSPrfId specifies the character string that was specified in the PRF identifier when the PRF daemon started.

### Syntax

```
HWSPrfId character_string
```

### Default value

If the value is omitted:

PRF_ID

### Location where it can be written

httpsd.conf

## 2.3.66 HWSProxyPassReverseCookie

HWSProxyPassReverseCookie converts the Set-Cookie header that was received from the backend server when the reverse proxy is being used.

### Description

When a reverse proxy is being used, HWSProxyPassReverseCookie converts the Set-Cookie header that was received from the backend server. After the web browser receives the Set-Cookie header, the header must be converted to enable cookies to be sent, for requests to the backend server via the reverse proxy.

*path_name*

Specify the same path name as the ProxyPass directive.

Note that to use a reverse proxy, you need to embed the following modules:

- mod_proxy module
  LoadModule proxy_module modules/mod_proxy.so
- mod_proxy_http module
  LoadModule proxy_http_module modules/mod_proxy_http.so

### Syntax

```
HWSProxyPassReverseCookie path_name
```

### Locations where it can be written

httpsd.conf and <VirtualHost>

## 2.3.67 HWSRequestLog

`HWSRequestLog` specifies the output destination of the request log data.

### Description

`HWSRequestLog` specifies the name of the file to which the request log data is to be output. The request log is a general term for the module trace, request trace, I/O filter trace, and proxy trace. You can use the `HWSRequestLogType` directive to select the types of the request log data to be output.

**Important note**

- If you omit this directive, the module trace is output to the file specified by the `ErrorLog` directive. To specify the collection level of the module trace, use the `LogLevel` directive.
- You cannot change the output destination of the request trace, I/O filter trace, and proxy trace to the file specified by the `ErrorLog` directive.

### Syntax

```
HWSRequestLog {file_name|pipe}
```

### Specifiable values

*file_name*

Specify the name of the file to which the request log data is to be output. For the file name, you can specify an absolute path or a relative path from the value specified by the `ServerRoot` directive.

*pipe*

Specify the program that receives the request log information from the standard input, in `|`*`program_name`* format.

### Location where it can be written

`httpsd.conf`

## 2.3.68 HWSRequestLogType

`HWSRequestLogType` specifies the trace types to be output to the request logs.

### Description

`HWSRequestLogType` specifies the trace types to be output to the request logs that are set by the `HWSRequestLog` directive.

### Syntax

```
HWSRequestLogType trace_type [trace_type ...]
```

### Specifiable values

The following shows the trace types that can be specified:

`module-debug`

The module trace for the internal modules and the trace equivalent to `module-info` are output. Note that you must use this only for debugging purposes because a large amount of data is output.

`module-info`

The module trace when an external module or a CGI program is executed is output.

`request`

The trace is output when the request processing starts or finishes. In addition, for the keep-alive connection, the trace is also output when receiving of the next request line is completed. These traces are called request traces.

`filter`

The I/O filter trace, which indicates when the input-output filter functions implemented by a module are executed, is output. Note that you must use this only for debugging purposes because a large amount of data is output.

`proxy`

When the proxy functionality is used, the trace related to the proxy is output.

`send-wait`

The trace is output when the waiting state starts and ends if transmission processing is temporarily disabled. Note that you must use this only for investigating transmission performance because a large amount of data is output.

`none`

The request log is not collected.

**Important note**

If `none` is included in the specified trace types, the request log is never collected.

### Default value

If the definition item is omitted:

```
module-info request proxy
```

### Location where it can be written

`httpsd.conf`

## 2.3.69 HWSSetEnvIfIPv6

`HWSSetEnvIfIPv6` defines environment variables based on the IPv6 address of the client or server.

### Description

`HWSSetEnvIfIPv6` defines environment variables based on the IPv6 address of the client or server. The specified environment variables are configured if the specified request value meets the conditions indicated by the IPv6 address. The default value to be set is `1`. If *environment_variable* is preceded by an exclamation mark (`!`), the environment variable setting is canceled.

The request value can be one of the following:

| Request value | Meaning |
|---|---|
| `Remote_Addr` | The IPv6 address of the client |
| `Server_Addr` | The IPv6 address of the server that received the request. |

Do not enclose the IPv6 address in square brackets ( `[ ]` ). You can specify the prefix length in a decimal number format after the IPv6 address. To specify the prefix length, use the format *`IPv6_address/prefix_length`*.

### Syntax

```
HWSSetEnvIfIPv6 request_value IPv6_address environment_variable[=value]
[environment_variable[=value]...]
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

FileInfo level

### Example

This example configures the environment variable `IPV6_CLIENT` if the IPv6 address of the client starts with 2001:0:0:1230.

```
HWSSetEnvIfIPv6 Remote_Addr 2001:0:0:1230::/64 IPV6_CLIENT
```

## 2.3.70 HWSSuppressModuleTrace

`HWSSuppressModuleTrace` suppresses the output of module traces.

### Description

`HWSSuppressModuleTrace` specifies the module file name and function type used to suppress the output of module traces.

`all`
: Suppresses all module traces to be output by the specified module.

`hook`
: Suppresses module traces for functions other than the `handler` function to be output by the specified module.

`handler`
: Suppresses module traces for the `handler` function to be output by the specified module.

Specify the name of the module file to be output to the error log or request log. To suppress the module trace in the example below, specify "`mod_example.c`" as the module file name.

Example:

```
[Mon Dec 18 14:57:14 2006] [info] hws : module --> (mod_example.c[12])(1896)
[Mon Dec 18 14:57:14 2006] [info] hws : module <-- (mod_example.c[12])(1896)(-1)
```

The following shows the external modules provided by the web server by default, along with the corresponding module file names:

Table 2-3: External modules provided by the web server by default and the corresponding module file names

| Module name | Module file name |
|---|---|
| mod_expires.so | mod_expires.c |
| mod_headers.so | mod_headers.c |
| mod_hws_qos.so | mod_hws_qos.c |
| mod_lbmethod_byrequests.so | No module trace is output. |
| mod_proxy.so | mod_proxy.c |
| mod_proxy_balancer.so | mod_proxy_balancer.c |
| mod_proxy_http.so | No module trace is output. |
| mod_reqtimeout.so | mod_reqtimeout.c |
| mod_slotmem_shm.so | No module trace is output. |

If modules other than the external modules provided by the web server by default are used, the traces of those modules might be output. The traces of internal modules are also output in the following situations:

- When `debug` is set in the `LogLevel` directive
- When `module-debug` is set in the `HWSRequestLogType` directive

You can specify this directive more than once. If you specify the same module file name, the one that is specified last takes effect.

**Important note**

Module traces of CGI program execution cannot be suppressed.

## Syntax

```
HWSSuppressModuleTrace module_file_name [all|hook|handler]
```

## Location where it can be written

`httpsd.conf`

## Examples

Example 1:

```
HWSSuppressModuleTrace mod_proxy.c
```

This example suppresses module traces for all functions in the proxy module.

Example 2:

```
HWSSuppressModuleTrace mod_proxy.c hook
```

This example suppresses module traces for functions other than the `handler` function in the proxy module.

## 2.3.71 HWSTraceIdFile

`HWSTraceIdFile` specifies the names of the files that will contain the IDs of the shared memory to be used to collect traces.

### Description

`HWSTraceIdFile` specifies the names of the files that will contain the IDs of the shared memory to be used to collect traces. In *file_name*, you can specify the absolute path or the relative path from the value specified in the `ServerRoot` directive.

This file cannot be shared by multiple web servers. To start multiple web servers by using the same `ServerRoot` directive specification, specify a different file name in this directive.

### Syntax

```
HWSTraceIdFile file_name
```

### Default value

If the definition item is omitted:

`logs/hws.trcid`

### Location where it can be written

`httpsd.conf`

## 2.3.72 HWSTraceLogFile

`HWSTraceLogFile` specifies the names of the files to which the traces collected in the shared memory are to be output if the server process terminates abnormally.

### Description

`HWSTraceLogFile` specifies the names of the files to which the traces collected in the shared memory are to be output if the server process terminates abnormally. In *file_name*, you can specify the absolute path or the relative path from the value specified in the `ServerRoot` directive.

The trace is output to multiple files in a wraparound manner.

Up to five files are output. The output files are named *specified_file_name*`.`*nn*, where *nn* is a number from 01 to 05. The current output file name becomes *specified_file_name*`.01` when the web server starts. If an attempt is made to output a trace to a file when the current output file name is *specified_file_name*`.`*nn*, the subsequent

current file name becomes *specified_file_name*.*nn+1*. If the last digits of the file name *specified_file_name*.*nn* are .05, the subsequent current file name becomes *specified_file_name*.01.

### Syntax

```
HWSTraceLogFile file_name
```

### Default value

If the definition item is omitted:

logs/hws.trclog

### Location where it can be written

httpsd.conf

## 2.3.73 IdentityCheck

IdentityCheck specifies whether to whether to check the client by using the identd daemon in the client host.

### Description

IdentityCheck specifies whether to whether to check the client by using the identd daemon in the client host. For details about identd, see RFC1413.

However, when an IPv6 address is used for the client host, even if On is specified, the client is not checked by using the identd daemon. In addition, when %l is specified for the log format, unknown is output to the CGI environment variable REMOTE_IDENT.

### Syntax

```
IdentityCheck {On|Off}
```

### Specifiable values

On

The client is checked by using the identd daemon.

Off

The client is not checked using the identd daemon.

### Default value

If the definition item is omitted:

Off

### Locations where it can be written

httpsd.conf, <VirtualHost>, and <Directory>

## 2.3.74 ImapBase

`ImapBase` specifies the default value for the `base` line of the image map file.

### Description

`ImapBase` specifies the default value for the base line of the image map file.

### Syntax

```
ImapBase {map|referer|URL}
```

### Specifiable values

`map`
Location of the map file.

`referer`
Location of a document (location of an HTML file that displays the image map).

*URL*
Specified URL.
For the URL, you can specify the IPv6 address or the host name that corresponds to an IPv6 address.

### Default value

If the definition item is omitted:
`map`

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

Indexes level

## 2.3.75 ImapDefault

`ImapDefault` specifies the default values for the `default` lines of the image map files.

### Description

`ImapDefault` specifies the default values for the default lines of the image map files.

### Syntax

```
ImapDefault {error|nocontent|map|referer|URL}
```

### Specifiable values

`error`

The standard error message is displayed. (The status code 500 Server Error is answered.)

`nocontent`

The request is ignored. (The status code 204 No Content is answered.)

`map`

The URL in the map file is displayed in the menu.

`referer`

The status code 302 Found is answered.

*URL*

The content of the specified URL is displayed.

For the URL, you can specify the IPv6 address or the host name that corresponds to an IPv6 address.

### Default value

If the definition item is omitted:

`nocontent`

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

Indexes level

## 2.3.76 ImapMenu

`ImapMenu` specifies the menu display.

### Description

`ImapMenu` specifies the menu display when `map` is specified for the value of the image map file, or when the mouse is pointing to the coordinates (0,0) of an image map picture. This setting is used when the image map file is requested with no coordinates specified.

### Syntax

```
ImapMenu {none|formatted|semiformatted|unformatted}
```

### Specifiable values

`none`

The menu is not created. At this time, the value specified for the default line in the map file is used.

`formatted`

The header and a list of links are displayed. The comments in the map file are ignored.

`semiformatted`

A list of links is displayed. The comments in the map file are also displayed.

`unformatted`

You can freely set the menu format by using HTML code in the map file.

### Default value

If the definition item is omitted:

`formatted`

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

Indexes level

## 2.3.77 Include

`Include` specifies a file to be used as a configuration file.

### Description

`Include` enables the file specified for *file_name* to be used as a configuration file.

For *file_name*, you can specify an absolute path or a relative path from the value specified for the `ServerRoot` directive. If you specify this directive multiple times, the merged content is used. If the file includes the same directives, the last specified directive overwrites the previous directives.

### Syntax

```
Include file_name
```

### Location where it can be written

`httpsd.conf`

## 2.3.78 IndexIgnore

`IndexIgnore` specifies the file name not to be displayed on the web browser when the directory index is displayed.

### Description

`IndexIgnore` specifies the file name not to be displayed on the web browser when the directory index is displayed. The file name can be specified by using a regular expression also.

### Syntax

```
IndexIgnore file_name [file_name ...]
```

### Locations where it can be written

httpsd.conf, <VirtualHost>, <Directory>, and .htaccess

### Overwrite permission

Indexes level

### Example

```
IndexIgnore .??* *~ *# HEADER* README* RCS CVS *,v *,t
```

## 2.3.79 IndexOptions

IndexOptions specifies the option of the function that formats and displays the directory index.

### Description

IndexOptions specifies the option of the function that formats and displays the directory index. The option becomes enabled by specifying + or by omitting +− before *option*. By default, all options are disabled. The following shows the list of options that can be specified:

Table 2-4: List of options

| *Option* | Meaning |
|---|---|
| Charset=*character_set* | Specifies the character set of the page that is to be displayed in the index. If the character set used in the file specified by the HeaderName directive or by the ReadmeName directive is different from the default character set (ISO-8859-1), specify the same character set used in the file specified by the HeaderName directive or by the ReadmeName directive. Note that this option cannot have =*character_set* omitted. In addition, this option operates the same as +Charset even if −Charset is specified.<br>The default value when this option is omitted is ISO-8859-1. |
| DescriptionWidth[={*number_of_characters*\|*}] | Specifies the width of the area used for file explanation in number of characters (one character = 1 byte). If * is specified, the width of the area used for file explanation will be the maximum length of characters that is specified in the AddDescription directive. When this option is omitted, the width of the area used for file explanation is 23 bytes (However, if SuppressSize is specified, the width of the area to be displayed will be 30 bytes. If SuppressLastModified is specified, the width of the area to be displayed will be 42 bytes.).<br>When −DescriptionWidth is specified, ={*number_of_characters*\|*} can be omitted. In this case, the width of the area to be displayed will be 23 bytes.<br>The default value when this option is omitted is 23, 30, 42, or 49. |
| FancyIndexing | Enables the function that formats and displays the directory index |
| FoldersFirst | Displays directories before files in the index. However, this option can be specified only when FancyIndexing is enabled. |
| IconsAreLinks | Sets the icon as the anchor to link to the files when the directory index is formatted and displayed |

| *Option* | **Meaning** |
|---|---|
| IconHeight[=*number_of_pixels*] | Specifies the height of the icon used when the directory index is formatted and displayed, in number of pixels. Specify this option together with the IconWidth option. This option becomes the HEIGHT attribute of the IMG tag of the HTML that displays the index.<br>You can specify the value of 1 or more. The specifiable values are >0 .<br>The default value when this option is omitted is 22. |
| IconWidth[=*number_of_pixels*] | Specifies the width of the icon used when the directory index is formatted and displayed, in number of pixels. Specify this option together with the IconHeight option. This option becomes the WIDTH attribute of the IMG tag of the HTML that displays the index.<br>You can specify the value of 1 or more.<br>The default value when this option is omitted is 20. |
| IgnoreCase | Sorts the file and directory names without case sensitivity when the directory index is formatted and displayed |
| NameWidth[={*number_of_characters*\|*}] | Specifies the width of the area used for the file name or directory name in number of characters (one character = 1 byte). If * is specified, the width of the area used for the file name or directory name will be the maximum length of characters.<br>When you want to omit ={*number_of_characters*\|*}, always specify this option as -NameWidth.<br>The default value when this option is omitted is 23. |
| ScanHTMLTitles | Searches for the <TITLE> tag in the HTML file and displays the title as an explanation when no specification exists in the AddDescription directive |
| SuppressColumnSorting | Suppresses the function for sorting the index of columns for file name, directory name, date and time of the latest update, file size, and explanation |
| SuppressDescription | Does not display the file explanation |
| SuppressHTMLPreamble | When the HeaderName directive is specified, outputs the file content specified in the HeaderName directive and the HTML header part (such as <HTML> and <TITLE>) that is automatically generated. When the file specified in the HeaderName directive is written in HTML, this option suppresses the output of the HTML header part that is automatically generated. |
| SuppressLastModified | Suppresses the date and time of the latest update to be displayed |
| SuppressSize | Suppresses the file size to be displayed |
| TrackModified | Sets the Last-Modified value and the Etag value in the HTTP response header of the response for displaying the directory. Specifying this option enables the client to track the changes made to the file configuration in the directory during a HEAD request, thus resulting in using the cache function of the client. This option is valid only when the operating system and the file system support stat(). |

## Syntax

```
IndexOptions [{+|-}]option [[{+|-}]option ...]
```

## Notes

- When specifying this directive more than once, a different character string cannot be specified for the same file name.
- When specifying =*value* in IconHeight, IconWidth, and NameWidth, - cannot be specified.
- The options that are set are inherited in the order of httpsd.conf, <VirtualHost>, <Directory>, and then .htaccess, from higher to lower directories. The inherited options are eventually merged, and the format for displaying the index is determined.

- Options that have +- attached to `httpsd.conf` will be invalid. However, an option is inherited in the order of `httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`, and then to lower directories. The inherited option specification becomes effective during the merging process. The merging process is performed when the specification of an option has a reference sequence at a low directory or when a directive of one of the following is specified:
  - `AddAlt`
  - `AddAltByEncoding`
  - `AddAltByType`
  - `AddDescription`
  - `AddIcon`
  - `AddIconByEncoding`
  - `AddIconByType`
  - `DefaultIcon`
  - `HeaderName`
  - `ReadmeName`

  Example:

  When `IndexOptions +FancyIndexing +IconsAreLinks` is specified in the `httpsd.conf` file, and the directive related to index at a lower directory is not specified, `FancyIndexing` and `IconsAreLinks` become disabled.

  When `IndexOptions +FancyIndexing +IconsAreLinks` is specified in the `httpsd.conf` file and `AddDescription "text_file" *.txt` is specified in the access control file in the lower directory, `FancyIndexing` and `IconsAreLinks` become enabled.
- If the `Charset`, `IconHeight`, `IconWidth`, and `NameWidth` directives are specified without +- within the specified location, the options with +- specified (except for `Charset`, `IconHeight`, `IconWidth`, and `NameWidth`) before that location become invalid.

  Example:

  ```
  IndexOptions FancyIndexing -IconsAreLinks IconHeight IconWidth
  ```

  In this case, the `FancyIndexing`, `IconHeight`, and `IconWidth` directives are enabled. The - specified for `IconsAreLinks` is not inherited.
- For the merge processing when the option is specified for the same directory index between the specified locations, when the option without +- is specified in the location at the lower priority for being referenced, the option that was specified earlier becomes invalid. However, `IconHeight`, `IconWidth`, and `NameWidth` do not become invalid.

  Example 1:

  - Specification in the `httpsd.conf` file

    ```
    IndexOptions +FancyIndexing +IconsAreLinks
    ```
  - Specification in the access control file

    ```
    IndexOptions FancyIndexing SuppressLastModified
    ```

  When these are specified, `IconsAreLinks` becomes invalid. `FancyIndexing` and `SuppressLastModified` become valid.

  Example 2:

- Specification in the `httpsd.conf` file

```
IndexOptions SuppressColumnSorting +FancyIndexing +IconsAreLinks
```

- Specification in the access control file

```
IndexOptions FancyIndexing SuppressLastModified
```

When these are specified, `SuppressColumnSorting` and `IconsAreLinks` become invalid. In addition, `FancyIndexing` and `SuppressLastModified` become valid.

- For the merge processing when the option is specified for the same directory index between the specified locations, the − specification becomes valid if both + and − is specified for the same option.

  Example:

  - Specification in the `httpsd.conf` file

```
IndexOptions +FancyIndexing -IconsAreLinks
```

  - Specification in the access control file

```
IndexOptions +IconsAreLinks
```

  When these are specified, `IconsAreLinks` becomes invalid.

- When the option without +− is specified in the same specified location, the option with +− specified becomes invalid except for the `Charset`, `IconHeight`, `IconWidth` and `NameWidth` directives.

  Example 1:

  - Specification in the `httpsd.conf` file

```
IndexOptions +IconsAreLinks FancyIndexing +SuppressLastModified
```

  In this case, `IconsAreLinks` becomes invalid.

  Example 2:

  - Specification in the `<VirtualHost>` block, `<Directory>` block, or access control file

```
IndexOptions +IconsAreLinks FancyIndexing +SuppressLastModified
```

  In this case, `IconsAreLinks` and `SuppressLastModified` become invalid.

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

Indexes level

## 2.3.80 IndexOrderDefault

`IndexOrderDefault` specifies the default sequence order of the files when displayed in the directory index.

### Description

`IndexOrderDefault` specifies the default sequence order of the files when displayed in the directory index.

### Syntax

```
IndexOrderDefault {Ascending|Descending} {Name|Date|Size|Description}
```

### Specifiable values

`Ascending`
Sorts the file in ascending order

`Descending`
Sorts the file in descending order

`Name`
Sorts the file by file name

`Date`
Sorts the file by date modified

`Size`
Sorts the file by size

`Description`
Sorts the file according to the description specified in the `AddDescription` directive

### Default value

If the definition item is omitted:

```
Ascending Name
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

Indexes level

## 2.3.81 KeepAlive

`KeepAlive` specifies whether to enable the KeepAlive connection.

### Description

`KeepAlive` specifies whether to enable the KeepAlive connection. The KeepAlive connection is performed only when the client also corresponds to the KeepAlive connection. Because the KeepAlive connection maintains the connection between the server process and the client, the responses to consecutive requests improve. In contrast, because the server process is specific for the client, as an entire web server, the service performance might decrease. Adjust the connection by using the `KeepAliveTimeout` and `MaxKeepAliveRequests` directives.

When the `KeepAlive` directive is `On`, the transmission of a response is completed, and then after the time specified in the `KeepAliveTimeout` directive elapses, a disconnect request is sent from the web server. When the `KeepAlive` directive is `Off`, the web server sends a disconnect request immediately after the transmission of a response is completed.

Depending on the response of the client to this disconnect request of the connection, the server process might be occupied for 2 seconds.

### Syntax

```
KeepAlive {On|Off}
```

### Specifiable values

`On`

Enables the continuous connection (KeepAlive)

`Off`

Disables the continuous connection (KeepAlive)

### Default value

If the definition item is omitted:

`On`

### Location where it can be written

`httpsd.conf`

### Example

```
KeepAlive On
```

## 2.3.82 KeepAliveTimeout

`KeepAliveTimeout` specifies the wait time for the request during the KeepAlive connection.

### Description

`KeepAliveTimeout` specifies the waiting time for the request during the KeepAlive connection in seconds. If the specified time elapses and the next request from the client is not received, the connection is disconnected. The server processes are occupied by a specific client during the KeepAlive connections. If more time is required than the standard time to navigate from a web page to another web page, a timeout occurs and disconnects the connection, and then makes the server process other requests. If `0` is specified for the time, the KeepAlive connection becomes disabled.

### Syntax

```
KeepAliveTimeout time
```

### Specifiable values

0 to 65,535

### Default value

If the definition item is omitted:

5

### Location where it can be written

httpsd.conf

### Example

```
KeepAliveTimeout 3
```

The waiting time for the request during the KeepAlive connection is 3 seconds.

## 2.3.83 LanguagePriority

LanguagePriority specifies the order of priority when the clients do not specify the priority of the language to be used.

### Description

LanguagePriority specifies the language to be used in order of priority starting from those of high priority. In the content negotiation, when the order of priority for the language code (Accept-Language header) is not included in the request from the web browser, the order of priority specified here is used.

### Syntax

```
LanguagePriority language_code [language_code ...]
```

### Locations where it can be written

httpsd.conf, <VirtualHost>, <Directory>, and .htaccess

### Overwrite permission

FileInfo level

### Example

```
LanguagePriority ja en fr de
```

The order of priority is Japanese, English, French, and then German.

## 2.3.84 LimitRequestBody

LimitRequestBody specifies the upper limit on the size of the object body that the server can receive.

### Description

LimitRequestBody specifies the upper limit on the size of the body (data) when the server receives a request sent from the web browser via HTTP communication. An object body is used when a request is sent from the web browser by using <FORM METHOD=POST ACTION=...>. When you do not set an upper limit, specify 0.

### Syntax

```
LimitRequestBody request_body_size
```

### Specifiable values

0 to 2,147,483,647

### Default value

If the definition item is omitted:

0

### Locations where it can be written

httpsd.conf, <VirtualHost>, <Directory>, and .htaccess

## 2.3.85 LimitRequestFields

LimitRequestFields specifies the upper limit on the number of HTTP headers that the server can receive.

### Description

LimitRequestFields specifies the upper limit on the number of HTTP headers when the server receives a request sent from the web browser via HTTP communication. The number of HTTP headers of the request depends on the specifications of the web browser and the proxy that relay the request. When you do not set an upper limit, specify 0.

### Syntax

```
LimitRequestFields number_of_headers
```

### Specifiable values

0 to 32,767

### Default value

If the definition item is omitted:

100

### Location where it can be written

httpsd.conf

## 2.3.86 LimitRequestFieldsize

`LimitRequestFieldsize` specifies the upper limit on the size of a single HTTP header that the server can receive.

### Description

`LimitRequestFieldsize` specifies the upper limit on the size of a single HTTP header when the server receives a request sent from the web browser via HTTP communication. The size of the request header depends on the specifications of the web browser and the proxy that relay the request.

### Syntax

```
LimitRequestFieldsize header_size
```

### Specifiable values

0 to 8,190

### Default value

If the definition item is omitted:

```
8190
```

### Location where it can be written

`httpsd.conf`

## 2.3.87 LimitRequestLine

`LimitRequestLine` specifies the upper limit on the length of the request line that the server can receive.

### Description

`LimitRequestLine` specifies the upper limit on the length of the request line (method, URI including the inquiry string, and HTTP version) when the server receives a request sent from the web browser via HTTP communication. A request line is used as an inquiry string when a request is sent from the web browser by using `<FORM METHOD=GET ACTION...>`. Note that the number of bytes that can be sent from the web browser as a request line depends on the specifications of the web browser and the proxy that relay the request.

### Syntax

```
LimitRequestLine request_line_length
```

### Specifiable values

0 to 8,190

### Default value

If the definition item is omitted:

```
8190
```

### Location where it can be written

`httpsd.conf`

## 2.3.88 Listen

`Listen` specifies the IP address and port number that accept requests.

### Description

`Listen` specifies the IP address and port number that accept requests. You must specify this directive.

For *IP_address*, you can also specify an IPv6 address. If you specify an IPv6 address, enclose the IPv6 address in square brackets (`[ ]`). Note that if you only specify a port number without specifying an IP address, only requests that use an IPv4 address are accepted. For this reason, if you use an IPv6 address, you must specify an IPv6 address for the `Listen` directive.

**Important note**

To restart the server after changing the IP address in the `Listen` directive, stop the server and then restart it. If you attempt to restart the server by a command, the server might fail to start.

### Syntax

```
Listen [IP_address:]port_number
```

### Location where it can be written

`httpsd.conf`

### Example

```
Listen 80
Listen [2001::123:4567:89ab:cdef]:8080
Listen [::]:80
```

## 2.3.89 ListenBacklog

`ListenBacklog` specifies the maximum number of connection requests from clients, which are kept in the queue.

### Description

`ListenBacklog` specifies the maximum number of connection requests from clients, which are kept in the queue. The specified value is to be set as the number of backlogs of the system call listen(). Note that the restricted values for the specified value and the maximum number of connection requests that will be actually kept in the queue differ depending on the OS. For details, see the manual that describes listen() of each OS or the documentation that describes the details about TCP/IP implementation of each OS.

### Syntax

```
ListenBacklog number_of_backlogs
```

### Specifiable values

1 to 2,147,483,647

### Default value

If the definition item is omitted:

```
511
```

### Location where it can be written

`httpsd.conf`

## 2.3.90 LoadFile

`LoadFile` specifies the object file or library that contains a code referenced by modules embedded by the DSO.

### Description

`LoadFile` specifies the object file or library that contains a code referenced by modules embedded by the DSO. For *file_name*, you can specify an absolute path or a relative path from the value specified for the `ServerRoot` directive.

If you use the `LoadModule` directive to specify the modules that reference this file, you need to specify this directive before those modules are used by `httpsd.conf`.

### Syntax

```
LoadFile file_name [file_name ...]
```

### Location where it can be written

`httpsd.conf`

## 2.3.91 LoadModule

`LoadModule` specifies the module to be dynamically embedded into the web server.

### Description

LoadModule specifies the module to be dynamically embedded into the web server. For *library_file_name*, you can specify an absolute path or a relative path from the value specified for the ServerRoot directive.

### Syntax

```
LoadModule module_structure_name library_file_name
```

### Location where it can be written

httpsd.conf

### Example

```
LoadModule hws01_module libexec/mod_hws01.so
LoadModule hws02_module libexec/mod_hws02.so
```

The modules hws01_module and hws02_module are embedded.

## 2.3.92 LogFormat

LogFormat defines the log format.

### Description

LogFormat defines the log format. When you specify a label name for Logformat, if you specify this label name in CustomLog, the log can be output in the format specified for Logformat.

Note that if you specify %A or %a for the format, IPv6 addresses can also be output. In addition, if you specify %h or %V for the format, the host names that correspond to IPv6 addresses or the IPv6 addresses can be output.

To specify this directive for multiple times, you need to attach a label name.

### Syntax

```
LogFormat "format" [label_name]
```

### Default value

If the definition item is omitted:

```
"%h %l %u %t \"%r\" %>s %b"
```

### Locations where it can be written

httpsd.conf and <VirtualHost>

### Example

```
LogFormat "%h %l %u %t \"%r\" %>s %b \"%{Referer}i\" \"%{User-Agent}i\""
 combined
```

```
LogFormat "%h %l %u %t \"%r\" %>s %b" common
LogFormat "%{Referer}i -> %U" referer
LogFormat "%{User-agent}i" agent
```

## 2.3.93 LogLevel

`LogLevel` specifies the level of the errors to be output to the error log.

### Description

`LogLevel` specifies the level of the errors to be output to the error log. Errors of levels that are equal to or higher than the specified level are output. Note that errors of the `notice` level are output regardless of this specification. In addition, messages that are output before analysis of the level specification finishes, such as when the web server starts, might be output regardless of this specification.

The order of the error levels from the highest is as follows: `emerg`, `alert`, `crit`, `error`, `warn`, `notice`, `info`, and then `debug`.

### Syntax

```
LogLevel {debug|info|notice|warn|error|crit|alert|emerg}
```

### Specifiable values

`emerg`
: Emergency message

`alert`
: Message that requests immediate processing

`crit`
: Message in the fatal state

`error`
: General error message

`warn`
: Warning level message

`notice`
: Standard but important message

`info`
: Information message, and module trace# when an external module or a CGI program is executed

`debug`
: Debug level message, internal module trace, and module trace# equivalent to info

#:
: You can specify settings so that the module trace is output to the request log, not the error log.

### Default value

If the definition item is omitted:

warn

### Locations where it can be written

httpsd.conf, and <VirtualHost>

### Example

```
LogLevel info
```

## 2.3.94 MaxConnectionsPerChild

MaxConnectionsPerChild specifies the number of times that request processing is to be performed by the server process.

### Description

MaxConnectionsPerChild specifies the number of times that request processing is to be performed by the server process. The server process performs request processing for the specified number of times, and then ends the processing. MaxConnectionsPerChild has a preventive effect on failures due to memory leaks that are caused by applications created by users. Note that if you specify 0, the upper limit for the number of times of request processing for the server process is not set. The server process waits for requests and continuously performs processing.

### Syntax

```
MaxConnectionsPerChild number_of_times_of_request_processing
```

### Specifiable values

0 to 2,147,483,647

### Default value

If the definition item is omitted:

0

### Location where it can be written

httpsd.conf

### Example

```
MaxConnectionsPerChild 10000
```

## 2.3.95 MaxKeepAliveRequests

`MaxKeepAliveRequests` specifies the upper limit on the number of continuous KeepAlive connections.

### Description

`MaxKeepAliveRequests` specifies the upper limit on the number of continuous KeepAlive connections. If you do not set the upper limit, specify `0`. For KeepAlive connections, the server process is occupied by a specific client. For this reason, set the upper limit to give other clients an opportunity to receive the service.

### Syntax

```
MaxKeepAliveRequests number_of_connections
```

### Specifiable values

0 to 2,147,483,647

### Default value

If the definition item is omitted:

`100`

### Location where it can be written

`httpsd.conf`

### Example

```
MaxKeepAliveRequests 100
```

## 2.3.96 MaxRequestWorkers

`MaxRequestWorkers` specifies the maximum number of clients that can be connected at the same time.

### Description

`MaxRequestWorkers` specifies the maximum number of clients that can be connected at the same time.

If you start the server, as many processes as the value specified for the `StartServers` directive are started and wait for requests. If many requests occur at the same time, multiple processes process the requests. When the remaining number of processes that are waiting for requests is fewer than the value specified for the `MinSpareServers` directive, new processes are gradually generated. At this time, processes are generated until the number of processes reaches the value specified for this directive. Then, when the request processing is finished and the number of processes that are waiting for requests increases, processes are finished until the number of processes is equal to the value specified for the `MaxSpareServers` directive.

### Syntax

```
MaxRequestWorkers number_of_connections
```

### Specifiable values

1 to 1,024

### Default value

If the definition item is omitted:

```
1024
```

### Location where it can be written

`httpsd.conf`

### Example

```
MaxRequestWorkers 150
```

## 2.3.97 MaxSpareServers

`MaxSpareServers` specifies the maximum number of server processes that can be running in the request waiting status.

### Description

`MaxSpareServers` specifies the maximum number of server processes that can be running in the request waiting status.

If you specify a value that is fewer than the value specified for `MinSpareServers`, the value that is added 1 to the value specified for `MinSpareServers` directive is assumed.

### Syntax

```
MaxSpareServers number_of_processes
```

### Specifiable values

1 to 1,024

### Default value

If the definition item is omitted:

```
10
```

### Location where it can be written

`httpsd.conf`

### Example

```
MaxSpareServers 10
```

## 2.3.98 MinSpareServers

`MinSpareServers` specifies the lower limit on the number of server processes that are running in the request waiting status.

### Description

`MinSpareServers` specifies the lower limit on the number of server processes running in the request waiting status. If the number of server processes becomes fewer than the specified value, a new process is generated.

### Syntax

```
MinSpareServers number_of_processes
```

### Specifiable values

1 to 1,024

### Default value

If the definition item is omitted:

5

### Location where it can be written

`httpsd.conf`

### Example

```
MinSpareServers 5
```

## 2.3.99 MultiviewsMatch

`MultiviewsMatch` specifies the type of extension that is the target of content negotiation.

### Description

`MultiviewsMatch` specifies the type of the extension that is the target of content negotiation.

### Syntax

```
MultiviewsMatch {NegotiatedOnly|Handlers}
```

### Specifiable values

`NegotiatedOnly`

Makes the extensions that are only related to character sets, compression format, language code, and MIME types as the target of content negotiation

`Handlers`

In addition to the subject specified in `NegotiatedOnly`, extensions that are related to handlers are also the target of content negotiation.

### Default value

If the definition item is omitted:

`NegotiatedOnly`

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

FileInfo level

### Example

```
MultiviewsMatch Handlers
```

## 2.3.100 Options

`Options` restricts the functions that users can use.

### Description

`Options` restricts the functions that users can use.

`+`

Permits the function specified in *option* to be used

`-`

Prohibits the function specified in *option* to be used

| Option | Function |
|---|---|
| `All` | Enables all options except for `MultiViews` and `SymLinksIfOwnerMatch` |
| `ExecCGI` | Permits CGI script execution |
| `FollowSymLinks` | Follows the symbolic link |
| `Indexes` | If the file specified in the `DirectoryIndex` directive (`index.html` by default) does not exist when a directory is specified in the URL, the directory index is displayed. |
| `MultiViews` | Supports `Content-negotiated Multiviews` |
| `None` | Disables the function that can be specified by all options |
| `SymLinksIfOwnerMatch` | Follows the link only when the owner of the file or directory is the same as the owner of symbolic link |

If this directive is specified more than once without using `+-`, only the directive that was last specified becomes valid.

Example 1:

```
Options All
Options ExecCGI
```

When the directives are specified in two lines without using +− with the option, the user can use the function for executing the CGI script only. A function such as directory index cannot be used.

Example 2:

Specification in the `httpsd.conf` file

```
Options All
```

Specification in the access control file

```
Options ExecCGI
```

Only the function for executing the CGI script can be used in the directory where the access control file is located because the access control file is referenced after the `httpsd.conf` file.

Example 3:

```
Options Indexes ExecCGI
```

When the directive is specified in a single line without using +− with the option, functions that are both specified can be used.

### Syntax

```
Options {+|-}option [{+|-}option ...]
```

### Default value

If the definition item is omitted:

None

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

Options level

## 2.3.101 Order

`Order` specifies the order in which the specifications of the `Allow` directive and the `Deny` directive are evaluated.

### Description

`Order` specifies the order in which the specifications of the `Allow` and the `Deny` directives are evaluated. Items that can be specified for the directives are shown below. The items that are evaluated first will be overwritten by succeeding evaluations.

| Directive | Meaning |
|---|---|
| deny,allow | Evaluate the specification of the Deny directive before the specification of the Allow directive. |
| allow,deny | Evaluate the specification of the Allow directive before the specification of the Deny directive. |
| mutual-failure | Permit only the hosts that are specified in the Allow directive and those that are not specified in the Deny directive. |

### Syntax

```
Order directive
```

### Default value

If the definition item is omitted:

```
deny,allow
```

### Locations where it can be written

<Directory> and .htaccess

### Overwrite permission

Limit level

## 2.3.102 PassEnv

PassEnv specifies an environment variable to be passed to the CGI script.

### Description

PassEnv specifies an environment variable to be passed to the CGI script.

### Syntax

```
PassEnv environment_variable [environment_variable ...]
```

### Locations where it can be written

httpsd.conf, <VirtualHost>, <Directory>, and .htaccess

### Overwrite permission

FileInfo level

### Example

```
PassEnv TMP
```

## 2.3.103 PidFile

`PidFile` specifies the file for storing the control process ID.

### Description

`PidFile` specifies the file name for storing the control process ID. For *file_name*, specify an absolute path, or a relative path from the value specified in the `ServerRoot` directive.

**Important note**

When the web server restarts, the changes made to the value specified in the `PidFile` directive will not be applied. If you changed the value specified in the `PidFile` directive, stop the web server by using the `kill` command, and then restart the web server. Note that the `httpsdctl` command cannot be used to stop the web server.

### Syntax

```
PidFile file_name
```

### Default value

If the definition item is omitted:

```
logs/httpd.pid
```

### Location where it can be written

`httpsd.conf`

### Example

```
PidFile logs/httpd.pid
```

## 2.3.104 ProxyErrorOverride

`ProxyErrorOverride` specifies whether to overwrite the response from the backend server if the response is an error status code.

### Description

`ProxyErrorOverride` overrides the response header and response body when the backend server returns a 400-series or 500-series status code. As a result, the reverse proxy generates and returns a response to the client, instead of returning the response from the backend server.

Note that the following modules must be built-in to use a reverse proxy:

- `mod_proxy` module
  `LoadModule proxy_module modules/mod_proxy.so`
- `mod_proxy_http` module

```
LoadModule proxy_http_module modules/mod_proxy_http.so
```

### Syntax

```
ProxyErrorOverride {On|Off}
```

### Specifiable values

`On`

Overrides the response header and response body when the backend server returns a 400-series or 500-series status code

`Off`

Does not override the response header and response body

### Default value

If the definition item is omitted:

`Off`

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

### Example

```
ProxyErrorOverride On
```

When the backend server returns a 400-series or 500-series status code, a response generated by the reverse proxy is returned to the client.

## 2.3.105 ProxyPass

`ProxyPass` specifies the request to be transferred to the backend server, and the address that is to be the forwarding destination.

### Description

`ProxyPass` specifies the request from the web browser and the address of the backend server which the request is sent, when a reverse proxy is used.

Note that the following modules must be built-in to use a reverse proxy:

- `mod_proxy` module
  `LoadModule proxy_module modules/mod_proxy.so`
- `mod_proxy_http` module
  `LoadModule proxy_http_module modules/mod_proxy_http.so`

## Syntax

```
ProxyPass path_name {URL|!} [key=value [key=value ...]]
```

## Specifiable values

*path_name*

Specify the request from the web browser to the reverse proxy in the URL beginning with a forward slash (/).

*URL*

Specify the URL of the backend server that is to be the forward destination in a format that includes `http://IP_address_or_host_name[:port_number]/`.

An IPv6 address or a host name that corresponds to an IPv6 address can be specified in the URL also.

When using this value in the load balancer configuration that uses `mod_proxy_balancer`, specify `balancer://cluster_name/`. A cluster name is a character string that correlates with the `<Proxy>` directive. Do not include / in the cluster name. In the load balancer configuration that uses `mod_proxy_balancer`, the `<Proxy>` directive and the `BalancerMember` directive must be specified at the same time.

!

Specify this value to exclude the request specified in the path name from the requests that are to be sent from the web browser to the reverse proxy.

*key*

The keys that can be specified when the URL begins with `http://` or with `balancer://` differ.

The specifiable keys for each case are as follows:

- Keys that can be specified when the URL begins with `http://`:

| Key | Value | Content |
|---|---|---|
| `timeout` | 1 to 65,535 (unit: seconds) | Specify the waiting time for transmission to or from the next backend server.<br>• Waiting time when the data cannot be sent during a request transmission to the backend server<br>• Waiting time of receiving a response after the request is sent to the backend server<br>• Waiting time when the data cannot be received during a response from the backend server<br>The default value when this key is omitted is the value specified in the `ProxyTimeout` directive. |
| `connectiontimeout` | 1 to 65,535 (unit: seconds) | Specify the waiting time when connecting to the backend server.<br>The default value when this key is omitted is the value specified in the `timeout` key. |

- Keys that can be specified when the URL begins with `balancer://`:

| Key | Value | Content |
|---|---|---|
| `lbmethod` | `byrequests` | Specify the distribution algorithm of the load balancer.<br>`byrequests`: Distributed according to the number of requests<br>When the key is omitted, the distribution is performed according to `byrequests`. |
| `stickysession` | Character string less than 64 bytes | Specify the cookie name to be used when determining the distribution destination. |

| Key | Value | Content |
|---|---|---|
| | | When specifying this key, the `route` key of the `BalancerMember` directive must be specified at the same time.<br>No default value exists when the key is omitted. |

### Note

If you do not want a request for a specific path to be sent to the reverse proxy, specify the `ProxyPass` directive that specifies path name that you do not want to send, before the `ProxyPass` directive that specifies the URL of a forwarding destination.

Example:

```
ProxyPass /abc/def/ !
ProxyPass /abc/ http://backend.example.com/
```

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

## 2.3.106 ProxyPassReverse

`ProxyPassReverse` changes the URL in the Location header received from the backend server.

### Description

`ProxyPassReverse` changes the URL in the Location header in the redirect response from the backend server, when a reverse proxy is used. `ProxyPassReverse` changes the Location header to the value specified in this directive to make the request redirected from the web browser to a request that goes through a reverse proxy.

Note that the following modules must be built-in to use a reverse proxy:

- `mod_proxy` module
  `LoadModule proxy_module modules/mod_proxy.so`
- `mod_proxy_http` module
  `LoadModule proxy_http_module modules/mod_proxy_http.so`

### Syntax

```
ProxyPassReverse path_name URL
```

### Specifiable values

*path_name*

Specify the path name of the reverse proxy that is the destination of the redirect request in the URL beginning with a forward slash (/).

*URL*

Specify the URL of the backend server in the Location header that is the target to be changed in a format that includes `http://`*`IP_address_or_host_name`*`[:`*`port_number`*`]/`.

An IPv6 address or a host name that corresponds to an IPv6 address can be specified in the URL also. Be careful when specifying the values, because the IPv6 addresses have various notation methods. When the notation of the IPv6 address does not match with the specified value, the directive is invalid. When specifying the IPv6 address, check the notation of the IPv6 address that is included in the Location header value of the response from the backend server.

When using this value in the load balancer configuration that uses `mod_proxy_balancer`, the URL (`balancer://`*`cluster_name`*`/`) of the `ProxyPass` directive can be specified. When this is specified, the URL specified in the corresponding `BalancerMember` directive becomes the actual target URL to be changed. Usually, the `BalancerMember` directives are specified more than once so that all URLs become the targets to be changed.

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

### Example

```
ProxyPass /examples/ balancer://cluster1/
ProxyPassReverse /examples/ balancer://cluster1/
<Proxy balancer://cluster1/>
        BalancerMember http://IP_address_A/examples/
        BalancerMember http://IP_address_B/examples/
</Proxy>
```

The URL becomes the target to be changed when the Location header from the backend server includes `http://`*`IP_address_A`*`/examples/` or `http://`*`IP_address_B`*`/examples/`.

## 2.3.107 ProxyPreserveHost

`ProxyPreserveHost` specifies whether the value of the Host header received from the client is to be transferred to the backend server.

### Description

`ProxyPreserveHost` specifies whether the value of the Host header received from the client is to be transferred to the backend server, when a reverse proxy is used.

Note that the following modules must be built-in to use a reverse proxy:

- `mod_proxy` module
  `LoadModule proxy_module modules/mod_proxy.so`
- `mod_proxy_http` module
  `LoadModule proxy_http_module modules/mod_proxy_http.so`

### Syntax

```
ProxyPreserveHost {On|Off}
```

### Specifiable values

`On`

Transfers the value of the Host header received from the client to the backend server

`Off`

Changes the value of the Host header received from the client according to the value specified in the `ProxyPass` directive, and then transfers the value to the backend server

### Default value

If the definition item is omitted:

`Off`

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

### Example

```
ProxyPreserveHost On
```

This example transfers the value of the Host header received from the client to the backend server.

## 2.3.108 ProxyTimeout

`ProxyTimeout` specifies the wait time for transmission to or from the backend server.

### Description

Specify the following wait time in seconds:

- Wait time when the data cannot be sent while sending a request to the backend server, when a reverse proxy is used.
- Wait time until receiving a response after the request is sent to the backend server, when a reverse proxy is used.
- Wait time when the data cannot be received while receiving a response from the backend server, when a reverse proxy is used.

Note that built-in of the following modules are required in order to use a reverse proxy:

- `mod_proxy` module
  `LoadModule proxy_module modules/mod_proxy.so`
- `mod_proxy_http` module
  `LoadModule proxy_http_module modules/mod_proxy_http.so`

### Syntax

```
ProxyTimeout time
```

### Specifiable values

1 to 65535

### Default value

If the definition item is omitted:

The value of the `Timeout` directive

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

## 2.3.109 ProxyVia

`ProxyVia` controls the use of the Via header.

### Description

`ProxyVia` controls the use of the Via header on a proxy.

Note that the following modules must be built-in to use a reverse proxy:

- `mod_proxy` module
  `LoadModule proxy_module modules/mod_proxy.so`
- `mod_proxy_http` module
  `LoadModule proxy_http_module modules/mod_proxy_http.so`

### Syntax

```
ProxyVia {on|off|full|block}
```

### Specifiable values

`on`

Adds information of the localhost to the Via header. Information that already exists will not be changed.

`off`

Does not add information of the localhost to the Via header. Information that already exists will not be changed.

`full`

Adds information with the version of the localhost as a comment to the Via header. Information that already exists will not be changed.

`block`

Does not add information of the localhost to the Via header. The Via header will be deleted.

### Default value

If the definition item is omitted:

`Off`

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

## 2.3.110 QOSCookieDomain

`QOSCookieDomain` specifies the domain where the cookies used by the flow control functionality are enabled.

### Description

`QOSCookieDomain` specifies the domain where the cookies used by the flow control functionality are enabled. This value is used in HWS creation mode, but not in user creation mode.

When multiple hosts are configured, you can use cookies between hosts with common domains by specifying this directive.

Note that the `mod_hws_qos` module must be built-in to use the flow control functionality.

```
LoadModule hws_qos modules/mod_hws_qos.so
```

### Syntax

```
QOSCookieDomain domain_name
```

### Specifiable values

*domain_name*

Specifies the domain where the cookies used by the flow control functionality are enabled.

*domain_name* must include at least two periods (`.`).

Note that you can specify also a domain name corresponding to an IPv6 address.

Example:

When the hosts `a.example.com` and `b.example.com` are configured, if `.example.com` is specified in this directive, the priority processing is performed when either of the hosts is accessed.

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

## 2.3.111 QOSCookieExpires

`QOSCookieExpires` specifies the amount of time for which the cookie used by the flow control functionality is enabled.

### Description

`QOSCookieExpires` specifies the amount of time (in seconds) for which the cookie used by the flow control functionality is enabled. The value specified in this directive is used in HWS creation mode, but not in user creation mode.

Note that the mod_hws_qos module must be built-in to use the flow control functionality.

```
LoadModule hws_qos modules/mod_hws_qos.so
```

**Reference note**

Sessions are managed by using the cookie that is created by the web server in HWS creation mode, or the cookie that is created by a server other than the web server in user creation mode. Specify HWS creation mode or user creation mode in the QOSCookieName directive.

## Syntax

```
QOSCookieExpires value
```

## Specifiable values

0 to 86,400

## Notes

- When the QOSCookieName directive is specified for a specific block, the higher-order QOSCookieName directives are not inherited.

  Example:

  ```
  QOSCookieName Cookie1 hws
  <Location /loc1>
      QOSCookieName Cookie2 user
  </Location>
  ```

  In this case, in the request beginning with /loc1, the specification of the cookie name Cookie2 is enabled. In a request beginning with something other than /loc1, the specification of the cookie name Cookie1 is enabled.

- When you specify multiple QOSCookieName directives, do not duplicate a cookie name. If a cookie name is duplicated, a start error occurs.

  Example:

  ```
  QOSCookieName Cookie1 hws
  QOSCookieName Cookie1 user
  ```

  In this case, a start error occurs because the cookie name is duplicated.

- When you specify multiple QOSCookieName directives in HWS creation mode, the directive specified later is enabled.

  Example:

  ```
  QOSCookieName Cookie1 hws
  QOSCookieName Cookie2 hws
  ```

  In this case, specification of the cookie name Cookie1 is disabled, and specification of Cookie2 is enabled.

## Default value

If the definition item is omitted:

300

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>` and `<Location>`

## 2.3.112 QOSCookieName

`QOSCookieName` specifies the name of the cookie used by the flow control functionality.

### Description

`QOSCookieName` specifies the name of the cookie used by the flow control functionality.

Note that the `mod_hws_qos` module must be built-in to use the flow control functionality.

```
LoadModule hws_qos modules/mod_hws_qos.so
```

### Syntax

```
QOSCookieName cookie_name [{hws|user}]
```

### Specifiable values

*cookie_name*

Specifies the name of the cookie used by the flow control functionality. You cannot use semicolons, commas, or spaces for *cookie_name*.

When you manage sessions by using different cookies between hosts and between URLs, you need to specify different cookie names.

`hws`

Sessions are managed by using the cookie that is created by the web server. This is called HWS creation mode.

`user`

Sessions are managed by using the cookies that are created by external modules other than the web server. This is called user creation mode.

### Notes

- When the `QOSCookieName` directive is specified for a specific block, the higher-order `QOSCookieName` directives are not inherited.

  Example:

  ```
  QOSCookieName Cookie1 hws
  <Location /loc1>
      QOSCookieName Cookie2 user
  </Location>
  ```

  In this case, in the request beginning with `/loc1`, the specification of the cookie name `Cookie2` is enabled. In a request beginning with something other than `/loc1`, the specification of the cookie name `Cookie1` is enabled.

- When you specify multiple `QOSCookieName` directives, do not duplicate a cookie name. If a cookie name is duplicated, a start error occurs.

Example:

```
QOSCookieName Cookie1 hws
QOSCookieName Cookie1 user
```

In this case, a start error occurs because the cookie name is duplicated.

- When you specify multiple `QOSCookieName` directives in HWS creation mode, the directive specified later is enabled.

  Example:

  ```
  QOSCookieName Cookie1 hws
  QOSCookieName Cookie2 hws
  ```

  In this case, the specification of the cookie name `Cookie1` is disabled, and the specification of `Cookie2` is enabled.

### Default value

If the definition item is omitted:

`hws`

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>` and `<Location>`

## 2.3.113 QOSCookieSecure

`QOSCookieSecure` specifies whether to send cookies only when an SSL-enabled host is accessed.

### Description

`QOSCookieSecure` specifies whether to send cookies to the client only when an SSL-enabled host is accessed. This value is used in HWS creation mode, but not in user creation mode. Note that the cookies are checked after the SSL encryption processing is finished.

Example:

When an SSL-enabled host and an SSL-disabled host are configured, if this directive is specified, cookies are sent only when the SSL-enabled host is accessed.

Note that the `mod_hws_qos` module must be built-in to use the flow control functionality.

```
LoadModule hws_qos modules/mod_hws_qos.so
```

### Syntax

```
QOSCookieSecure {on|off}
```

### Specifiable values

`on`

Cookies are sent to the client only when an SSL-enabled host is accessed.

`off`

Cookies are sent to the client even when an SSL-disabled host is accessed.

### Default value

If the definition item is omitted:

`Off`

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>` and `<Location>`

## 2.3.114 QOSCookieServers

`QOSCookieServers` specifies the number of server processes when only requests that send cookies are being processed.

### Description

`QOSCookieServers` specifies the number of server processes when only requests that send cookies are being processed if the number of server processes in the request waiting status decreases.

Note that the `mod_hws_qos` module must be built-in to use the flow control functionality.

```
LoadModule hws_qos modules/mod_hws_qos.so
```

### Syntax

```
QOSCookieServers value
```

### Specifiable values

0 to the value specified in the `MaxRequestWorkers` directive

### Default value

If the definition item is omitted:

10

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>` and `<Location>`

## 2.3.115 QOSRedirect

`QOSRedirect` redirects requests rejected by the flow control functionality.

### Description

QOSRedirect redirects requests from the client to the specified path when request processing is rejected by the flow control functionality.

Note that the mod_hws_qos module must be built-in to use the flow control functionality.

```
LoadModule hws_qos modules/mod_hws_qos.so
```

### Syntax

```
QOSRedirect old_path new_path
```

### Specifiable values

*old_path*

Specify the request URL path starting with a forward slash (/). Note that, for *old_path*, you cannot specify the query string after the question mark (?).

If a request is received in *old_path*, a response is returned with the status code 302 and *new_path* set in the Location header. You cannot customize the response.

*new_path*

Specify a URL path that includes *protocol_name*://*host_name*[:*port_number*]. For the URL, you can also specify an IPv6 address or the host name that corresponds to an IPv6 address.

### Locations where it can be written

httpsd.conf, <VirtualHost> and <Location>

## 2.3.116 QOSRejectionServers

QOSRejectionServers specifies the number of server processes when all received requests are being rejected.

### Description

QOSRejectionServers specifies the number of server processes when all received requests are being rejected and the number of server processes waiting for requests is decreased.

Note that the mod_hws_qos module must be built-in to use the flow control functionality.

```
LoadModule hws_qos modules/mod_hws_qos.so
```

### Syntax

```
QOSRejectionServers value
```

### Specifiable values

0 to the value specified for the MaxRequestWorkers directive

### Default value

If the definition item is omitted:

1

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>` and `<Location>`

## 2.3.117 QOSResponse

`QOSResponse` specifies the content to be returned as the response when processing is rejected by the flow control functionality.

### Description

`QOSResponse` specifies the content to be returned with the status code 503 when processing is rejected by the flow control functionality. To change the content, you need to restart the web server because the content is cached in the server process.

Note that the `mod_hws_qos` module must be built-in to use the flow control functionality.

```
LoadModule hws_qos modules/mod_hws_qos.so
```

### Syntax

```
QOSResponse {file [MIME_type] file_name|message text}
```

### Specifiable values

`file`

Returns the specified file by using the specified MIME type. If you omit the MIME_type, `text/html` is set. For *file_name*, you can specify the absolute path or the relative path from the value specified for the `ServerRoot` directive.

`message`

Returns the specified text. For the text, specify a character string that begins with `"`. `text/html` is set for the MIME type.

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>` and `<Location>`*location*

### Example

```
QOSResponse file "text/html; charset=ISO-8859-1" htdocs/busy.html
QOSResponse message "Server busy.
```

## 2.3.118 ReadmeName

`ReadmeName` specifies the file containing the comments to be appended as Readme when the directory index is displayed.

### Description

`ReadmeName` specifies the name (without path information) of the file containing the comments to be appended as Readme when the directory index is displayed. You can use HTML or plaintext to create a comment. Note that a MIME type must be correctly defined for the file specified in the `AddType` directive or `TypesConfig` directive. If you use plain text to create the comment, the <PRE> tag is added to the HTML displayed in the directory index.

### Syntax

```
ReadmeName file_name
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>` and `.htaccess`

### Overwrite permission

Indexes level

### Example

```
ReadmeName README.html
```

This example displays the content of the `README.html` file in the directory.

## 2.3.119 Redirect

`Redirect` redirects the requests sent from clients.

### Description

`Redirect` redirects the requests sent from clients to the old path, to a new path.

If a request for the old path was received, a response with the specified status code and a new path set to the Location header is returned. Normally, if the web browser receives a 300-series status code, the browser automatically redirects requests to the address specified in the Location header.

The `Redirect` directive redirects a request for a specific file to another specific file, or redirects a request for a path in a specific directory to a path with the same name in another specific directory. To redirect a request for a path in a specific directory to another specific directory, use the `RedirectMatch` directive.

### Syntax

```
Redirect [{permanent|temp|seeother|gone|status_code}] old_path new_path
```

### Specifiable values

`permanent`

Specify this value if you want to send the status code 301 Moved Permanently.

`temp`

Specify this value if you want to send the status code 302 Found.

`seeother`

Specify this value if you want to send the status code 303 See Other.

`gone`

Specify this value if you want to send the status code 410 Gone. You cannot specify *new_path*.

*status_code*

Specify this value if you want to send the specified status code.

Note that, if a status code other than a 300-series status code is specified, you cannot specify *new_path*.

*old_path*

Specify a path of a request URL that starts with a forward slash. Note that, for *old_path*, you cannot specify the path after `?` (an inquiry string).

The specification for *old_path* cannot be the same as the value specified in the following directive:

- *path_name_specified_for_ProxyPass*

For example, you cannot specify a path such as the following:

```
Redirect temp /aaa/bbb/ http://aaa.example.com/
ProxyPass /aaa/ http://aaa.example.com/
```

*new_path*

Specify a path of a URL that includes *protocol_name*`://`*host_name*`[:`*port_number*`]`. For the URL to be specified as *new_path*, you can also specify an IPv6 address or a host name that corresponds to the IPv6 address.

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>` and `.htaccess`

### Overwrite permission

FileInfo level

### Example

```
Redirect temp /index.html http://host_name:port_number/default.html
```

A request for `/index.html` will be redirected to `http://`*host_name*`:`*port_number*`/default.html` with the status code 302.

## 2.3.120 RedirectMatch

`RedirectMatch` redirects the requests from clients that meet conditions specified by using regular expressions.

## Description

`RedirectMatch` redirects the requests sent from clients to paths that meet conditions specified by using regular expressions to a new path.

When the regular expression in *regular_expression* is surrounded by parentheses ( `()` ), you can specify `$n` (where *n* is a number from 1 to 9) which indicate the character string matching the *n*th regular expression in the *regular_expression*. For example, `$1` indicates the first group, and `$2` indicates the second group. The specified status code and the Location header that have the new path set are returned as responses when a request to the path that meets conditions specified by regular expressions is received. Generally, the web browser that received status codes of the 300-series automatically sends the request again (redirects) to the address specified in the Location header.

## Syntax

```
RedirectMatch [{permanent|temp|seeother|gone|status_code}] regular_expression
new_path
```

## Specifiable values

`permanent`

Specify this value if you want to send the status code 301 Moved Permanently.

`temp`

Specify this value if you want to send the status code 302 Found.

`seeother`

Specify this value if you want to send the status code 303 See Other.

`gone`

Specify this value if you want to send the status code 410 Gone. You cannot specify *new_path*.

*status_code*

Specify this value if you want to send the specified status code.

Note that, if a status code other than a 300-series status code is specified, you cannot specify *new_path*.

*regular_expression*

Specify the URL path of an old request that begins with a slash mark (`/`), in regular expressions. Note that, for *old_path*, you cannot specify the path after `?` (an inquiry string).

The specification for *old_path* cannot be the same as the value specified in the following directive:

- *path_name_specified_for_ProxyPass*

For example, the following specification cannot be made:

```
RedirectMatch ^/aaa/bbb/(.*) http://aaa.example.com/$1
ProxyPass /aaa/ http://aaa.example.com/
```

*new_path*

Specify a path of a URL that includes *protocol_name*`://`*host_name*`[:`*port_number*`]`. For the URL to be specified as *new_path*, you can also specify an IPv6 address or a host name that corresponds to the IPv6 address.

## Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>` and `.htaccess`

### Overwrite permission

FileInfo level

### Examples

Example 1:

```
RedirectMatch ^/other/ http://www.example.com/
```

All requests starting with `/other/` are redirected to `http://www.example.com/` with the status code 302.

Example 2:

```
RedirectMatch permanent ^/old/(.*) http://www.example.com/new/$1
```

Requests to `/old/`*`file_name`* are redirected to `http://www.example.com/new/`*`file_name`* with the status code 301.

## 2.3.121 RequestHeader

`RequestHeader` customizes the request header.

### Description

`RequestHeader` customizes the header value received from the client.

Note that the `mod_headers` module needs to be implemented to customize the response header.

```
LoadModule headers_module modules/mod_headers.so
```

### Syntax

```
RequestHeader {{set|append|add}header header_value[env=[!]environment_variable]|
unset header}
```

### Specifiable values

`set`

Set the header. If the header already exists, it will be replaced with the specified header value.

`append`

Add the header value to the existing header. A comma is placed to separate the headers. A header is set when no header exists.

`add`

Set the header to a new line even if the header exists. Use this value to set the same header in multiple lines.

`unset`

When a specified header exists, delete the entire header.

`env=`*`environment_variable`*

Execute the content specified in the `RequestHeader` directive when the specified environment variable is set.

env=!*environment_variable*

Execute the content specified in the RequestHeader directive when the specified environment variable is not set.

*header_value*

A character string composed of characters only, a character string composed of a format directive, or a character string composed of both can be specified.

The header value must be enclosed in double quotation marks (") when the header value contains a space.

The format directives are as follows:

| Format directive | Meaning |
|---|---|
| %t | Displays the time when the request was received, from the amount of time that has elapsed since midnight on January 1st, 1970 (GMT: Greenwich Mean Time). The units are in microseconds. t= is attached at the beginning. |
| %D | Displays the time taken for processing the request. The units are in microseconds. D= is attached at the beginning |
| %{env_name}e | Displays the value for the environment variable set in *env_name*. |

### Locations where it can be written

httpsd.conf, <VirtualHost>, <Directory> and .htaccess

### Overwrite permission

FileInfo level

### Example

```
RequestHeader set Host www.example.com
```

## 2.3.122 RequestReadTimeout

RequestReadTimeout specifies the timeout time from the start of the reception of the request to the end of the reception of the request header, and from the start of the reception of the request body to the end.

### Description

RequestReadTimeout specifies the timeout time (in seconds) from the start of the reception of the request to the end of the reception of the request header, and from the start of the reception of the request body to the end.

This is effective in preventing requests that take a long time to send data from occupying server resources for a long time.

Note that the mod_reqtimeout module needs to be implemented to set the timeout.

```
LoadModule reqtimeout_module modules/mod_reqtimeout.so
```

In addition, we recommend that you also suppress output of the module trace at the same time.

```
HWSSuppressModuleTrace mod_reqtimeout.c
```

### Syntax

```
RequestReadTimeout type=time [type=time]
```

### Specifiable values

*type*

You can specify `header` and `body`.

- `header`

  Specify this if you want to monitor the elapsed time from the start of the reception of the request to the end of the reception of the request header.

- `body`

  Specify this if you want to monitor the elapsed time from the start of the reception of the request body to the end.

*time*

Specify the timeout time (in seconds) from the start of the reception of the request to the end of the reception of the request header, and from the start of the reception of the request body to the end.

You can specify a value from 0 to 2,147,483,647. If you specify `0`, the timeout is not set.

### Default value

If the definition item is omitted:

`20`

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

### Examples

Example 1:

```
RequestReadTimeout header=10 body=30
```

The timeout time from the start of the reception of the request to the end of the reception of the request header is set to 10 seconds. The timeout time from the start of the reception of the request body to the end is set to 30 seconds.

Example 2:

```
RequestReadTimeout header=0 body=0
```

The timeout is not set.

## 2.3.123 Require

`Require` defines access control.

### Description

`Require` defines access control by specifying with the following directives: `AuthName`, `AuthType` , and `AuthUserFile` (or `AuthGroupFile`).

### Syntax

```
Require {user user_name [user_name ...]
|group group_name [group_name ...]|valid-user|file-owner|file-group}
```

### Specifiable values

`user`

Among the users that are registered in the password file specified for the `AuthUserFile` directive, only specified users are allowed access.

`group`

Among the users that belong to the groups registered in the group file specified for the `AuthGroupFile` directive, only users that belongs to the specified groups are allowed access.

`valid-user`

All users that are registered in the password file specified for the `AuthUserFile` directive are allowed access.

`file-owner`

Among the users that are registered in the password file specified for the `AuthUserFile` directive, only users who are owners for the files to be accessed are allowed access.

`file-group`

Among the users that belong to the groups registered in the group file specified for the `AuthGroupFile` directive, only users who belong the owner groups for the files to be accessed are allowed access.

### Locations where it can be written

`<Directory>` and `.htaccess`

### Overwrite permission

AuthConfig level

## 2.3.124 Satisfy

`Satisfy` specifies the access condition when content access is restricted both by user authentication, and by host name or IP address.

### Description

`Satisfy` specifies the access condition when content access is restricted both by user authentication (for example, by specifying the `AuthUserFile` or `Require` directive) and by host name or IP address (for example, by specifying the `Allow from` or `Deny from` directive).

### Syntax

```
Satisfy {any|all}
```

### Specifiable values

`any`
Permits access to content if one of the conditions is met.

`all`
Permits access to content only if both conditions are met.

### Default value

If the definition item is omitted:
`all`

### Locations where it can be written

`<Directory>` and `.htaccess`

## 2.3.125 Script

`Script` executes a CGI script for a specific method.

### Description

`Script` executes the script specified by *CGI_script_name* when a request is made using the specified method.

Specifiable methods:
GET, POST, PUT, DELETE
The method name is case sensitive.
However, for the GET method, the script is called only if the request contains query arguments (for example, `/foo.html?bar`).

### Syntax

```
Script method CGI_script_name
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>` and `<Directory>`

### Example

```
Script POST /cgi-bin/search
```

## 2.3.126 ScriptAlias

`ScriptAlias` specifies the URL for executing a CGI program, and the name of the directory where the CGI program is located.

### Description

`ScriptAlias` specifies the request of the executing CGI program that was specified in the URL from the web browser, and the path of the directory containing the CGI program to be executed..

### Syntax

```
ScriptAlias URL directory_name
```

### Specifiable values

*URL*

Specify the URL for executing the CGI program.

A URL that is the same as the following directive value cannot be specified.

- *path_name_specified_for_ProxyPass*

For example, the following specification is not possible:

```
ScriptAlias /aaa/bbb/ C:/alias/
ProxyPass /aaa/ http://aaa.example.com/
```

*directory_name*

Specify the directory name where the CGI program is located.

Specify the directory name as an absolute path.

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

### Example

```
ScriptAlias /cgi-bin/ "installation_directory_for_Application_Server/httpsd/cgi-bin/"
```

## 2.3.127 ScriptAliasMatch

`ScriptAliasMatch` specifies a regular expression that indicates the URL for executing a CGI program, and the name of the directory where the CGI program is located.

### Description

`ScriptAliasMatch` executes the CGI program in the specified new path when the URL of a request of the executing the CGI program that was specified from the web browser meets the conditions specified by the regular expression. When the regular expression in *regular_expression* is surrounded by parentheses ( `()` ), you can specify `$n` (where *n* is a number from 1 to 9) which indicate the character string matching the *n*th regular expression in the *regular_expression*. For example, `$1` indicates the first group, and `$2` indicates the second group.

Specify the new path as an absolute path. In addition, if you want to include a dollar sign (`$`) or an ampersand (`&`) in the new path, add a backslash (`\`) before that character. Note that you do not need to add a backslash before the dollar sign when specifying `$i`.

A regular expression that is the same as the following directive value cannot be specified.

- *path_name_specified_for_ProxyPass*

For example, the following specification is not possible:

```
ScriptAliasMatch ^/aaa/bbb/(.*) C:/alias/$1
ProxyPass /aaa/ http://aaa.example.com/
```

### Syntax

```
ScriptAliasMatch regular_expression new_path
```

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

### Example

```
ScriptAliasMatch ^/cgi-bin/(.*)
 "installation_directory_for_Application_Server/httpsd/cgi-bin/$1"
```

## 2.3.128 ScriptLog

`ScriptLog` specifies the output destination of the error logs for the CGI script.

### Description

`ScriptLog` specifies the output destination of the error logs for the CGI script.

### Syntax

```
ScriptLog file_name
```

### Specifiable values

*file_name*

Specify the output destination of the error logs for the CGI script.

For *file_name*, specify an absolute path, or a relative path from the value specified in the `ServerRoot` directive.

Note that the user specified in the `User` directive must have the write permission for the file to be specified.

### Location where it can be written

`httpsd.conf`

## 2.3.129 ScriptLogBuffer

`ScriptLogBuffer` specifies the maximum size when the request body is logged.

### Description

`ScriptLogBuffer` specifies the maximum size (in bytes) when logging the body of a request made by the `PUT` or `POST` method. This specification has an effect only if the `ScriptLog` directive is used to specify the file to which the error log is output.

An area of the size specified in this directive is secured during request processing. Therefore, if you specify a large value, the memory might fail to be secured and the web server might stop. We recommend that you specify the default value or the minimum value.

### Syntax

```
ScriptLogBuffer size_of_buffers
```

### Specifiable values

0 to 2,147,483,647

### Default value

If the definition item is omitted:

```
1024
```

### Location where it can be written

`httpsd.conf`

## 2.3.130 ScriptLogLength

`ScriptLogLength` specifies the maximum size of the error log file for CGI scripts.

### Description

`ScriptLogLength` specifies the maximum size (in bytes) of the error log file for CGI scripts. This specification applies only when the `ScriptLog` directive is used to specify the file to which the error log is output.

### Syntax

```
ScriptLogLength file_size
```

### Specifiable values

0 to 2,147,483,647

### Default value

If the definition item is omitted
   10385760

### Location where it can be written

httpsd.conf

## 2.3.131 SendBufferSize

SendBufferSize specifies the size of the TCP send buffer of the web server.

### Description

SendBufferSize specifies the size (in bytes) of the TCP send buffer of the web server. If you specify 0, the default value of the operating system is used.

In a high-speed network environment, setting a larger value than the default value of the operating system can improve the performance of response sending.

### Syntax

```
SendBufferSize send_buffer_size
```

### Specifiable values

0, 512 to 2147483647

### Default value

If the definition item is omitted:
   0

### Location where it can be written

httpsd.conf

### Example

```
SendBufferSize 131072
```

## 2.3.132 ServerAdmin

ServerAdmin specifies the email address of the server administrator.

### Description

ServerAdmin specifies the email address of the server administrator. Always specify this if you want to specify the email address in the ServerSignature directive.

### Syntax

```
ServerAdmin email_address
```

### Locations where it can be written

httpsd.conf and <VirtualHost>

### Example

```
ServerAdmin www-admin@server.example.com
```

## 2.3.133 ServerAlias

ServerAlias specifies the alias for the host name to be used by the virtual host that is based on the server name.

### Description

ServerAlias specifies the alias for the host name (ServerName) to be used by the virtual host that is based on the server name. You can also specify a host name corresponding to an IPv6 address.

### Syntax

```
ServerAlias host_name [host_name ...]
```

### Location where it can be written

<VirtualHost>

## 2.3.134 ServerName

ServerName specifies the server name and the port number of the web server.

### Description

ServerName specifies the server name and the port number of the web server.

According to the specified value in the UseCanonicalName directive, the server name that can be accessed from the client must be specified because requests such as those using image maps or those that have a directory specified without a forward slash (/) at the end are sent back to the client when a redirect is ordered from the web server and the redirect destination is set to the Location header. This directive must be specified.

### Syntax

```
ServerName server_name[:port_number]
```

### Specifiable values

*server_name*

Specify a FQDN (fully qualified domain name) or an IP address.

For *server_name*, you can also specify an IPv6 address or a FQDN that corresponds with an IPv6 address.

If an IPv6 address is specified, and if you want to specify the port number, enclose the IPv6 address in square brackets ([ ]).

*port_number*

Specify the port number of the web server.

When the port number is omitted, the default port number is set (80 when SSL is disabled, and 443 when SSL is enabled).

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`

### Example

```
ServerName www.example.com
ServerName 2001::123:4567:89ab:cdef
ServerName [2001::123:4567:89ab:cdef]
ServerName [2001::123:4567:89ab:cdef]:8080
```

## 2.3.135 ServerPath

`ServerPath` specifies the path name to connect to each host by using the path name instead of the Host header, for the name-based virtual host.

### Description

`ServerPath` specifies the path name to connect to each host by using the path name instead of the Host header, for the name-based virtual host.

### Syntax

```
ServerPath path_name
```

### Location where it can be written

`<VirtualHost>`

## 2.3.136 ServerRoot

`ServerRoot` specifies the root directory of the web server.

### Description

`ServerRoot` specifies an absolute path for the root directory of the web server.

### Syntax

```
ServerRoot directory_name
```

### Default value

If the definition item is omitted:
`/opt/hitachi/APServer/httpsd`

### Location where it can be written

`httpsd.conf`

### Example

```
ServerRoot "installation_directory_for_Application_Server/httpsd"
```

## 2.3.137 ServerSignature

`ServerSignature` specifies whether to add a signature to the footer of content such as error messages created by the web server.

### Description

`ServerSignature` specifies whether to add a signature to the footer of content such as error messages created by the web server.

### Syntax

```
ServerSignature {On|Off|Email}
```

### Specifiable values

`On`

Displays a character string in accordance with the `ServerTokens` directive (for example, "Hitachi Web Server" or a version number), the server name in accordance with the value specified in the `UseCanonicalName` directive, and the port number.

```
Hitachi Web Server 10-00 at www.example.com Port 80
```

`Off`

Does not display a signature in the footer of the content.

`Email`

Adds the value specified in the `ServerAdmin` directive by using the `mailto` tag, in addition to the contents when `On` is specified.

### Default value

If the definition item is omitted:

`Off`

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>` and `.htaccess`

### Example

```
ServerSignature On
```

## 2.3.138 ServerTokens

`ServerTokens` specifies the format of the Server header.

### Description

`ServerTokens` specifies the format of the Server header in an HTTP response header.

> **Reference note**
>
> `Unix`, `Win32`, or `Win64` is set for *OS_type*. The usage of a Server header value depends on the client specifications.

### Syntax

```
ServerTokens {Minimal|OS|Full|ProductOnly}
```

### Specifiable values

The specifiable Server header values and the output format of the header are as follows:

`Minimal`

Hitachi Web Server *version_number*

`OS`

Hitachi Web Server *version_number* (*OS_type*)

`Full`

Hitachi Web Server *version_number* (*OS_type*)
*information_set_by_additional_program_product*

`ProductOnly`

Hitachi Web Server

### Default value

If the definition item is omitted:

`Full`

### Location where it can be written

`httpsd.conf`

### Example

```
ServerTokens Full
```

## 2.3.139 SetEnv

`SetEnv` specifies values for the environment variables to be passed to a CGI script.

### Description

`SetEnv` specifies values for the environment variables to be passed to a CGI script. If you specify this directive more than once, you cannot specify different values for the same environment variable.

### Syntax

```
SetEnv environment_variable value
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>` and `.htaccess`

### Overwrite permission

FileInfo level

### Example

```
SetEnv MY_ENV myenv
```

## 2.3.140 SetEnvIf

`SetEnvIf` defines an environment variable based on the request from a client.

### Description

`SetEnvIf` sets specified environment variables when the value of the request from a client meets conditions specified by a regular expression.

## Syntax

```
SetEnvIf request_value regular_expression environment_variable[=value]
[environment_variable[=value] ...]
```

## Specifiable values

*request_value*

You can specify the HTTP request header or the values listed in the table below.

The `SetEnvIf` directive enables you to check the environment variable specified in *request_value*, by specifying the environment variable of the directive specified earlier in the file, into the request value. However, in this case, the environment variable must not correspond to the HTTP request header or to the values listed in the table below.

| Request values | Meanings |
|---|---|
| `Remote_Addr` | IP address of the client |
| `Remote_Host` | Host name of the client (only if specified in the request) |
| `Request_Protocol` | Protocol of the request (such as HTTP/1.1) |
| `Request_Method` | Method name of the request (such as GET, POST, or HEAD) |
| `Request_URI` | URI of the request |
| `Server_Addr` | IP address of the server that received the request |

If you specify this directive more than once, you cannot specify the same request value more than once.

However, if you specify `Remote_Host` for the request value, you can specify a host name corresponding to an IPv6 address for the regular expression. In addition, you cannot use the request value `Remote_Addr` or `Server_Addr` for a connection using IPv6. If you want to use `Remote_Addr` or `Server_Addr`, specify them by using the `HWSSetEnvIfIPv6` directive.

*regular_expression*

Specify conditions.

*environment_variable*

Specify the environment variable to be set when the value of a request from a client meets the conditions specified by the regular expression.

Adding `!` before an environment variable disables the environment variable.

*values*

Specify the value for the environment variable.

The default value is `1`.

## Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>` and `.htaccess`

## Overwrite permission

FileInfo level

## Examples

Example 1:

```
SetEnvIf User-Agent "Mozilla.*" SETENVIF_USER_AGENT=Mozilla
```

Example 2:

```
SetEnvIf Request_URI "\.(gif)|(jpg)$" request_is_image
```

Example 3:

This example sets an environment variable for a specific client, from among the connections that use IPv4:

```
Listen 123.123.123.123:80
Listen [2001::123:4567:89ab:cdef]:80
<VirtualHost 123.123.123.123:80>
        SetEnvIf Remote_Addr ^234\.234\.234\.234$ IPV4_CLIENT
</VirtualHost>
```

# 2.3.141 SetEnvIfNoCase

`SetEnvIfNoCase` defines an environment variable based on the request from a client.

## Description

`SetEnvIfNoCase` sets specified environment variables when the value of the request from a client meets conditions specified by a regular expression.

## Syntax

```
SetEnvIfNoCase request_value regular_expression environment_variable[=value]
[environment_variable[=value] ...]
```

## Specifiable values

*request_value*

You can specify the HTTP request header or the values listed in the table below.

The `SetEnvIfNoCase` directive enables you to check the environment variable specified in *request_value*, by specifying the environment variable of the directive specified earlier in the file, into the request value. However, in this case, the environment variable must not correspond to the HTTP request header or to the values listed in the table below.

| Request values | Meanings |
|---|---|
| `Remote_Addr` | IP address of the client |
| `Remote_Host` | Host name of the client (only if specified in the request) |
| `Request_Protocol` | Protocol of the request (such as HTTP/1.1) |
| `Request_Method` | Method name of the request (such as GET, POST, or HEAD) |
| `Request_URI` | URI of the request |
| `Server_Addr` | IP address of the server that received the request |

If you specify this directive more than once, you cannot specify the same *request_value* more than once.

However, if you specify `Remote_Host` for the request value, you can specify a host name corresponding to an IPv6 address for the regular expression. In addition, you cannot use the request value `Remote_Addr` or `Server_Addr` for a connection using IPv6. If you want to use `Remote_Addr` or `Server_Addr`, specify them by using the `HWSSetEnvIfIPv6` directive.

*regular_expression*

Specify conditions.

Note that, in this directive, the regular expression is not case-sensitive.

*environment_variable*

Specify the environment variable to be set when the value of a request from a client meets the conditions specified by the regular expression.

Adding `!` before an environment variable disables the environment variable.

*values*

Specify the value for the environment variable.

The default value is `1`.

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

FileInfo level

## 2.3.142 SetHandler

`SetHandler` specifies the name of the handler for which an association is to be created.

### Description

`SetHandler` specifies the name of the handler to which all requests within the scope of the specified `<Directory>` or the access control file are to be associated. If you specify `none` for the handler name, any previous setting of the `SetHandler` directive is disabled.

### Syntax

```
SetHandler handler_name
```

### Locations where it can be written

`<Directory>`, `.htaccess`

### Overwrite permission

FileInfo level

## 2.3.143 SSLBanCipher

`SSLBanCipher` denies access of the specified encryption type and returns the status code 403 Forbidden.

### Description

`SSLBanCipher` denies access of specified encryption type and returns the status code 403 Forbidden.

The following table lists encryption types:

| Encryption type | Key exchange method | Authentication method | Symmetric key cryptography | Encryption key size (in bits) | Message authentication algorithm |
|---|---|---|---|---|---|
| `RC4-MD5` | RSA | RSA | RC4 | 128 | MD5 |
| `RC4-SHA` | RSA | RSA | RC4 | 128 | SHA |
| `AES128-SHA` | RSA | RSA | AES | 128 | SHA |
| `AES128-SHA256` | RSA | RSA | AES | 128 | SHA256 |
| `DES-CBC3-SHA` | RSA | RSA | DES | 168 | SHA |
| `AES256-SHA` | RSA | RSA | AES | 256 | SHA |
| `AES256-SHA256` | RSA | RSA | AES | 256 | SHA256 |

### Syntax

```
SSLBanCipher encryption_type [encryption_type ...]
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

FileInfo level

## 2.3.144 SSLCACertificateFile

`SSLCACertificateFile` specifies the CA certificate file.

### Description

For SSL server and client authentication, `SSLCACertificateFile` specifies the file name of the public key (PEM format) of the CA (Certificate Authority). By concatenating multiple certificate files, you can create a single file that contains multiple certificates.

For *file_name*, specify the absolute path.

- For server authentication:
  To perform authentication by using the server certificate issued by the chained CA, specify the certificate of the chained CA.

- For client authentication:

  Specify the certificate of the CA that issued the client certificate. For the chained client certificate, also specify the certificate of the chained CA.

### Syntax

```
SSLCACertificateFile file_name
```

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

### Example

```
SSLCACertificateFile "installation_directory_for_Application_Server
/httpsd/conf/ssl/cacert/anycert.pem"
```

## 2.3.145 SSLCACertificatePath

`SSLCACertificatePath` specifies the directory that stores the hash link to the CA certificate.

### Description

For SSL server and client authentication, `SSLCACertificatePath` specifies the directory that stores the hash link to the CA certificate (PEM format).

The hash link is necessary to verify the client certificate. For the obtained CA certificate, create a hash link in a specific directory, and then specify the directory in the `SSLCACertificatePath` directive.

Specify the directory name as an absolute path.

### Syntax

```
SSLCACertificatePath directory
```

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

### Example

```
SSLCACertificatePath "installation_directory_for_Application_Server/httpsd/conf/ssl/
cacerts"
```

## 2.3.146 SSLCacheServerPath

`SSLCacheServerPath` specifies the path name for the SSL session management cache server `gcache`.

### Description

SSLCacheServerPath specifies the path name for the SSL session management cache server gcache. Specify the path name as an absolute path or as a relative path from the ServerRoot directive.

### Syntax

```
SSLCacheServerPath path_name
```

### Location where it can be written

httpsd.conf

### Example

```
SSLCacheServerPath "installation_directory_for_Application_Server/httpsd/sbin/gcache"
```

## 2.3.147 SSLCacheServerPort

SSLCacheServerPort specifies the port number or path name for exchanging data between the web server and the SSL session management cache server gcache.

### Description

SSLCacheServerPort specifies the port number or path name for exchanging data between the web server and SSL session management cache server gcache. For *path_name*, specify the path name as an absolute path or as a relative path from the ServerRoot directive.

### Syntax

```
SSLCacheServerPort {port_number|path_name}
```

### Specifiable values

When specifying the port number:

1 to 65535

### Location where it can be written

httpsd.conf

### Example

```
SSLCacheServerPort logs/gcache_port
```

## 2.3.148 SSLCacheServerRunDir

SSLCacheServerRunDir specifies the path name where the SSL session management cache server gcache is running.

### Description

SSLCacheServerRunDir specifies the path name where the SSL session management cache server gcache is running. Use this directive to specify the directory where gcache stores the core dumps. Specify the path name as an absolute path or as a relative path from the ServerRoot directive. The user specified in the User directive must have read, write, and execute permissions for the directory specified for the path name.

### Syntax

```
SSLCacheServerRunDir path_name
```

### Default value

If the definition item is omitted

Value specified in the ServerRoot directive.

### Location where it can be written

httpsd.conf

### Example

```
SSLCacheServerRunDir "installation_directory_for_Application_Server/httpsd/logs
```

## 2.3.149 SSLCertificateFile

SSLCertificateFile specifies the certificate file of the web server when SSL authentication is used.

### Description

SSLCertificateFile specifies the certificate file (PEM format) of the web server when SSL authentication is used.

For *file_name*, specify an absolute path.

### Syntax

```
SSLCertificateFile file_name
```

### Locations where it can be written

httpsd.conf and <VirtualHost>

### Example

```
SSLCertificateFile "installation_directory_for_Application_Server
/httpsd/conf/ssl/server/httpsd.pem"
```

## 2.3.150 SSLCertificateKeyFile

SSLCertificateKeyFile specifies the private key file of the web server when SSL authentication is used.

### Description

SSLCertificateKeyFile specifies the private key file of the web server when SSL authentication is performed.

For *file_name*, specify an absolute path.

### Syntax

```
SSLCertificateKeyFile file_name
```

### Default value

If the definition item is omitted

Value specified in the SSLCertificateFile directive.

### Locations where it can be written

httpsd.conf and <VirtualHost>

### Example

```
SSLCertificateKeyFile "installation_directory_for_Application_Server
/httpsd/conf/ssl/server/httpsdkey.pem"
```

## 2.3.151 SSLCertificateKeyPassword

SSLCertificateKeyPassword specifies the file for storing the password of the password-protected server private key.

### Description

SSLCertificateKeyPassword specifies the path name of the file for storing the password of the password-protected server private key. Create a password storage file by using the sslpasswd command. For *path_name*, specify an absolute path or a relative path from the ServerRoot directive.

### Syntax

```
SSLCertificateKeyPassword path_name
```

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

## 2.3.152 SSLCRLAuthoritative

`SSLCRLAuthoritative` specifies the behavior when the date of the next CRL issuance passes.

### Description

`SSLCRLAuthoritative` specifies how to handle the next issuance date of the CRL to be used for SSL client authentication.

### Syntax

```
SSLCRLAuthoritative {On|Off}
```

### Specifiable values

`On`

In SSL client authentication, if the next issuance date of the CRL corresponding to the client certificate has passed, authentication fails, and the web server denies access to the client. For this reason, proper handling of the CRL is required.

`Off`

Ignores the next issuance date of the CRL. The client can access the server even if it is not registered in the CRL, because the CRL is treated as valid, even if the next issuance date has passed. The security level is reduced, but the service can continue running at the minimum level of security, even if the CRL is not handled properly.

### Default value

If the definition item is omitted

`On`

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

### Example

```
SSLCRLAuthoritative On
```

After the next issuance date of a CRL passes, the web server denies access to clients holding a certificate issued by the CA that issued that CRL.

## 2.3.153 SSLCRLDERPath

`SSLCRLDERPath` specifies the directory that stores the CRLs in the DER format.

### Description

SSLCRLDERPath specifies the absolute path to the directory that stores CRLs in the DER format. To use CRLs for SSL client authentication, store the required CRLs in the specified directory, and then start or restart the web server. If the directory contains multiple CRLs issued by the same CA (including the CRLs in the directory specified in the SSLCRLPEMPath directive), the CRL that has the most recent issuance date is used. If the directory contains a file that is not a CRL in the DER format, the web server will not start.

### Syntax

```
SSLCRLDERPath path_name
```

### Locations where it can be written

httpsd.conf and <VirtualHost>

### Example

```
SSLCRLDERPath "installation_directory_for_Application_Server/httpsd/conf/ssl/crl/DER"
```

Specify the directory for storing CRL files in the DER format.

## 2.3.154 SSLCRLPEMPath

SSLCRLPEMPath specifies the directory that stores CRLs in the PEM format.

### Description

SSLCRLPEMPath specifies the absolute path to the directory that stores CRLs in the PEM format. To use CRLs for SSL client authentication, store the required CRLs in the specified directory, and then start or restart the web server. If the directory contains multiple CRLs issued by the same CA (including the CRLs in the directory specified in the SSLCRLDERPath directive), the CRL that has the most recent issuance date is used. If the directory contains a file that is not a CRL in the PEM format, the web server will not start.

### Syntax

```
SSLCRLPEMPath path_name
```

### Locations where it can be written

httpsd.conf and <VirtualHost>

### Example

```
SSLCRLPEMPath "installation_directory_for_Application_Server/httpsd/conf/ssl/crl/PEM"
```

Specify the directory for storing CRL files in the PEM format.

## 2.3.155 SSLDenySSL

SSLDenySSL prohibits SSL access.

### Description

SSLDenySSL prohibits SSL access. If this directive is specified, HTTPS access is denied with the status code 403 Forbidden, even if SSL is enabled by the SSLEnable directive. The behavior of this directive is the opposite of that of the SSLRequireSSL directive.

### Syntax

```
SSLDenySSL
```

### Locations where it can be written

httpsd.conf, <VirtualHost>, <Directory>, and .htaccess

### Overwrite permission

FileInfo level

## 2.3.156 SSLDisable

SSLDisable disables SSL.

### Description

SSLDisable disables SSL. SSL is enabled by default (or by specification of the SSLEnable directive). Specify this item, for example, to disable SSL on a specific host on a virtual host.

### Syntax

```
SSLDisable
```

### Locations where it can be written

httpsd.conf and <VirtualHost>

## 2.3.157 SSLEnable

SSLEnable enables SSL.

### Description

SSLEnable enables SSL. Unless the SSLDisable directive is specified, SSL is enabled by default.

### Syntax

```
SSLEnable
```

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

## 2.3.158 SSLExportCertChainDepth

`SSLExportCertChainDepth` specifies the depth of the certificate chain, when certificates (from those from the CA that issued the client certificate, to those from the root CA) are to be set to the environment variables `SSL_CLIENT_CERT_CHAIN_`*n*.

### Description

When SSL client authentication is used, `SSLExportCertChainDepth` specifies the depth of the certificate chain, when certificates (from those from the CA that issued the client certificate, to those from the root CA) are to be set for the environment variables `SSL_CLIENT_CERT_CHAIN_`*n*. The specified value becomes the maximum value of *n*. This directive is enabled only if the `SSLExportClientCertificates` directive is specified. Because the value specified in this directive will be the number of CA certificates that are cached on the gcache server, you can use the cache more efficiently if you specify the number of CA certificates that are necessary for CGI programs and servlets. Note, however, that if some of the certificates that were cached because of memory restrictions have been deleted and can no longer be acquired, only the certificates that can be acquired will be set in the environment variables.

### Syntax

```
SSLExportCertChainDepth value
```

### Specifiable values

0
: Does not set the environment variables.

1 to 9
: Assigns certificates to the environment variables in order from the certificate closest to the client certificate. The values derived by changing DER-format certificates to Base64-encoding are set for the environment variables. The size of a certificate encoded in Base64 is approximately 1 KB.

### Default value

If the definition item is omitted
: 0

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

### Example

For a certificate chain consisting of "root CA-lower CA-client certificate"

The following table shows the correlation between the environment variables and certificates:

| Environment variable | Certificate |
|---|---|
| SSL_CLIENT_CERT | Client certificate |
| SSL_CLIENT_CERT_CHAIN_1 | Lower CA certificate |
| SSL_CLIENT_CERT_CHAIN_2 | Root CA certificate |

To obtain all environment variables and certificate chains, specify the directive as follows:

```
SSLExportClientCertificates
SSLExportCertChainDepth 2
```

For SSLExportCertChainDepth, specify 2 or a greater value.

## 2.3.159 SSLExportClientCertificates

SSLExportClientCertificates specifies to set the client certificate for the environment variable SSL_CLIENT_CERT.

### Description

For SSL client authentication, SSLExportClientCertificates specifies to set the client certificate for the environment variable SSL_CLIENT_CERT. Set the values derived by changing DER-format certificates to Base64-encoding for the environment variable SSL_CLIENT_CERT.

### Syntax

```
SSLExportClientCertificates
```

### Locations where it can be written

httpsd.conf, <VirtualHost>, <Directory>, and .htaccess

## 2.3.160 SSLFakeBasicAuth

SSLFakeBasicAuth specifies to enable basic authentication by using the client certificate.

### Description

Along with SSL client authentication, SSLFakeBasicAuth specifies to enable basic authentication by using only the client certificate, even if the user ID and password are not entered in the web browser. The file specified in the AuthUserFile directive must contain Subject and the password of the X509 client certificate. The password is fixed to the following value (generated by encrypting "password"):

```
"{SHA}W6ph5Mm5Pz8GgiULbPgzG37mj9g="
```

### Syntax

```
SSLFakeBasicAuth
```

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

### Example

The value of the `Subject` field in the certificate that is displayed by the `hwscertutil` command is as follows:

```
Subject: EMAIL=username@userhost,CN=username,OU=Software,O=HITACHI,
L=Yokohama-shi,ST=Kanagawa,C=JP
```

In this case, the file to be specified by the `AuthUserFile` directive is as follows:

```
/C=JP/ST=Kanagawa/L=Yokohama-shi/O=HITACHI/OU=Software/CN=username
/Email=username@userhost:{SHA}W6ph5Mm5Pz8GgiULbPgzG37mj9g=
```

The value of `Subject` is recorded in a log if `u` is specified in the `LogFormat` directive.

If authentication fails, the status code 401 Authorization Required is returned.

## 2.3.161 SSLProtocol

`SSLProtocol` specifies the version of the SSL protocol to be used.

### Description

`SSLProtocol` specifies the version of the SSL protocol to be used.

You can specify the following values for *protocol_name*:

`SSLv3`
: Uses SSL protocol version 3.

`TLSv1`
: Uses TLS protocol version 1.0.

`TLSv11`
: Uses TLS protocol version 1.1.

`TLSv12`
: Uses TLS protocol version 1.2.

`All`
: Uses all of the above protocols.

### Syntax

```
SSLProtocol protocol_name [protocol_name ...]
```

### Default value

If the definition item is omitted

`All`

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

## 2.3.162 SSLRequireCipher

`SSLRequireCipher` denies access that uses an encryption type other than the specified types, and returns the status code 403 Forbidden.

### Description

`SSLRequireCipher` denies access that uses an encryption type other than the specified types, and returns the status code 403 Forbidden.

The following table lists encryption types.

| Encryption type | Key exchange method | Authentication method | Symmetric key cryptography | Encryption key size (in bits) | Message authentication algorithm |
|---|---|---|---|---|---|
| `RC4-MD5` | RSA | RSA | RC4 | 128 | MD5 |
| `RC4-SHA` | RSA | RSA | RC4 | 128 | SHA |
| `AES128-SHA` | RSA | RSA | AES | 128 | SHA |
| `AES128-SHA256` | RSA | RSA | AES | 128 | SHA256 |
| `DES-CBC3-SHA` | RSA | RSA | DES | 168 | SHA |
| `AES256-SHA` | RSA | RSA | AES | 256 | SHA |
| `AES256-SHA256` | RSA | RSA | AES | 256 | SHA256 |

### Syntax

```
SSLRequireCipher encryption_type [encryption_type ...]
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

FileInfo level

## 2.3.163 SSLRequiredCiphers

SSLRequiredCiphers specifies encryption types that can be used for the SSL communication.

### Description

SSLRequiredCiphers specifies the encryption types that can be used for the SSL communication. If one of the encryption types specified in this directive matches one of the encryption types that can be used by the client, SSL communication can be established and HTTP requests can be received. If none of these encryption types match, SSL communication cannot be established and HTTP requests cannot be received.

The following table lists encryption types.

| Encryption type | Key exchange method | Authentication method | Symmetric key cryptography | Encryption key size (in bits) | Message authentication algorithm |
|---|---|---|---|---|---|
| RC4-MD5 | RSA | RSA | RC4 | 128 | MD5 |
| RC4-SHA | RSA | RSA | RC4 | 128 | SHA |
| AES128-SHA | RSA | RSA | AES | 128 | SHA |
| AES128-SHA256 | RSA | RSA | AES | 128 | SHA256 |
| DES-CBC3-SHA | RSA | RSA | DES | 168 | SHA |
| AES256-SHA | RSA | RSA | AES | 256 | SHA |
| AES256-SHA256 | RSA | RSA | AES | 256 | SHA256 |

### Syntax

```
SSLRequiredCiphers encryption_type [:encryption_type ...]
```

### Locations where it can be written

httpsd.conf and <VirtualHost>

### Example

```
SSLRequiredCiphers RC4-MD5:RC4-SHA:DES-CBC3-SHA:AES128-SHA:AES256-SHA
```

## 2.3.164 SSLRequireSSL

SSLRequireSSL prohibits non-SSL access.

### Description

SSLRequireSSL prohibits non-SSL access. If this directive is specified, HTTP access is denied with the status code 403 Forbidden, even when SSL is disabled by the SSLDisable directive. This directive prevents the inadvertent disabling of SSL and inadvertent disclosure of content that might occur if other directives are incorrectly specified.

### Syntax

```
SSLRequireSSL
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

FileInfo level

### Example

```
<VirtualHost 172.17.40.10:443>
 SSLDisable
 ...
 <Directory /secure/dir>
 SSLRequireSSL
 ...
 </Directory>
 </VirtualHost>
```

In this example, HTTP access to port 443 of the host 172.17.40.10 is allowed, but access to the `/secure/dir` directory is not allowed. For HTTP access to the `/secure/dir` directory, the status code 403 Forbidden is returned.

## 2.3.165 SSLSessionCacheSize

`SSLSessionCacheSize` specifies the maximum size of the session cache.

### Description

`SSLSessionCacheSize` specifies the maximum memory size (in bytes) of data, such as session ID information, that is to be cached in the memory of the SSL session management cache server gcache. If 0 is specified, the gcache server does not start and session caching is not performed.

If `max` is specified, the maximum size is not set. When only server authentication is being used, approximately 200 bytes are used per SSL session. When client authentication is also being used, approximately 1 kilobyte is used per SSL session.

### Syntax

```
SSLSessionCacheSize {size|max}
```

### Specifiable values

0 to 2147483647

### Default value

If the definition item is omitted

`16777216`

### Location where it can be written

`httpsd.conf`

### Example

```
SSLSessionCacheSize 1024
```

## 2.3.166 SSLSessionCacheSizePerChild

`SSLSessionCacheSizePerChild` specifies the maximum size of the session cache to be cached in the server process.

### Description

`SSLSessionCacheSizePerChild` specifies the maximum memory size of data, such as session ID information, that is to be cached in the server process memory. If `max` is specified, the maximum memory size is not set.

### Syntax

```
SSLSessionCacheSizePerChild {size|max}
```

### Specifiable values

0 to 2147483647

### Default value

If the definition item is omitted
   `20480`

### Location where it can be written

`httpsd.conf`

### Example

```
SSLSessionCacheSizePerChild 1024
```

## 2.3.167 SSLSessionCacheTimeout

`SSLSessionCacheTimeout` specifies the validity period for the SSL sessions.

### Description

`SSLSessionCacheTimeout` specifies the validity period (in seconds) for data, such as session ID information, that is kept on the web server or on the SSL session management cache server gcache.

**Important note**

Set a value for the validity period that does not exceed January 19, 2038, 03:14:07 Greenwich Mean Time (GMT).

### Syntax

```
SSLSessionCacheTimeout value
```

### Specifiable values

1 to 2147483647

### Default value

If the definition item is omitted

3600

### Locations where it can be written

httpsd.conf and <VirtualHost>

### Example

```
SSLSessionCacheTimeout 3600
```

## 2.3.168 SSLVerifyClient

SSLVerifyClient specifies the settings for the certificates used for client authentication.

### Description

SSLVerifyClient specifies the settings for the certificates used for client authentication.

### Syntax

```
SSLVerifyClient {0|1|2}
```

### Specifiable values

0

No certificate is required.

1

The client can present a certificate (for the operational test).

2

The client must present a certificate.

### Default value

If the definition item is omitted

0

### Locations where it can be written

httpsd.conf and <VirtualHost>

### Example

```
SSLVerifyClient 2
```

## 2.3.169 SSLVerifyDepth

SSLVerifyDepth specifies the level to which certificate chains are to be traced.

### Description

SSLVerifyDepth specifies the level to which certificate chains are to be traced.

For the CA certificate chain used for client authentication, specify the level to which the authentication check is to be performed for the CA certificate chain. Use this directive to limit the number of chained CAs to be trusted. For *number_of_levels*, specify 2 or a greater value, because self-signed certificates are not authenticated. The following is an example:

Example:

Condition 1

CA1 is signed by the root CA.

Condition 2

Certificate 1 is signed by the root CA.

Condition 3

Certificate 2 is signed by CA1.

Value to be specified in the SSLVerifyDepth directive

In the above example, to perform the authentication check for both certificates 1 and 2, specify 3 or a greater value in the SSLVerifyDepth directive. To perform the authentication check for certificate 1 but not for certificate 2, specify 2 in the SSLVerifyDepth directive.

### Syntax

```
SSLVerifyDepth number_of_levels
```

### Specifiable values

0 to 10

### Default value

If the definition item is omitted
    0

### Locations where it can be written

httpsd.conf and <VirtualHost>

### Example

```
SSLVerifyDepth 10
```

## 2.3.170 StartServers

StartServers specifies the number of server processes created when the web server is started.

### Description

StartServers specifies the number of server processes created when the web server is started.

### Syntax

```
StartServers number_of_processes
```

### Specifiable values

0 to 1,024

### Default value

If the definition item is omitted:
    5

### Locations where it can be written

httpsd.conf

### Examples

```
StartServers 5
```

## 2.3.171 Timeout

Timeout specifies the wait time for transmission to or from the web server.

### Description

`Timeout` specifies the following wait time in seconds. If `0` is specified, the wait time becomes 0 seconds.

- Wait time when data cannot be received during reception of a request from a client (after a connection is established, during reception by the HTTP protocol)
- Wait time when data cannot be sent during the sending of a response to a client
- Wait time when data cannot be sent during the sending of a request to a CGI program
- Wait time until the response is received after a request is sent to a CGI program
- Wait time when data cannot be received during reception of a response from a CGI program
- Wait time until the pipe is closed for input and output after a response is received from a CGI program.
- Wait time when data cannot be sent during the sending of a request to the backend server, when a reverse proxy is used.
- Wait time until the response is received after a request is sent to the backend server, when a reverse proxy is used.
- Wait time when data cannot be received during reception of a response from the backend server, when a reverse proxy is used.

The `ProxyTimeout` directive value takes priority over the wait time for transmission to or from the backend server when a reverse proxy is used.

### Syntax

```
Timeout time
```

### Specifiable values

0 to 65,535

### Default value

If the definition item is omitted:

```
60
```

### Location where it can be written

`httpsd.conf`

### Example

```
Timeout 300
```

## 2.3.172 TraceEnable

`TraceEnable` specifies whether to reject requests made by the `TRACE` method.

### Description

`TraceEnable` specifies whether to reject requests made by the `TRACE` method.

### Syntax

```
TraceEnable {On|Off|extended}
```

### Specifiable values

`On`

Accepts requests made by the `TRACE` method. However, if a request body is added, `413 Request Entity Too Large` is returned as a response.

`Off`

Rejects requests made by the `TRACE` method. If a request is made by the `TRACE` method, the status code `403 Forbidden` is returned as a response.

`extended`

Accepts requests made by the `TRACE` method. A request is accepted even if the request body is added. However, the maximum request body size other than a reverse proxy is 64 KB.

### Default value

If the definition item is omitted:

`On`

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

### Example

```
TraceEnable Off
```

## 2.3.173 TransferLog

`TransferLog` outputs the access log in the format specified in the `LogFormat` directive without specifying the label name.

### Description

`TransferLog` specifies a file to store the log, or a program that outputs the log. You can specify the log format in the `LogFormat` directive without specifying the label name.

If the log format is specified in the `LogFormat` directive, IPv6 addresses and host names corresponding to IPv6 addresses can be output.

If the log format is not specified in the `LogFormat` directive, the log is output in the standard log format.

### Syntax

```
TransferLog {file_name|pipe}
```

### Specifiable values

*file_name*

Specify the name of the file to store the log. For *file_name*, specify an absolute path, or a relative path from the value specified in the `ServerRoot` directive.

*pipe*

Specify the program that receives the log information from the standard input in "`|`*program_name*" format.

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

### Example

```
TransferLog "|
\"\"installation_directory_of_Application_Server/httpsd/sbin/rotatelogs.exe\"
\"installation_directory_of_Application_Server/httpsd/logs/access\" 86400\""
```

The example uses the rotatelogs program to collect the log every 24 hours.

## 2.3.174 TypesConfig

`TypesConfig` specifies the configuration file that defines the relationship between file extensions and a content type.

### Description

`TypesConfig` specifies the configuration file that defines the relationship between file extensions and a content type (MIME type). For *file_name*, specify an absolute path, or a relative path from the value specified in the `ServerRoot` directive.

Specify the each item in the configuration file in the following format. Lines that only have a MIME type specified will be ignored.

```
MIME_type file_extension [file_extension ...]
```

Adding # to the beginning of a line changes the line to a comment.

### Syntax

```
TypesConfig file_name
```

### Default values

If the definition item is omitted:

`conf/mime.types`

### Location where it can be written

`httpsd.conf`

### Example

```
TypesConfig conf/mime.types
```

The configuration file of the MIME type is `mime.types`.

## 2.3.175 UnsetEnv

`UnsetEnv` specifies environment variables, specified in the `SetEnv` directive or the `PassEnv` directive, that are to be deleted from the environment variables passed to a CGI script.

### Description

`UnsetEnv` specifies environment variables, specified in the `SetEnv` directive or the `PassEnv` directive, that are to be deleted from the environment variables passed to a CGI script.

### Syntax

```
UnsetEnv environment_variable [environment_variable ...]
```

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, `<Directory>`, and `.htaccess`

### Overwrite permission

FileInfo level

### Example

```
UnsetEnv MY_ENV
```

## 2.3.176 UseCanonicalName

`UseCanonicalName` specifies how to generate the canonical name of the web server.

### Description

`UseCanonicalName` specifies how to generate the canonical name of the web server. The canonical name of the web server is set in the URL that references the local server and in the environment variables `SERVER_NAME` and `SERVER_PORT`. Note that IPv6 addresses are supported for all of the following: `On`, `Off`, and `dns`.

### Syntax

```
UseCanonicalName {On|Off|dns}
```

### Specifiable values

`On`

Creates the canonical name of the web server from the value specified in the `ServerName` directive, and then sets the name into the URL that references the local server and into the environment variables. If an IP address is specified in the `VirtualHost` directive, specify `ServerName` within the `VirtualHost` block. If `ServerName` is not specified within the block, the host name will be obtained from the IP address.

`Off`

Creates the canonical name of the web server from the host name and the port number given from the client by the Host header, and then sets the name into the URL that references the local server and into the environment variables. However, if the Host header cannot give this information, the canonical name of the web server is created from the value of the `ServerName` directive and the port number used in the actual connection.

`dns`

This option is for old clients that do not have Host headers. If you specify this option, the canonical name of the web server is created by reverse resolution of the IP address given by the client and the port number that is actually being used in the connection, and then the name is set into the URL that references the local server and into the environment variables.

### Default value

If the definition item is omitted:

`Off`

### Locations where it can be written

`httpsd.conf`, `<VirtualHost>`, and `<Directory>`

## 2.3.177 User

`User` specifies the user name which is used to run the server processes.

### Description

`User` specifies the user name which is used to run the server processes.

### Syntax

```
User user_name
```

### Default values

If the definition item is omitted:

`#-1`

### Location where it can be written

`httpsd.conf`

### Example

```
User nobody
```

## 2.3.178 UserDir

`UserDir` specifies the location on the server to be disclosed when a web browser issues a request to */~user_name/*.

### Description

`UserDir` specifies the directory name of the location on the server to be disclosed when a web browser issues a request to */~user_name/*. If you specify `disabled`, you can specify the users to whom the web content is not disclosed.

Specify a relative path or an absolute path for the directory name.

*directory_name*

- When specifying a relative path:
  Specify the location when a user who has a user ID on the server is disclosing web content under the user's home directory. When a request to */~user_name/* is issued, *home_directory_of_user/directory_name* is accessed.
- When specifying an absolute path:
  Specify the location of the user directory. When a request to */~user_name/* is issued, *directory_name/user_name* is accessed.

`disabled`

Specify the users to whom the web content is not disclosed in response to a request to */~user_name/* issued from a web browser. The directory name to be accessed will not be converted for a request with the specified user name. If a user name is not specified, it is assumed that all users are specified as `disabled`.

#### Important note

- When you specify a directory name in multiple `UserDir` directives, the later-specified directory name overwrites the earlier-specified directory name.
- You can use the multiple `UserDir` directives to specify multiple disabled user name.

### Syntax

```
UserDir {directory_name|disabled [user_name [user_name ...]]}
```

### Default value

If the definition item is omitted:

`disabled`

### Locations where it can be written

`httpsd.conf` and `<VirtualHost>`

## Example

Example 1:

```
UserDir public_html
```

If the home directory of `user1` is `/home/user1`, `/home/user1/public_html/index.html` is accessed in response to a request for `http://host_name[:port_number]/~user1/index.html`.

Example 2:

```
UserDir /home
UserDir disabled user3
UserDir disabled user4 user5
```

`/home/user1/index.html` is accessed in response to a request for `http://host_name[:port_number]/~user1/index.html`. However, `user3` cannot access `http://host_name[:port_number]/~user3/index.html` when making a request for `/home/user3/index.html` because `disabled` is specified for `user3`. This also applies to `user4` and `user5`.

Example 3:

```
UserDir disabled
```

All users are specified as `disabled`.

## 2.4 mime.types

`mime.types` is a configuration file that defines the relationship between file extensions and content types.

### Description

`mime.types` defines the relationship between file extensions and content types (MIME types). This file is managed by the system administrator.

### Syntax

```
MIME_type file_extension [file_extension ...]
```

### Storage location

`/opt/hitachi/APServer/httpsd/conf/mime.types`

# 2.5 Access control file

The access control file defines the access controls.

## Description

Create an access control file (`.htaccess`) in a specific directory to specify an access permission for the directory.

Specify the name of the access control file by using the `AccessFileName` directive. The default is `.htaccess`.

You can enable the access controls in the access control file without restarting the web server. However, you need to set the `AllowOverride` directive in `httpsd.conf` to the appropriate level that permits overwriting to make the access controls function properly.

If you specify a password file for the access control file, when a user accesses the directory, the user is asked to enter a user name and password.

The access control file (`.htaccess`) does not need to correspond with the password file (`.htpasswd`) on a one-to-one basis. You can specify the same password file for the `AuthUserFile` directive in a different access control file.

## Syntax

The syntax of the directive is as follows.

Regular expression:

The following are the regular expressions that can be used for defining the directive:

| Code | Functionality | Usage example | Meaning of the usage example |
|---|---|---|---|
| `.` | Any single character | `a...c` | `a` is followed by any 3 characters, and then `c`. For example, `abcdc` matches this code. |
| `*` | The character right before this code is repeated zero or more times | `ab*cd*` | For example, `ac`, `abbbbc`, and `abbbbcd` match this example code. |
| `+` | The character right before this code is repeated one or more times | `ab*c+` | For example, `abbbc` matches this example code, but `abbb` does not. |
| `?` | Whether a character right before this code exists | `abbbc?` | For example, `abbbc` and `abbb` match this example code. |
| `\|` | A delimiter for options | `a\|bc\|d` | `a`, `bc`, or `d` |
| `\` | A special character (`. ^$*+?\|\[]()\{\}`) comes right after this code. However, `\\\` is used to express `\`. | `\.` | For example, `.` matches this example code. |
| | | `\\\` | For example, a single character `\` matches this example code. |
| `^` | The characters after the symbol are at the beginning of the line | `^ab` | For example, `abcde` matches this example code. |
| `$` | The characters before the symbol are at the end of the line | `abc$` | For example, `aaabc` matches this example code. |
| `{m}` | The regular expression right before this code is repeated *m* times | `a{5}` | For example, `aaaaa` matches this example code. |
| `{m,}` | The regular expression right before this code is repeated *m* or more times | `a{3,}` | For example, `aaa` and `aaaa` match this example code, but `aa` does not. |

| Code | Functionality | Usage example | Meaning of the usage example |
|---|---|---|---|
| {*m*,*n*} | The regular expression right before this code is repeated *m* or more times, and *n* or less times | a{3,5} | For example, aaa, aaaa, and aaaaa match this example code. aa and aaaaaa do not match this code. |
| [*character_string*] | The character is in the character string# | [abc]* or [a-c]* | For example, aaa, bbb, ccc, cba, and aab match this example code. |
| [^*character_string*] | The character is not in the character string | [^0-9] | Any single character other than a numerical character matches this example code. |
| (*character_string*) | The character string is grouped | (ab)+ | For example, ababab matches this example code, but ababb does not. |
| | | aa(xx\|yy)bb | For example, aaxxbb and aayybb match this example code. |

#

The following three characters have special meanings in [*character_string*].

^: Specify this character after the opening square bracket ([) to indicate characters that are not included in the character string.

]: This character is used to indicate the end of the character string.

-: This character is used specify a range.

In addition, backslashes (\) used before these special characters are omitted.

To use characters that have special meanings in [*character_string*] as normal characters, specify the character as below. Note that special characters other than the following four characters are treated as normal characters.

^: Specify this character anywhere except at the beginning of the character string. Example: [ab^yz]

]: Specify this character at the beginning of the character string. Example: []abxy]

-: Specify this character at the end of the character string. Example: [abxy-]

\: Specify \\\. Example: [\\\abxy]

Path information to be specified in the directive:

For directives that specify the directory name, file name or path name, the path information that can be specified differs depending on the types of directives.

The following are the types of paths. The path information for each directive is explained in each directive.

- Absolute path.
- Relative path from the value specified in the ServerRoot directive (however, note that the ServerRoot directive must be specified in advance).

In addition, you cannot specify directories or files on the network in the path information. You cannot specify directories or files on the file system that uses the network, either.

Comment line:

In the configuration file, add a hash mark (#) to the beginning of the line to make a comment line. However, if you write a character string that begins with a hash mark after the directive is specified, the characters after the hash mark will not be treated as comments.

The following shows an example of specifying a comment line:

- Correct example:

```
#Deny from all
```

The line beginning with the hash mark is treated as a comment line.

- Incorrect example:

```
Deny from all    #comment
```

The `#comment` part will be treated as a value specified for the directive. This will not be treated as a comment.

Notes on specification of IPv6 addresses

To describe the IPv6 address in the directive, enclose the IPv6 address in square brackets ( `[]` ), such as `[`*IPv6_address*`]`. In addition, when writing both the IPv6 address and the port number in the directive, enclose the IPv6 address in square brackets and specify the port number after a colon (`:`), such as `[`*IPv6_address*`]:`*port_number*.

However, do not enclose the IPv6 address in square brackets when writing the IPv6 address in the following directives:

- The `Allow from` directive
- The `Deny from` directive
- The `HWSSetEnvIfIPv6` directive

When you want to specify the IPv6 address for these directives, specify a global unicast address.

## Storage location

*Directory_to_be_defined_access_permissions*

## Examples

Use the following directory configuration to specify access permissions in the access control file for each directory.

```
[public_html for user001]
 |
 +-[auth]--+-.htaccess
 |         +-index.html
 |
 +-[test1]-+-.htaccess
 |         +-.htpasswd (user001/test1)
 |         +-index.html
 |         +-[test11]-+-.htaccess
 |         |          +-.htpasswd (user001/test11)
 |         |          +-index.html
 |         |
 |         +-[test12]-+-index.html
 |                    +-[test121]-+-.htaccess
 |                                +-index.html
 |
 +-[test2]-+-.htaccess
           +-.htpasswd (user001/test21,user002/test22,user003/test23)
           +-.groupfile(mygroup:  user001 user002)
           +-index.html
```

Example 1: Defining access permissions for the `auth` directory (`auth/.htaccess` file)

Denying access from the servers with the IP addresses `172.18.102.11` and `172.16.202.4`.

```
Order deny,allow                      ...1.
Deny from 172.18.102.11 172.16.202.4  ...2.
```

1. Evaluate the definition of access denial first.
2. Definition of the access denial

Example 2: Defining access permissions for the `test1` directory (`test1/.htaccess` file)

Permit access to `test1/index.html` and `test1/test12/index.html` only when you enter the user name `user001` and the password `test1`.

```
AuthUserFile C:/user001/public_html/test1/.htpasswd      ...1.
AuthName "test1 Directory"                               ...2.
AuthType Basic
<Limit GET POST>                                         ...3.
   Require user user001                                  ...4.
</Limit>
```

1. Definition of the user name (`user001`) and password (`test1`) registered in the password file.
2. Definition of the realm name
3. Definition of the method
4. Access for the user name `user001` is permitted.

Example 3: Defining access permissions for the `test1/test11` directory (`test1/test11/.htaccess` file)

Permit access to `test1/test11/index.html` only when you enter the user name `user001` and the password `test11`.

```
AuthUserFile C:/user001/public_html/test1/test11/.htpasswd      ...1.
AuthName "test11 Directory"                                     ...2.
AuthType Basic
<Limit GET POST>                                                ...3.
   Require user user001                                         ...4.
</Limit>
```

1. Definition of the user name (`user001`) and password (`test11`) registered in the password file.
2. Definition of the realm name
3. Definition of the method
4. Access for the user name `user001` is permitted.

Example 4: Defining access permissions for the `test1/test12/test121` directory (`test1/test12/test121/.htaccess` file)

Permit access to `test1/test12/test121/index.html` only when you enter the user name `user001`, the password `test1`, and your web browser is MSIE.

```
Order deny,allow      ...1.
Allow from env=MSIE   ...2.
Deny from all         ...3.
```

1. Evaluate the definition of access denial first.
2. If your web browser is MSIE, access is permitted.
3. Access from all hosts is denied.

Note that the directive shown below must be defined in `httpsd.conf`.

```
SetEnvIf User-Agent ".*MSIE.*" MSIE
```

Example 5: Defining access permissions for the `test2` directory (`test2/.htaccess` file)

Permit access to `test2/index.html` only when you enter a user name and password for the `mygroup` group.

```
AuthUserFile C:/user001/public_html/test2/.htpasswd        ...1.
AuthGroupFile C:/user001/public_html/test2/.groupfile      ...2.
AuthName "test2 Directory"                                 ...3.
AuthType Basic
<Limit GET POST>                                           ...4.
   Require group mygroup                                   ...5.
</Limit>
```

1. Definition of the following data stored in the password file

   User name: `user001`, Password: `test21`

   User name: `user002`, Password: `test22`

   User name: `user003`, Password: `test23`

2. Definition of the group name (`mygroup`) stored in the group file, and the user names (`user001`, `user002`, and `user003`) registered in `mygroup`
3. Definition of the realm name
4. Definition for the method
5. Access for the `mygroup` group is permitted.

## 2.6 Details on the definition items (utilities) used on web servers

This section describes the types of utilities used to configure the operating environment of the web server.

### 2.6.1 rotatelogs

`rotatelogs` splits logs by time and outputs them into multiple files.

#### Description

`rotatelogs` splits the access log or the error log by time (for example, in unit of 24 hours) and output the log into multiple files. You can specify the `rotatelogs` program in the following directives:

- `CustomLog` directive
- `ErrorLog` directive
- `HWSRequestLog` directive
- `TransferLog` directive

#### Syntax

```
rotatelogs prefix_of_log_files_to_be_generated_after_the_split
time_interval_for_splitting_log
    [-fnum number_of_files] [-diff time_difference_from_GMT]
```

*prefix_of_log_files_to_be_generated_after_the_split*

Specify the prefix, as an absolute path, of the log files to be generated after the split.

Logs will be collected into files whose names are in the format *prefix.nnnnnnnnnn*.

*nnnnnnnnnn* indicates the starting time when the log was obtained. The following formula is used to calculate the time when the log was obtained:

$\downarrow(A/B)\downarrow * B$

Legend
*A* : total number of seconds after January 1st 1970 00:00:00 GMT until the time when log is output
*B* : time interval for splitting log
↑ ↑ : value obtained by truncating the decimal part

*time_interval_for_splitting_log*

Specify the time interval (in seconds) for obtaining a log file. The log is collecting into a new file when the specified time elapses.

Specifiable values

1 to 31536000

-fnum *number_of_files*

Specify the maximum number of log files that can exist after the split. If the number of log files generated after the split exceeds this number, files are deleted in order from the oldest file. If this option is omitted, no files are deleted.

Specifiable values

1 to 256

`-diff` *`time_difference_from_GMT`*

Specify the time difference (in minutes) from GMT, which is used as the basic time for splitting the log file. If nothing or 0 (zero) is specified, the basic time is January 1, 1970, 00:00:00 (GMT). If the time difference between GMT and the local time is *n* hours and you want to set the *m*:00:00 (local time) as the basic time, specify the value obtained from the formula (*n*-*m*)*60. If you want to set 00:00:00 JST as the basic time, specify 540, which is calculated by the formula (+9-0)*60.

Specifiable values

`-1439` to `1439`

### Storage location

*`installation_directory_for_Application_Server`*`/httpsd/sbin`

### Example

Specify the directive by using the "`|`*`program_name`*" format. The log file will be split and collected into separate files at regular intervals.

At 24-hour intervals, the access log is split and log entries are collected into the file *`installation_directory_for_Application_Server`*`/httpsd/logs/access.`*`nnnnnnnnnn`*. In the following example, the log file is split every day at midnight (00:00:00), Japan time:

```
TransferLog "|installation_directory_for_Application_Server/httpsd/sbin/
rotatelogs installation_directory_for_Application_Server/httpsd/logs/access
86400 -diff 540"
```

- Log file name: *`installation_directory_for_Application_Server`*`/httpsd/logs/access.`*`nnnnnnnnnn`*
- Time interval for splitting the log: 86400 seconds (24 hours)

### Notes

- The `rotatelogs` program does not terminate processes when the `SIGTERM`, `SIGUSR1` and `SIGHUP` signals are received. Processes will terminate when the control process and the server process terminate.
- Regarding the control of log files by specifying the `-fnum` option is specified, if you change the directory name or the log file prefix when restarting the web server, the log files that were previously obtained will not be deleted. In this case, delete the files as needed.
- After the startup or restart of the web server, when the specified interval for splitting the log elapses, if the number of files that have the prefix of log files generated after the split exceeds the value specified in the `-fnum` option, the log files are deleted in order from the oldest file.
- Be sure to specify the prefix of the log files to be generated after the split, as an absolute path.
- If an argument of the `rotatelogs` program is incorrect, the `rotatelogs` program does not start but the web server starts. In this case, logs are not output. If you specify the `rotatelogs` program, make sure log files are created and split as intended.

## 2.6.2 rotatelogs2

`rotatelogs2` splits logs by file size and outputs them into multiple files.

## Description

rotatelogs2 splits the access log or the error log by log file size, and output the log into multiple files by using the wraparound method. You can specify the rotatelogs2 program in the following directives:

- CustomLog directive
- ErrorLog directive
- HWSRequestLog directive
- TransferLog directive

## Syntax

```
rotatelogs2 prefix_of_log_files log_file_size
    number_of_files
```

*prefix_of_log_files*

Specify the prefix, as an absolute path, of the log files to be generated after the split.

Logs will be collected into files whose names are in the format prefix.*nnn*.

*nnn* is the number of log files, from 001 to the number specified in *number_of_files*.

If the number of log files is *nnn*, among the *nnn* files, the file that had the latest update time when the web server started will be the current log file. The log files are distinguished from other files by adding an extension, from 001 to *nnn*, to the prefix file name. If the extension of the current log file is *mmm* and the current log file becomes full, the log file becomes *mmm+1*, the content of this log file is cleared, and the log is output to this log file. If *nnn* is the same as *nnn*, the log is output to the log file 001.

*log_file_size*

Specify the maximum size of a log file (unit: KB).

If the log file reaches the maximum size when a log entry is output to the log file, the program clears the next log file and output continues to that file.

Specifiable values:

1 to 2097151

*number_of_files*

Specify the maximum number of log files to which the log will be output.

If the log file reaches the maximum size and output moves on to the next file, and if the extension of the process log files is the same as the maximum number of files, the program reuses the files from 001.

Specifiable values:

1 to 256

## Storage location

*installation_directory_for_Application_Server*/httpsd/sbin

## Example

Specify the directive by using the |*program_name* format.

Example: This example collects the log into a maximum of five error log files, each of which is a maximum of 4,096 KB:

```
ErrorLog "|\"\"installation_directory_for_Application_Server/httpsd/sbin/
rotatelogs2.exe\" \"installation_directory_for_Application_Server/httpsd/logs/
errorlog\" 4096 5\""
```

In the example, the log is output to the log files in the order from `errorlog.001` to `errorlog.005`. If `errorlog.005` reaches 4,096 KB, `errorlog.001` is cleared and output continues to that log file. If these log files already exist when the web server starts, the last updated log file will be the log file targeted for output. If this log file already reaches 4,096 KB, the next log file is cleared and output continues to that log file. If the file size is less than 4,096 KB , output continues to the same file.

## Notes

- The `rotatelogs2` program does not terminate processes when the `SIGTERM`, `SIGUSR1`, and `SIGHUP` signals are received. Processes will terminate when the control process and the server process terminate.
- If you update the latest log file by mistake, the log data cannot be output into the file correctly because the last modified log file is targeted for output when the web server starts.
- Do not specify a size that is so small that multiple log files reach the specified size within the same second. If you specify such a small size, log files other than the latest file will be targeted for output, and rotation through the files will not take place properly.
- Do not specify the same prefix for log files at multiple locations within the one of following files.

  `httpsd.conf`

  `httpsd.conf@linux.vtl`
- If the same prefix for log files is specified at multiple locations, log files other than the latest file will be targeted for output, and rotation through the files will not take place properly.
- If an argument of the `rotatelogs2` program is incorrect, the `rotatelogs2` program does not start but the web server starts. In this case, logs are not output. If you specify the `rotatelogs2` program, make sure log files are created and split as intended.

# 3 Deployment Descriptor (DD) Used in Java EE Servers

This chapter describes the files used to set up the Java EE server functionality in applications and resources, and the files used to define configuration information.

# 3.1 List of DD used in Java EE servers

This section provides an overview of all DD that are used in Java EE servers.

| File | Overview | Details |
|---|---|---|
| 3.2 glassfish-acc.xml | Java EE RI DD (application client container) | `glassfish-acc.xml` is the DD for specifying application client container settings that are unique to Java EE RI. |
| 3.4 glassfish-application.xml | Java EE RI DD used for specifying Java EE application settings | `glassfish-application.xml` is the DD used for specifying the Java EE application settings that are unique to Java EE RI. |
| 3.6 glassfish-application-client.xml | Java EE RI DD (application client) | The `glassfish-application-client.xml` is the DD for specifying the application client settings that are unique to Java EE RI. |
| 3.8 glassfish-ejb-jar.xml | Java EE RI DD (EJB-JAR) | `glassfish-ejb-jar.xml` specifies the `EJB-JAR` settings that are unique to Java EE RI for the DD. |
| 3.10 glassfish-resources.xml | Java EE RI DD used to specify resource settings | `glassfish-resources.xml` is the DD used to specify resource settings that are unique to Java EE RI. |
| 3.12 glassfish-web.xml | Java EE RI DD used to specify web application (WAR) settings | `glassfish-web.xml` is the DD used to specify the web application (WAR) settings, which are unique to Java EE RI. |
| 3.14 hitachi-application.xml | Specific DD to set up Java EE application | The DD to carry out the original setup of the Java EE Server in relation to the Java EE application. |
| 3.16 hitachi-application-client.xml | Specific DD to set up application client | The DD to carry out the original setup of the Java EE Server in relation to the application client. |
| 3.18 hitachi-ejb-jar.xml | Specific DD to set up EJB-JAR | The DD to carry out the original setup of the Java EE Server in relation to EJB-JAR. |
| 3.20 hitachi-ra.xml | Specific DD to set up resource | The DD to carry out the original setup of the Java EE Server in relation to the resource. |
| 3.22 hitachi-web.xml | Specific DD to set up web application (WAR) | The DD to carry out the original setup of the Java EE Server in relation to the web application (WAR). |

## 3.2 glassfish-acc.xml

`glassfish-acc.xml` is the Java EE RI DD for specifying application client container settings.

### Description

`glassfish-acc.xml` is the DD for specifying application client container settings that are unique to Java EE RI.

The root element of `glassfish-acc.xml` is `client-container`. The element `client-container` contains child elements and attributes, as indicated by "Element hierarchy". These child elements and attributes may also contain their child elements and attributes.

### Schema

```
<!DOCTYPE client-container PUBLIC
"-//GlassFish.org//
DTD GlassFish Application Server 3.1 Application Client Container//EN"
"http://glassfish.org/dtds/glassfish-application-client-container_1_3.dtd">
```

### Storage location

The DD file is stored in the following location:

*domain-dir*`/config` directory.

*domain-dir*: Represents the directory in which the configuration of a domain is stored.

### Element hierarchy

```
client-container
. target-server
.. description
.. security
. auth-realm
.. property
. message-security-config
.. provider-config
... request-policy
... response-policy
... property
. property
```

### Example

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE client-container PUBLIC
"-//GlassFish.org//
DTD GlassFish Application Server 3.1 Application Client Container//EN"
"http://glassfish.org/dtds/glassfish-application-client-container_1_3.dtd">
<client-container>
  <target-server name="vm006248" address="localhost" port="3700"/>
  <log-service file="" level="WARNING"/>
  <message-security-config auth-layer="SOAP">
    <provider-config class-name=
"com.sun.xml.wss.provider.ClientSecurityAuthModule"
provider-id="XWS_ClientProvider" provider-type="client">
       <request-policy auth-source="content"/>
```

```
      <response-policy auth-source="content"/>
    </provider-config>
  </message-security-config>
</client-container>
```

## 3.3 Details of the elements specified in glassfish-acc.xml

This section describes the elements specified in `glassfish-acc.xml`.

### 3.3.1 /client-container

`/client-container` defines the Java EE Server specific configuration for the application client container.

#### Description

`/client-container` defines the Java EE Server specific configuration for the application client container. This is the root element, there can be only one `client-container` element in a `glassfish-acc.xml` file.

#### Repetition pattern

Only one time.

#### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `send-password` | If `true`, then specifies that client authentication credentials must be sent to the server. Without the authentication credentials, all access to the protected EJB components results in exceptions. | Type: `Boolean` `{true \| false}` | `true` | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

### 3.3.2 /client-container/target-server

`/client-container/target-server` specifies the IIOP listener for the target server. Additionally, it specifies IIOP endpoints used for load balancing.

#### Description

`/client-container/target-server` specifies the IIOP listener for the target server. Also specifies the IIOP endpoints used for load balancing. If the server instance on which the application client is deployed participates in a cluster, then the Java EE Server finds all the currently active IIOP endpoints in the cluster automatically.

However, a client must have at least two endpoints specified for bootstrapping purposes, in case one of the endpoints fails.

A listener or endpoint is in the form *`host`*`:`*`port`*, where the *host* is an IP address or host name, and the *port* specifies the port number.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

1 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specifies the name of the server instance accessed by the client container. | Type: `String` | No default value | N/A | Only one time |
| `address` | Specifies the host name or IP address (resolvable by DNS) of the server to which this client attaches. | Type: `String` | No default value | N/A | Only one time |
| `port` | Specifies the naming service port number of the server to which this client is attached.<br>For a new server instance, assign a port number other than 3700. You can change the port number in the Administration Console. | Type: `Integer`<br>`0` to `65535` | No default value | N/A | Only one time |

Legend

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.3.3 /client-container/target-server/description

`/client-container/target-server/description` specifies the description of the target server.

### Description

`/client-container/target-server/description` specifies a text description of the stored element.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.3.4 /client-container/target-server/security

`/client-container/target-server/security` specifies the security configuration for the IIOP/SSL communication with the target server.

### Description

`/client-container/target-server/security` specifies the security configuration for the IIOP/SSL communication with the target server.

### Repetition pattern

0 or 1 time

## 3.3.5 /client-container/auth-realm

`/client-container/auth-realm` specifies the optional configuration for a JAAS authentication realm.

### Description

`/client-container/auth-realm` specifies the optional configuration for a JAAS authentication realm. JAAS is available on the ACC.

The authentication realms require provider-specific properties, which vary depending on the requirement of a particular implementation.

### Dependencies of elements and attributes

The `auth-realm` element usage depends on the value of the name attribute of the `auth-realm` element.

### Repetition pattern

0 or 1 time

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Defines the name of this realm.<br>The following realms are supported:<br>• `file`<br>Stores user information in a file. This is the default realm when you first install the Application Server.<br>• `ldap`<br>Stores user information in an LDAP directory.<br>• `jdbc`<br>Stores user information in a database.<br>In the JDBC realm, the server gets user credentials from a database. The Java EE Server uses the database information and the enabled JDBC realm option in the configuration file. For digest authentication, a JDBC realm must be | Type: `String`<br>`{file \| ldap \| jdbc \| certificate}` | No default value | N/A | Only one time |

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| | created with `jdbcDigestRealm` as the JAAS context.<br>• `certificate`<br>Sets up the user identity in the Java EE Server security context, and populates it with user data obtained from cryptographically verified client certificates. | | | | |
| `classname` | Defines the Java class which implements this realm. | Type: `String`<br>`{com.sun.enterprise.security.auth.realm.file.FileRealm \| com.sun.enterprise.security.auth.realm.certificate.CertificateRealm \| com.sun.enterprise.security.auth.realm.jdbc.JDBCRealm \| com.sun.enterprise.security.auth.realm.ldap.LDAPRealm \| com.sun.enterprise.security.auth.realm.ldap.PamRealm \| Any custom realm.}` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.3.6 /client-container/auth-realm/property

`/client-container/auth-realm/property` specifies a property, which has a name and a value.

## Description

`/client-container/auth-realm/property` specifies the name and value of a property.

## Repetition pattern

0 or more times

## Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specifies the name of the property. | Type: `String` | No default value | N/A | Only one time |
| `value` | Specifies the value of the property. | Type: `String` | No default value | N/A | Only one time |

Legend

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

# 3.3.7 /client-container/message-security-config

`/client-container/message-security-config` specifies configurations for message security providers.

## Description

`/client-container/message-security-config` specifies configurations for message security providers.

## Repetition pattern

0 or more times

## Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `auth-layer` | Specifies the message layer at which authentication is performed. The value must be `SOAP`. | Type: `String` | No default value | N/A | Only one time |
| `default-provider` | Specifies the server provider that is invoked for any application not bound to a specific server provider. | Type: `String` | No default value | N/A | 0 or 1 time |
| `default-client-provider` | Specifies the client provider that is invoked for any application, which is not bound to a specific client provider. | Type: `String` | No default value | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.3.8 /client-container/message-security-config/provider-config

`/client-container/message-security-config/provider-config` specifies a configuration for a message security provider.

### Description

`/client-container/message-security-config/provider-config` specifies a configuration for a message security provider.

Although the `request-policy` and `response-policy` sub-elements are optional, the `provider-config` element does not do anything if they are not specified.

Use the `property` sub-elements to configure provider-specific properties.

Property values are passed to the provider when its `initialize` method is called.

### Repetition pattern

1 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `provider-id` | Specifies the provider ID. | Type: `String` | No default value | N/A | Only one time |
| `provider-type` | Specifies whether the provider is a client, server, or client-server authentication provider. | Type: `String`<br>`{client\|server\|client-server}` | No default value | N/A | Only one time |
| `class-name` | Specifies the Java implementation class of the provider.<br>• Client authentication providers must implement the `com.sun.enterprise.security.jauth.ClientAuthModule` interface.<br>• Server authentication providers must implement the `com.sun.enterprise.security.jauth.ServerAuthModule` interface.<br>• Client-server providers must implement both interfaces. | Type: `String`<br>Any class (sub-class) name which implements any one or both of the following interfaces:<br>• `com.sun.enterprise.security.jauth.ClientAuthModule`<br>• `com.sun.enterprise.security.jauth.ServerAu` | No default value | N/A | Only one time |

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| | | thModule | | | |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.3.9 /client-container/message-security-config/provider-config/request-policy

`/client-container/message-security-config/provider-config/request-policy` defines the authentication policy requirements for processing the request of the authentication provider.

### Description

`/client-container/message-security-config/provider-config/request-policy` defines the authentication policy requirements for processing the request of the authentication provider.

### Repetition pattern

0 or 1 time

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `auth-source` | Specifies the type of authentication required, which is either `sender` (user name and password) or `content` (digital signature). | Type: `String` {`content`\|`sender`} | No default value | N/A | Only one time |
| `auth-recipient` | Specifies whether the recipient authentication occurs before or after the content authentication. | Type: `String` {`before-content`\|`after-content`} | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.3.10 /client-container/message-security-config/provider-config/response-policy

`/client-container/message-security-config/provider-config/response-policy` defines the authentication policy requirements for processing the response of the authentication provider.

## Description

`/client-container/message-security-config/provider-config/response-policy` defines the authentication policy requirements for processing the response of the authentication provider.

## Repetition pattern

0 or 1 time

## Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `auth-source` | Specifies the type of authentication required, which is either `sender` (user name and password) or `content` (digital signature). | Type: `String` `{content\|sender}` | No default value | N/A | Only one time |
| `auth-recipient` | Specifies whether recipient authentication occurs before or after content authentication. | Type: String `{before-content\|after-content}` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

# 3.3.11 /client-container/message-security-config/provider-config/property

`/client-container/message-security-config/provider-config/property` specifies a property, which has a name and value.

## Description

`/client-container/message-security-config/provider-config/property` specifies a property, which has a name and value.

## Repetition pattern

0 or more times

## Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specifies the name of the property. | Type: `String` | No default value | N/A | Only one time |
| `value` | Specifies the value of the property. | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.3.12 /client-container/property

`/client-container/property` specifies a property, which has a name and a value.

### Description

Specifies a property, which has a name and a value.

### Repetition pattern

0 or more than 0 times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| name | Specifies the name of the property. | Type : String | No Default Value | n/a | only 1 times |
| value | Specifies the value of the property. | Type : String | No Default Value | n/a | only 1 times |

Legend

n/a : Not applicable.

#

This is the default value that is set when a definition item is omitted.

## 3.4 glassfish-application.xml

`glassfish-application.xml` is the Java EE RI DD used for specifying the Java EE application settings.

### Description

`glassfish-application.xml` is the DD used for specifying the Java EE application settings that are unique to Java EE RI.

The root element of `glassfish-application.xml` is `glassfish-application`. The `glassfish-application` element contains child elements and attributes as indicated by "Element hierarchy". These child elements and attributes may further contain child elements and attributes.

### Schema

```
<!DOCTYPE glassfish-application PUBLIC "-//GlassFish.org//DTD
GlassFish Application Server 3.1 Java EE Application 6.0//EN"
"http://glassfish.org/dtds/glassfish-application_6_0-1.dtd">
```

### Storage location

The DD file is stored in the following location:

`application_ear_name/META-INF` directory.

`application_ear_name`: Represents the archive name of the application.

### Element hierarchy

```
glassfish-application
. web
.. web-uri
.. context-root
. security-role-mapping
.. role-name
.. principal-name
.. group-name
. realm
. ejb-ref
.. ejb-ref-name
.. jndi-name
. resource-ref
.. res-ref-name
.. jndi-name
.. default-resource-principal
... name
... password
. resource-env-ref
.. resource-env-ref-name
.. jndi-name
. service-ref
.. service-ref-name
.. port-info
... service-endpoint-interface
... wsdl-port
.... namespaceURI
.... localpart
... stub-property
```

```
.. service-impl-class
.. service-qname
... namespaceURI
... localpart
. message-destination-ref
.. message-destination-ref-name
.. jndi-name
. message-destination
.. message-destination-name
.. jndi-name
. archive-name
. version-identifier
```

## Examples

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE glassfish-application PUBLIC "-//GlassFish.org//DTD
GlassFish Application Server 3.1 Java EE Application 6.0//EN"
"http://glassfish.org/dtds/glassfish-application_6_0-1.dtd">
<glassfish-application>
    <unique-id>67488732739338240</unique-id>
    <web>
        <web-uri>hello.war</web-uri>
        <context-root>/hello</context-root>
    </web>
</glassfish-application>
```

## 3.5 Details of the elements specified in glassfish-application.xml

This section describes the elements specified in `glassfish-application.xml`.

### 3.5.1 /glassfish-application

`/glassfish-application` defines the Java EE Server specific configuration for an application.

#### Description

`/glassfish-application` defines the Java EE Server specific configuration for an application. This is the root element. There can be only one `glassfish-application` element in a `glassfish-application.xml` file.

#### Repetition pattern

Only one time

### 3.5.2 /glassfish-application/web

`/glassfish-application/web` specifies the application web tier configuration.

#### Description

`/glassfish-application/web` specifies the application web tier configuration.

#### Repetition pattern

0 or more times

### 3.5.3 /glassfish-application/web/web-uri

`/glassfish-application/web/web-uri` contains the web URI for the application.

#### Description

`/glassfish-application/web/web-uri` contains the web URI for the application. This URI must match the corresponding element in the `application.xml` file.

#### Specifiable values

Type: `String`

#### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.5.4 /glassfish-application/web/context-root

`/glassfish-application/web/context-root` contains the web context root for the web module.

### Description

`/glassfish-application/web/context-root` contains the web context root for the application or web application that was packaged as a WAR file. This element overrides the corresponding element in the `application.xml` file.

If you are setting up load balancing, then the web module context roots must be unique within a server instance.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

*`Value specified in the application.xml`*

### Repetition pattern

Only one time

## 3.5.5 /glassfish-application/security-role-mapping

`/glassfish-application/security-role-mapping` maps a role in the corresponding Java EE XML file to a user or a group.

### Description

`/glassfish-application/security-role-mapping` maps roles to users or groups in the currently active realm.

The `role mapping` element maps a role, as specified in the EJB JAR DD `role-name` entries, to an environment-specific user or group.

If the `role mapping` element maps a role to a user, then it must be a concrete user which exists in the current realm. This user can log into the server using the current authentication method.

If it maps to a group, then the realm must support groups and the group must be a concrete group which exists in the current realm. There must be at least one user in that realm that belongs to that group, to be productive.

### Repetition pattern

0 or more times

## 3.5.6 /glassfish-application/security-role-mapping/role-name

`/glassfish-application/security-role-mapping/role-name` contains the `role-name` in the `security-role` element of the corresponding Java EE RI DD file.

### Description

`/glassfish-application/security-role-mapping/role-name` contains the `role-name` in the `security-role` element of the corresponding Java EE RI DD file.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.5.7 /glassfish-application/security-role-mapping/principal-name

`/glassfish-application/security-role-mapping/principal-name` contains a principal (user) name in the current realm.

### Description

`/glassfish-application/security-role-mapping/principal-name` contains a principal (user) name in the current realm. In an enterprise bean, the principal must have the `run-as` role specified.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Dependencies of elements and attributes

`<security-role-mapping><group-name>`

### Repetition pattern

1 or more times if no `group-name` is specified.

Else, 0 or more times.

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `class-name` | Specifies the custom principal implementation class corresponding to the named principal. | Type: `String` | `com.sun.enterprise.deployment.PrincipalImpl` | N/A | 0 or 1 time |

Legend

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.5.8 /glassfish-application/security-role-mapping/group-name

`/glassfish-application/security-role-mapping/group-name` contains a group name in the current realm.

### Description

`/glassfish-application/security-role-mapping/group-name` contains a group name in the current realm.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Dependencies of elements and attributes

`<security-role-mapping><principal-name>`

### Repetition pattern

1 or more times if no `principal-name` is specified.

Else, 0 or more times.

## 3.5.9 /glassfish-application/realm

`/glassfish-application/realm` specifies an authentication realm.

### Description

`/glassfish-application/realm` specifies the name of the realm used to process all the authentication requests associated with this application.

If this element is not specified or does not match the name of a configured realm, then the default realm is used.

The following realms are supported:

`file`
: Stores the user information in a file. This is the default realm when you first install the Application Server.

`ldap`
: Stores the user information in an LDAP directory.

`jdbc`
: Stores the user information in a database.

  In the JDBC realm, the server gets the user credentials from a database. The Java EE Server uses the database information and the enabled JDBC realm option in the configuration file. For digest authentication, a JDBC realm must be created, with `jdbcDigestRealm` as the JAAS context.

`certificate`
: Sets up the user identity in the Java EE Server security context, and populates it with user data received from cryptographically verified client certificates.

### Specifiable values

Type: `String`

`{file|ldap|jdbc|certificate}`

### Default value

If the definition item is omitted
: `file`

### Repetition pattern

0 or 1 time

## 3.5.10 /glassfish-application/ejb-ref

`/glassfish-application/ejb-ref` maps the absolute `JNDI name` to the `ejb-ref` in the corresponding Java EE XML file.

### Description

`/glassfish-application/ejb-ref` maps the `ejb-ref-name` in the corresponding Java EE RI DD file `ejb-ref` entry to the absolute `JNDI-name` of a resource.

The `ejb-ref` element is used to declare a reference to an EJB's home.

This applies to session beans or entity beans.

### Repetition pattern

0 or more times

## 3.5.11 /glassfish-application/ejb-ref/ejb-ref-name

`/glassfish-application/ejb-ref/ejb-ref-name` specifies the `ejb-ref-name` in the `ejb-ref` entry of the corresponding Java EE RI DD file.

### Description

`/glassfish-application/ejb-ref/ejb-ref-name` specifies the `ejb-ref-name` in the `ejb-ref` entry of the corresponding Java EE RI DD file.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.5.12 /glassfish-application/ejb-ref/jndi-name

`/glassfish-application/ejb-ref/jndi-name` specifies the absolute `JNDI-name` of a resource.

### Description

`/glassfish-application/ejb-ref/jndi-name` specifies the absolute `JNDI-name` of a URL resource or a resource.

For entity beans and session beans, this value specifies the global `JNDI name` of the `EJBHome` object. This value is required only if the entity or session bean exposes a remote view.

For JMS `message-driven beans`, this value is the `JNDI name` of the JMS resource from which the `message-driven bean` consumes JMS messages. This information is alternatively specified within the `activation-config` sub-element of the `mdb-resource-adapter` element.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

Only one time

## 3.5.13 /glassfish-application/resource-ref

`/glassfish-application/resource-ref` maps the absolute `JNDI name` to `resource-ref` in the corresponding Java EE XML file.

### Description

`/glassfish-application/resource-ref` maps the `res-ref-name` value in the corresponding Java EE RI DD file `resource-ref` entry to the absolute `JNDI-name` of a resource.

### Repetition pattern

0 or more times

## 3.5.14 /glassfish-application/resource-ref/res-ref-name

`/glassfish-application/resource-ref/res-ref-name` specifies the `res-ref-name` value in the `resource-ref` entry of the corresponding Java EE RI DD file.

### Description

`/glassfish-application/resource-ref/res-ref-name` specifies the `res-ref-name` value in the `resource-ref` entry of the corresponding Java EE RI DD file. The `res-ref-name` element specifies the name of a resource manager connection factory reference.

The name must be unique within an enterprise bean.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

Only one time

## 3.5.15 /glassfish-application/resource-ref/jndi-name

`/glassfish-application/resource-ref/jndi-name` specifies the absolute `JNDI-name` of a resource.

### Description

`/glassfish-application/resource-ref/jndi-name` specifies the absolute `JNDI-name` of a URL resource or a resource.

For entity beans and session beans, this value specifies the global JNDI name of the `EJBHome` object. This value is required only when the entity or session bean exposes a remote view.

For JMS message-driven beans, this is the JNDI name of the JMS resource from which the message-driven bean consumes JMS messages. This information is alternatively specified within the `activation-config` sub-element of the `mdb-resource-adapter` element.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.5.16 /glassfish-application/resource-ref/default-resource-principal

`/glassfish-application/resource-ref/default-resource-principal` specifies the default principal (user) for the resource.

### Description

`/glassfish-application/resource-ref/default-resource-principal` specifies the default principal (user) for the resource. If this element is used in conjunction with a `JMS Connection Factory` resource, then the name and password sub-elements must be valid entries in the Message Queue broker user repository.

### Repetition pattern

0 or 1 time

## 3.5.17 /glassfish-application/resource-ref/default-resource-principal/name

`/glassfish-application/resource-ref/default-resource-principal/name` specifies the default resource principal name used to sign in to a resource manager.

### Description

`/glassfish-application/resource-ref/default-resource-principal/name` specifies the default resource principal name used to sign in to a resource manager.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.5.18 /glassfish-application/resource-ref/default-resource-principal/password

`/glassfish-application/resource-ref/default-resource-principal/password` specifies the password of the default resource principal.

### Description

`/glassfish-application/resource-ref/default-resource-principal/password` specifies the password of the default resource principal.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.5.19 /glassfish-application/resource-env-ref

`/glassfish-application/resource-env-ref` maps the absolute JNDI name to the `resource-env-ref` entry in the corresponding Java EE XML file.

### Description

/glassfish-application/resource-env-ref maps the res-ref-name in the corresponding Java EE RI DD file resource-env-ref entry to the absolute JNDI-name of a resource.

### Repetition pattern

0 or more times

## 3.5.20 /glassfish-application/resource-env-ref/resource-env-ref-name

/glassfish-application/resource-env-ref/resource-env-ref-name specifies the res-ref-name in the corresponding Java EE RI DD file resource-env-ref entry.

### Description

/glassfish-application/resource-env-ref/resource-env-ref-name specifies the res-ref-name in the corresponding Java EE RI DD file resource-env-ref entry.

### Specifiable values

Type: String

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

Only one time

## 3.5.21 /glassfish-application/resource-env-ref/jndi-name

/glassfish-application/resource-env-ref/jndi-name specifies the absolute JNDI-name of a resource.

### Description

/glassfish-application/resource-env-ref/jndi-name specifies the absolute JNDI-name of a URL resource or a resource.

For entity beans and session beans, this value specifies the global JNDI name of the EJB Home object. It is needed only if the entity or session bean exposes a remote view.

For JMS message-driven beans, this is the JNDI name of the JMS resource from which the message-driven bean consumes JMS messages. This information is alternatively specified within the activation-config sub-element of the mdb-resource-adapter element.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.5.22 /glassfish-application/service-ref

`/glassfish-application/service-ref` specifies the runtime settings for a web service reference.

### Description

`/glassfish-application/service-ref` specifies the runtime settings for a web service reference. Runtime information is only needed in the following cases:

- To define the port used to resolve a container-managed port.
- To define the default `Stub/Call` property settings for Stub objects.
- To define the URL of a final WSDL document to be used instead of the one associated with the `service-ref` in the standard DD.

### Repetition pattern

0 or more times

## 3.5.23 /glassfish-application/service-ref/service-ref-name

`/glassfish-application/service-ref/service-ref-name` specifies the web service reference name that is relative to `java:comp/env`.

### Description

`/glassfish-application/service-ref/service-ref-name` specifies the web service reference name that is relative to `java:comp/env`.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.5.24 /glassfish-application/service-ref/port-info

`/glassfish-application/service-ref/port-info` specifies information for a port within a web service reference.

### Description

`/glassfish-application/service-ref/port-info` specifies information for a port within a web service reference. Specify a `service-endpoint-interface` or a `wsdl-port`, or both. If you have specified both, then the `wsdl-port` specifies the port that the container chooses for container-managed port selection.

### Repetition pattern

0 or more times

## 3.5.25 /glassfish-application/service-ref/port-info/service-endpoint-interface

`/glassfish-application/service-ref/port-info/service-endpoint-interface` specifies the web service reference name relative to `java:comp/env`.

### Description

`/glassfish-application/service-ref/port-info/service-endpoint-interface` specifies the web service reference name relative to `java:comp/env`.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.5.26 /glassfish-application/service-ref/port-info/wsdl-port

`/glassfish-application/service-ref/port-info/wsdl-port` specifies the WSDL port.

### Description

`/glassfish-application/service-ref/port-info/wsdl-port` specifies the WSDL port.

### Repetition pattern

0 or 1 time

## 3.5.27 /glassfish-application/service-ref/port-info/wsdl-port/namespaceURI

`glassfish_application_xml-0270-0000-namespaceURI.dita` specifies the namespace URI.

### Description

`glassfish_application_xml-0270-0000-namespaceURI.dita` specifies the namespace URI.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.5.28 /glassfish-application/service-ref/port-info/wsdl-port/localpart

`/glassfish-application/service-ref/port-info/wsdl-port/localpart` specifies the local part of a QNAME.

### Description

`/glassfish-application/service-ref/port-info/wsdl-port/localpart` specifies the local part of a QNAME.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.5.29 /glassfish-application/service-ref/port-info/stub-property

`/glassfish-application/service-ref/port-info/stub-property` specifies the `JAX-RPC` property values that are set on the `javax.xml.rpc.Stub` object before it is returned to the web service client.

### Description

`/glassfish-application/service-ref/port-info/stub-property` specifies `JAX-RPC` property values that are set on the `javax.xml.rpc.Stub` object before it is returned to the web service client. The property names can be any properties supported by the `JAX-RPC` Stub implementation.

### Repetition pattern

0 or more times

### Specifiable sub-elements

| Element name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specifies the name of the entity. | Type: `String` | No default value | N/A | Only one time |
| `value` | Specifies the value of the entity. | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.5.30 /glassfish-application/service-ref/service-impl-class

`/glassfish-application/service-ref/service-impl-class` specifies the name of the generated service implementation class.

### Description

`/glassfish-application/service-ref/service-impl-class` specifies the name of the generated service implementation class.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

0 or 1 time

## 3.5.31 /glassfish-application/service-ref/service-qname

`/glassfish-application/service-ref/service-qname` specifies the referred WSDL service element.

### Description

`/glassfish-application/service-ref/service-qname` specifies the referred WSDL service element.

### Repetition pattern

0 or 1 time

## 3.5.32 /glassfish-application/service-ref/service-qname/namespaceURI

`/glassfish-application/service-ref/service-qname/namespaceURI` specifies the namespace URI.

### Description

`/glassfish-application/service-ref/service-qname/namespaceURI` specifies the namespace URI.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

Only one time

## 3.5.33 /glassfish-application/service-ref/service-qname/localpart

`/glassfish-application/service-ref/service-qname/localpart` specifies the local part of `QNAME`.

### Description

/glassfish-application/service-ref/service-qname/localpart specifies the local part of QNAME.

### Specifiable values

Type: String

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.5.34 /glassfish-application/message-destination-ref

/glassfish-application/message-destination-ref specifies the name of the physical message destination.

### Description

/glassfish-application/message-destination-ref directly binds the message destination reference to the JNDI name of a Queue, Topic, or other physical destinations.

Use only when the message destination reference in the corresponding Java EE RI DD file does not specify a message-destination-link to the logical message destination.

### Repetition pattern

0 or more times

## 3.5.35 /glassfish-application/message-destination-ref/message-destination-ref-name

/glassfish-application/message-destination-ref/message-destination-ref-name specifies the name of the physical message destination defined within the corresponding Java EE RI DD file.

### Description

/glassfish-application/message-destination-ref/message-destination-ref-name specifies the name of the physical message destination defined within the corresponding Java EE RI DD file.

### Specifiable values

Type: String

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.5.36 /glassfish-application/message-destination-ref/jndi-name

`/glassfish-application/message-destination-ref/jndi-name` specifies the JNDI name of the associated entity.

### Description

`/glassfish-application/message-destination-ref/jndi-name` specifies the absolute JNDI name of a URL resource or a resource.

For the entity beans and session beans, this value specifies the global JNDI name of the EJBHome object. It is only required if the entity bean or session bean exposes a remote view.

For the JMS message-driven beans, this is the JNDI name of the JMS resource from which the message-driven bean consumes the JMS messages.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.5.37 /glassfish-application/message-destination

`/glassfish-application/message-destination` specifies the name of the logical message destination.

### Description

`/glassfish-application/message-destination` specifies the name of the logical message destination defined within an application.

The `message-destination-name` matches the corresponding `message-destination-name` in the Java EE RI DD file.

Use when the message destination reference in the corresponding Java EE RI DD file specifies a `message-destination-link` to the logical message destination.

### Repetition pattern

0 or more times

## 3.5.38 /glassfish-application/message-destination/message-destination-name

`/glassfish-application/message-destination/message-destination-name` specifies the name of a logical message destination defined within the corresponding Java EE RI DD file.

### Description

`/glassfish-application/message-destination/message-destination-name` specifies the name of a logical message destination defined within the corresponding Java EE RI DD file.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.5.39 /glassfish-application/message-destination/jndi-name

`/glassfish-application/message-destination/jndi-name` specifies the `JNDI-name` of the associated entity.

### Description

`/glassfish-application/message-destination/jndi-name` specifies the absolute `JNDI-name` of a URL resource or a resource.

For entity beans and session beans, this value specifies the global JNDI name of the `EJBHome` object. It is required only if the entity or session bean exposes a remote view.

For JMS message-driven beans, this is the JNDI name of the JMS resource from which the message-driven bean consumes JMS messages.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

Only one time

## 3.5.40 /glassfish-application/archive-name

`/glassfish-application/archive-name` specifies the name of the archive file.

### Description

`/glassfish-application/archive-name` specifies the name of the archive file. The value of the `archive-name` element is used to derive the default application name, when the `display-name` value is not present in the `application.xml` file.

The default application name is the `archive-name` value without the file extension. For example, if `archive-name` is `foo.ear`, then the default application name is `foo`.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

0 or 1 time

## 3.5.41 /glassfish-application/version-identifier

`/glassfish-application/version-identifier` specifies the version information for an application or module.

### Description

`/glassfish-application/version-identifier` specifies the version information for an application or module. The version identifier is a suffix to the module or application name. It is separated from the name by a colon (`:`). It must begin with a letter or number. The version identifier can contain alphanumeric characters, underscore (_), hyphen (-), and period (`.`).

The following examples list the valid version identifiers for the `foo` application:

- *`application name`*`:1`

- *application name*:BETA-2e
- *application name*:3.8
- *application name*:patch39875

## Specifiable values

Type: String

## Default value

If the definition item is omitted

No default value

## Repetition pattern

0 or 1 time

## 3.6 glassfish-application-client.xml

The `glassfish-application-client.xml` is the Java EE RI DD for specifying the application client settings.

### Description

The `glassfish-application-client.xml` is the DD for specifying the application client settings that are unique to Java EE RI.

The root element of `glassfish-application-client.xml` is `glassfish-application-client`. The element `glassfish-application-client` contains child elements and attributes, as indicated by "Element hierarchy". These child elements and attributes may also contain their child elements and attributes.

### Schema

```
<!DOCTYPE glassfish-application-client PUBLIC ""-//GlassFish.org
//DTD GlassFish Application Server 3.1 Application Client 6.0//EN""
"http://glassfish.org/dtds/glassfish-application-client_6_0-1.dtd">
```

### Storage location

The DD file is stored in the following location:

*client_jar_name*/`META-INF` directory.

*client_jar_name*: Represents the archive name of the client application.

### Element hierarchy

```
glassfish-application-client
. ejb-ref
.. ejb-ref-name
.. jndi-name
. resource-ref
.. res-ref-name
.. jndi-name
.. default-resource-principal
... name
... password
. resource-env-ref
.. resource-env-ref-name
.. jndi-name
. service-ref
.. service-ref-name
.. port-info
... service-endpoint-interface
... wsdl-port
.... namespaceURI
.... localpart
... stub-property
... call-property
... message-security-binding
.... message-security
..... message
...... operation-name
..... request-protection
..... response-protection
.. call-property
```

```
.. wsdl-override
.. service-impl-class
.. service-qname
... namespaceURI
... localpart
. message-destination-ref
.. message-destination-ref-name
.. jndi-name
. message-destination
.. message-destination-name
.. jndi-name
. version-identifier
```

## Example

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE glassfish-application-client PUBLIC ""-//GlassFish.org
//DTD GlassFish Application Server 3.1 Application Client 6.0//EN""
"http://glassfish.org/dtds/glassfish-application-client_6_0-1.dtd">
<glassfish-application-client>
    <message-destination-ref>
        <message-destination-ref-name>ClientQueue
</message-destination-ref-name>
        <jndi-name>jms/security_mdb_OutQueue</jndi-name>
    </message-destination-ref>
</glassfish-application-client>
```

## 3.7 Details of the elements specified in glassfish-application-client.xml

This section describes the elements specified in `glassfish-application-client.xml`.

### 3.7.1 /glassfish-application-client

`/glassfish-application-client` defines the Java EE Server specific configuration for an application client.

#### Description

`/glassfish-application-client` defines the Java EE Server specific configuration for an application client. This is the root element, there can only be one `glassfish-application-client` element in a `glassfish-application-client.xml` file.

#### Repetition pattern

Only one time

### 3.7.2 /glassfish-application-client/ejb-ref

`/glassfish-application-client/ejb-ref` maps the absolute `JNDI name` to `ejb-ref` in the corresponding Java EE XML file.

#### Description

`/glassfish-application-client/ejb-ref` maps `ejb-ref-name` in the corresponding Java EE RI DD file `ejb-ref` entry to the absolute `JNDI name` of a resource.

The `ejb-ref` element is used for the declaration of a reference to an EJB's home. This applies to session beans or entity beans.

#### Repetition pattern

0 or more times

### 3.7.3 /glassfish-application-client/ejb-ref/ejb-ref-name

`/glassfish-application-client/ejb-ref/ejb-ref-name` specifies the `ejb-ref-name` in the corresponding Java EE RI DD file `ejb-ref` entry.

#### Description

`/glassfish-application-client/ejb-ref/ejb-ref-name` specifies the `ejb-ref-name` in the corresponding Java EE RI DD file `ejb-ref` entry.

#### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

Only one time

## 3.7.4 /glassfish-application-client/ejb-ref/jndi-name

`/glassfish-application-client/ejb-ref/jndi-name` specifies the absolute JNDI-name of a resource.

### Description

`/glassfish-application-client/ejb-ref/jndi-name` specifies the absolute JNDI-name of a URL resource or a resource. For entity beans and session beans, this value specifies the global JNDI name of the `EJBHome` object.

It is only needed if the entity or session bean exposes a remote view.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

Only one time

## 3.7.5 /glassfish-application-client/resource-ref

`/glassfish-application-client/resource-ref` maps the absolute JNDI name to `resource-ref` in the corresponding Java EE XML file.

### Description

`/glassfish-application-client/resource-ref` maps `res-ref-name` in the corresponding Java EE RI DD file `resource-ref` entry to the absolute JNDI-name of a resource.

### Repetition pattern

0 or more times

## 3.7.6 /glassfish-application-client/resource-ref/res-ref-name

`/glassfish-application-client/resource-ref/res-ref-name` specifies the `res-ref-name` in the corresponding Java EE RI DD file `resource-ref` entry.

### Description

`/glassfish-application-client/resource-ref/res-ref-name` specifies the `res-ref-name` in the corresponding Java EE RI DD file `resource-ref` entry. The `res-ref-name` element specifies the name of a resource manager connection factory reference. The name must be unique within an enterprise bean.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.7.7 /glassfish-application-client/resource-ref/jndi-name

`/glassfish-application-client/resource-ref/jndi-name` specifies the absolute JNDI-name of a resource.

### Description

`/glassfish-application-client/resource-ref/jndi-name` specifies the absolute JNDI-name of a URL resource or a resource.

For JMS message-driven beans, this is the JNDI name of the JMS resource from which the message-driven bean consumes JMS messages.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.7.8 /glassfish-application-client/resource-ref/default-resource-principal

`/glassfish-application-client/resource-ref/default-resource-principal` specifies the default principal (user) for the resource.

### Description

`/glassfish-application-client/resource-ref/default-resource-principal` specifies the default principal (user) for the resource.

If this element is used in conjunction with a `JMS Connection Factory` resource, then the name and password sub-elements must be valid entries in the Message Queue broker user repository.

### Repetition pattern

0 or 1 time

## 3.7.9 /glassfish-application-client/resource-ref/default-resource-principal/name

`/glassfish-application-client/resource-ref/default-resource-principal/name` specifies the default resource principal name used to sign in to a resource manager.

### Description

`/glassfish-application-client/resource-ref/default-resource-principal/name` specifies the default resource principal name used to sign in to a resource manager.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.7.10 /glassfish-application-client/resource-ref/default-resource-principal/password

`/glassfish-application-client/resource-ref/default-resource-principal/password` specifies the password of the default resource principal.

### Description

/glassfish-application-client/resource-ref/default-resource-principal/password specifies the password of the default resource principal.

### Specifiable values

Type: String

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.7.11 /glassfish-application-client/resource-env-ref

/glassfish-application-client/resource-env-ref maps the absolute JNDI name to the resource-env-ref entry in the corresponding Java EE XML file.

### Description

/glassfish-application-client/resource-env-ref maps res-ref-name in the corresponding Java EE RI DD file resource-env-ref entry to the absolute JNDI name of a resource.

### Repetition pattern

0 or more times

## 3.7.12 /glassfish-application-client/resource-env-ref/resource-env-ref-name

/glassfish-application-client/resource-env-ref/resource-env-ref-name specifies res-ref-name in the corresponding Java EE RI DD file resource-env-ref entry.

### Description

/glassfish-application-client/resource-env-ref/resource-env-ref-name specifies res-ref-name in the corresponding Java EE RI DD file resource-env-ref entry.

### Specifiable values

Type: String

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

Only one time

## 3.7.13 /glassfish-application-client/resource-env-ref/jndi-name

`/glassfish-application-client/resource-env-ref/jndi-name` specifies the absolute `JNDI name` of the resource.

### Description

`/glassfish-application-client/resource-env-ref/jndi-name` specifies the absolute `JNDI name` of the URL resource or a resource. For the entity beans and session beans, this value specifies the global `JNDI name` of the `EJBHome` object. It is needed only if the entity bean or session bean exposes a remote view.

For the JMS `message-driven beans`, this is the `JNDI name` of the JMS resource from which the `message-driven bean` consumes the JMS messages. This information is alternatively specified within the `activation-config` sub-element of the `mdb-resource-adapter` element.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

Only one time

## 3.7.14 /glassfish-application-client/service-ref

`/glassfish-application-client/service-ref` specifies runtime settings for a web service reference.

### Description

`/glassfish-application-client/service-ref` specifies runtime settings for a web service reference.

Runtime information is required only in the following cases:

- To define the port used to resolve a container-managed port.
- To define the default `Stub` or `Call` property settings for the `Stub` objects.

- To define the URL of the final WSDL document to be used instead of the one associated with `service-ref` in the standard DD.

### Repetition pattern

0 or more times

## 3.7.15 /glassfish-application-client/service-ref/service-ref-name

`/glassfish-application-client/service-ref/service-ref-name` specifies the web service reference name relative to `java:comp/env`.

### Description

`/glassfish-application-client/service-ref/service-ref-name` specifies the web service reference name relative to `java:comp/env`.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.7.16 /glassfish-application-client/service-ref/port-info

`/glassfish-application-client/service-ref/port-info` specifies the information for a port within a web service reference.

### Description

`/glassfish-application-client/service-ref/port-info` specifies the information for a port within a web service reference.

Either the `Service Endpoint Interface` or `WSDL port` or both must be specified. If both are specified, then the `WSDL port` specifies the port that the container chooses for the container-managed port selection.

The same `WSDL port` value must not appear in more than one `port info` element within the same `service-ref`.

If the `Service Endpoint Interface` is using container-managed port selection, then its value must not appear in more than one `port info` element within the same `service-ref`.

### Repetition pattern

0 or more times

## 3.7.17 /glassfish-application-client/service-ref/port-info/service-endpoint-interface

`/glassfish-application-client/service-ref/port-info/service-endpoint-interface` specifies the web service reference name relative to `java:comp/env`.

### Description

`/glassfish-application-client/service-ref/port-info/service-endpoint-interface` specifies the web service reference name relative to `java:comp/env`.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.7.18 /glassfish-application-client/service-ref/port-info/wsdl-port

`/glassfish-application-client/service-ref/port-info/wsdl-port` specifies the WSDL port.

### Description

`/glassfish-application-client/service-ref/port-info/wsdl-port` specifies the WSDL port.

### Repetition pattern

0 or 1 time

## 3.7.19 /glassfish-application-client/service-ref/port-info/wsdl-port/namespaceURI

`/glassfish-application-client/service-ref/port-info/wsdl-port/namespaceURI` specifies the namespace URI.

### Description

/glassfish-application-client/service-ref/port-info/wsdl-port/namespaceURI specifies the namespace URI.

### Specifiable values

Type: String

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.7.20 /glassfish-application-client/service-ref/port-info/wsdl-port/localpart

/glassfish-application-client/service-ref/port-info/wsdl-port/localpart specifies the local part of QNAME.

### Description

/glassfish-application-client/service-ref/port-info/wsdl-port/localpart specifies the local part of QNAME.

### Specifiable values

Type: String

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.7.21 /glassfish-application-client/service-ref/port-info/stub-property

/glassfish-application-client/service-ref/port-info/stub-property specifies the JAX-RPC property values that are set on the javax.xml.rpc.Stub object before it is returned to the web service client.

## Description

/glassfish-application-client/service-ref/port-info/stub-property specifies the JAX-RPC property values that are set on the javax.xml.rpc.Stub object before it is returned to the web service client. The property names can be any properties supported by the JAX-RPC Stub implementation.

## Repetition pattern

0 or more times

## Specifiable sub-elements

| Element name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| name | Specifies the name of the entity. | Type: String | No default value | N/A | Only one time |
| value | Specifies the value of the entity. | Type: String | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

# 3.7.22 /glassfish-application-client/service-ref/port-info/call-property

/glassfish-application-client/service-ref/port-info/call-property specifies the JAX-RPC property values that are set on the javax.xml.rpc.Call object before it is returned to the web service client.

## Description

/glassfish-application-client/service-ref/port-info/call-property specifies the JAX-RPC property values that are set on the javax.xml.rpc.Call object before it is returned to the web service client. The property names are any properties supported by the JAX-RPC Call implementation.

## Repetition pattern

0 or more times

## Specifiable sub-elements

| Element name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| name | Specifies the name of the entity. | Type: String | No default value | N/A | Only one time |
| value | Specifies the value of the entity. | Type: String | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.7.23 /glassfish-application-client/service-ref/port-info/message-security-binding

`/glassfish-application-client/service-ref/port-info/message-security-binding` specifies the custom authentication provider binding.

### Description

`/glassfish-application-client/service-ref/port-info/message-security-binding` specifies the custom authentication provider binding for a parent `port info` element in one or both of the following ways:

- By binding to a specific provider.
- By specifying the message security requirements enforced by the provider.

### Repetition pattern

0 or 1 time

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `auth-layer` | Specifies the message layer on which the authentication is performed. | Type: `String`<br>`SOAP` | No default value | N/A | Only one time |
| `provider-id` | Specifies the authentication provider used to meet application-specific message security requirements. If this attribute is not specified, then a default provider is used, if it is defined for the message layer. If no default provider is defined, then authentication requirements that are defined in the message-security-binding are not enforced. | Type: `String` | No default value | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.7.24 /glassfish-application-client/service-ref/port-info/message-security-binding/message-security

`/glassfish-application-client/service-ref/port-info/message-security-binding/message-security` specifies the message security requirements.

### Description

`/glassfish-application-client/service-ref/port-info/message-security-binding/message-security` specifies the message security requirements.

As the grandparent element is `port info`, these requirements correspond to the port of the referenced service.

### Repetition pattern

0 or more times

## 3.7.25 /glassfish-application-client/service-ref/port-info/message-security-binding/message-security/message

`/glassfish-application-client/service-ref/port-info/message-security-binding/message-security/message` specifies the methods or operations to which the message security requirements apply.

### Description

`/glassfish-application-client/service-ref/port-info/message-security-binding/message-security/message` specifies the methods or operations to which the message security requirements apply.

### Repetition pattern

One or more times

## 3.7.26 /glassfish-application-client/service-ref/port-info/message-security-binding/message-security/message/operation-name

`/glassfish-application-client/service-ref/port-info/message-security-binding/message-security/message/operation-name` specifies the WSDL name of a web service operation.

### Description

`/glassfish-application-client/service-ref/port-info/message-security-binding/message-security/message/operation-name` specifies the WSDL name of an operation of a web service.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.7.27 /glassfish-application-client/service-ref/port-info/message-security-binding/message-security/request-protection

`/glassfish-application-client/service-ref/port-info/message-security-binding/message-security/request-protection` defines the authentication policy requirements for processing the request of the application.

### Description

`/glassfish-application-client/service-ref/port-info/message-security-binding/message-security/request-protection` defines the authentication policy requirements for processing the request of the application.

### Repetition pattern

0 or 1 time

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `auth-source` | Specifies the type of required authentication, either `sender` (user name and password) or `content` (digital signature). | Type: `String` `{content\|sender}` | No default value | N/A | Only one time |
| `auth-recipient` | Specifies whether recipient authentication occurs before or after content authentication. | Type: `String` `{before-content\|after-content}` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.7.28 /glassfish-application-client/service-ref/port-info/message-security-binding/message-security/response-protection

`/glassfish-application-client/service-ref/port-info/message-security-binding/message-security/response-protection` defines the authentication policy requirements for processing the response of the application.

### Description

`/glassfish-application-client/service-ref/port-info/message-security-binding/message-security/response-protection` defines the authentication policy requirements for processing the response of the application.

### Repetition pattern

0 or 1 time

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| auth-source | Specifies the type of required authentication, either sender (user name and password) or content (digital signature). | Type: String {content\|sender} | No default value | N/A | Only one time |
| auth-recipient | Specifies when the recipient authentication should occur, before or after content authentication. | Type: String {before-content\|after-content} | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.7.29 /glassfish-application-client/service-ref/call-property

/glassfish-application-client/service-ref/call-property specifies the JAX-RPC property values that are set on the javax.xml.rpc.Call object before it is returned to the web service client.

### Description

/glassfish-application-client/service-ref/call-property specifies the JAX-RPC property values that can be set on the javax.xml.rpc.Call object before it is returned to the web service client. The property names can be any properties supported by the JAX-RPC Call implementation.

### Repetition pattern

0 or more times

### Specifiable sub-elements

| Element name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| name | Specifies the name of the entity. | Type: String | No default value | NA | Only one time |
| value | Specifies the value of the entity. | Type: String | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.7.30 /glassfish-application-client/service-ref/wsdl-override

`/glassfish-application-client/service-ref/wsdl-override` specifies a valid URL pointing to a final WSDL document.

### Description

`/glassfish-application-client/service-ref/wsdl-override` specifies a valid URL pointing to a final WSDL document. If not specified, then the WSDL document associated with the `service-ref` in the standard DD is used.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.7.31 /glassfish-application-client/service-ref/service-impl-class

`/glassfish-application-client/service-ref/service-impl-class` specifies the name of the generated service implementation class.

### Description

`/glassfish-application-client/service-ref/service-impl-class` specifies the name of the generated service implementation class.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.7.32 /glassfish-application-client/service-ref/service-qname

`/glassfish-application-client/service-ref/service-qname` specifies the WSDL service element that is being referenced.

### Description

`/glassfish-application-client/service-ref/service-qname` specifies the WSDL service element that is being referenced.

### Repetition pattern

0 or 1 time

## 3.7.33 /glassfish-application-client/service-ref/service-qname/namespaceURI

`/glassfish-application-client/service-ref/service-qname/namespaceURI` specifies the namespace URI.

### Description

`/glassfish-application-client/service-ref/service-qname/namespaceURI` specifies the namespace URI.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.7.34 /glassfish-application-client/service-ref/service-qname/localpart

`/glassfish-application-client/service-ref/service-qname/localpart` specifies the local part of `QNAME`.

### Description

`/glassfish-application-client/service-ref/service-qname/localpart` specifies the local part of `QNAME`.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.7.35 /glassfish-application-client/message-destination-ref

`/glassfish-application-client/message-destination-ref` specifies the name of a physical message destination.

### Description

`/glassfish-application-client/message-destination-ref` directly binds a message destination reference to the `JNDI name` of a Queue, Topic, or other physical destinations.

Use only when the message destination reference in the corresponding Java EE RI DD file does not specify a `message-destination-link` to a logical message destination.

### Repetition pattern

0 or more times

## 3.7.36 /glassfish-application-client/message-destination-ref/message-destination-ref-name

`/glassfish-application-client/message-destination-ref/message-destination-ref-name` specifies the name of a physical message destination defined within the corresponding Java EE RI DD file.

### Description

`/glassfish-application-client/message-destination-ref/message-destination-ref-name` specifies the name of a physical message destination defined within the corresponding Java EE RI DD file.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.7.37 /glassfish-application-client/message-destination-ref/jndi-name

`/glassfish-application-client/message-destination-ref/jndi-name` specifies the `JNDI name` of the associated entity.

### Description

For the JMS `message-driven beans`, this is the `JNDI name` of the JMS resource from which the `message-driven bean` consumes the JMS messages.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.7.38 /glassfish-application-client/message-destination

`/glassfish-application-client/message-destination` specifies the name of the logical message destination.

### Description

`/glassfish-application-client/message-destination` specifies the name of the logical message destination defined within an application.

The `message-destination-name` matches the corresponding `message-destination-name` available in the Java EE RI DD file.

Use when the message destination reference in the corresponding Java EE RI DD file specifies a `message-destination-link` to a logical message destination.

### Repetition pattern

0 or more times

## 3.7.39 /glassfish-application-client/message-destination/message-destination-name

`/glassfish-application-client/message-destination/message-destination-name` specifies the name of the logical message destination defined within the corresponding Java EE RI DD file.

### Description

`/glassfish-application-client/message-destination/message-destination-name` specifies the name of the logical message destination defined within the corresponding Java EE RI DD file.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.7.40 /glassfish-application-client/message-destination/jndi-name

`/glassfish-application-client/message-destination/jndi-name` specifies the `JNDI name` of the associated entity.

### Description

`/glassfish-application-client/message-destination/jndi-name` specifies the absolute `JNDI name` of a URL resource or a resource.

For the entity beans and session beans, this value specifies the global `JNDI name` of the `EJBHome` object. It is only needed if the entity bean or session bean exposes a remote view.

For the JMS `message-driven beans`, this is the `JNDI name` of the JMS resource from which the `message-driven bean` consumes the JMS messages.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.7.41 /glassfish-application-client/version-identifier

`/glassfish-application-client/version-identifier` contains the version information of an application or module.

### Description

`/glassfish-application-client/version-identifier` contains the version information of an application or module. The version identifier is a suffix to the module or application name. It is separated from the name by a colon (`:`). It must begin with a letter or number. It can contain alphanumeric characters, underscore (_), dash (-), and period (`.`).

The following examples display valid version identifiers for the `foo` application:

- *application name*`:1`
- *application name*`:BETA-2e`
- *application name*`:3.8`
- *application name*`:patch39875`

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.8 glassfish-ejb-jar.xml

glassfish-ejb-jar.xml specifies the EJB-JAR settings for the Java EE RI DD.

### Description

glassfish-ejb-jar.xml specifies the EJB-JAR settings that are unique to Java EE RI for the DD.

The root element of glassfish-ejb-jar.xml is glassfish-ejb-jar. The element glassfish-ejb-jar contains child elements and attributes, as indicated by "Element hierarchy". These child elements and attributes may also contain their child elements and attributes.

### Schema

```
<!DOCTYPE glassfish-ejb-jar PUBLIC
"-//GlassFish.org//DTD GlassFish Application Server 3.1 EJB 3.1//EN"
"http://glassfish.org/dtds/glassfish-ejb-jar_3_1-1.dtd">
```

### Storage location

The DD file is stored in the following location:

*ejb_jar_name*/META-INF directory.

*ejb_jar_name*: Represents the archive name of the ejb application.

### Element hierarchy

```
glassfish-ejb-jar
. security-role-mapping
. . role-name
. . principal-name
. . group-name
. enterprise-beans
. . name
. . ejb
. . . ejb-name
. . . jndi-name
. . . ejb-ref
. . . . ejb-ref-name
. . . . jndi-name
. . . resource-ref
. . . . res-ref-name
. . . . jndi-name
. . . . default-resource-principal
. . . . . name
. . . . . password
. . . resource-env-ref
. . . . resource-env-ref-name
. . . . jndi-name
. . . service-ref
. . . . service-ref-name
. . . . port-info
. . . . . service-endpoint-interface
. . . . . wsdl-port
. . . . . namespaceURI
. . . . . localpart
. . . . . stub-property
```

```
. . . . . call-property
. . . . . message-security-binding
. . . . . . message-security
. . . . . . . message
. . . . . . . . java-method
. . . . . . . . . method-name
. . . . . . . . . method-params
. . . . . . . . . . method-param
. . . . . . . . operation-name
. . . . . . . . request-protection
. . . . . . . . response-protection
. . . . call-property
. . . . wsdl-override
. . . . service-impl-class
. . . . service-qname
. . . . . namespaceURI
. . . . . localpart
. . . message-destination-ref
. . . . message-destination-ref-name
. . . . jndi-name
. . . principal
. . . . name
. . . mdb-connection-factory
. . . . jndi-name
. . . . default-resource-principal
. . . . . name
. . . . . password
. . . jms-durable-subscription-name
. . . jms-max-messages-load
. . . ior-security-config
. . . . transport-config
. . . . . integrity
. . . . . confidentiality
. . . . . establish-trust-in-target
. . . . . establish-trust-in-client
. . . . as-context
. . . . . auth-method
. . . . . realm
. . . . . required
. . . commit-option
. . . cmt-timeout-in-seconds
. . . bean-pool
. . . . steady-pool-size
. . . . resize-quantity
. . . . max-pool-size
. . . . pool-idle-timeout-in-seconds
. . . mdb-resource-adapter
. . . . resource-adapter-mid
. . . . activation-config
. . . . . description
. . . . . activation-config-property
. . . . . . activation-config-property-name
. . . . . . activation-config-property-value
. . . webservice-endpoint
. . . . port-component-name
. . . . endpoint-address-uri
. . . . login-config
. . . . . auth-method
. . . . . realm
. . . . message-security-binding
. . . . . message-security
. . . . . . message
. . . . . . . java-method
. . . . . . . . method-name
```

```
. . . . . . . . method-params
. . . . . . . . . method-param
. . . . . . . operation-name
. . . . . . request-protection
. . . . . . response-protection
. . . . transport-guarantee
. . . . service-qname
. . . . . namespaceURI
. . . . . localpart
. . . . tie-class
. . . . servlet-impl-class
. . . . debugging-enabled
. . . . property
. . message-destination
. . . message-destination-name
. . . jndi-name
. . webservice-description
. . . webservice-description-name
. . . wsdl-publish-location
. version-identifier
```

## Example

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE glassfish-ejb-jar PUBLIC
"-//GlassFish.org//DTD GlassFish Application Server 3.1 EJB 3.1//EN"
"http://glassfish.org/dtds/glassfish-ejb-jar_3_1-1.dtd">
<glassfish-ejb-jar>
    <ejb>
        <ejb-name>CustomerEJB</ejb-name>
        <jndi-name>customer</jndi-name>
        <bean-pool>
            <steady-pool-size>10</steady-pool-size>
        </bean-pool>
     </ejb>
</glassfish-ejb-jar>
```

## 3.9 Details of the elements specified in glassfish-ejb-jar.xml

This section describes the elements specified in `glassfish-ejb-jar.xml`.

### 3.9.1 /glassfish-ejb-jar

`/glassfish-ejb-jar` defines the Java EE Server specific configuration for an EJB JAR file.

#### Description

`/glassfish-ejb-jar` defines the Java EE Server specific configuration for an EJB JAR file. This is the root element. There can be only one `glassfish-ejb-jar` element in a `glassfish-ejb-jar.xml` file.

#### Repetition pattern

Only one time

### 3.9.2 /glassfish-ejb-jar/security-role-mapping

`/glassfish-ejb-jar/security-role-mapping` maps a role in the corresponding standard DD to a user or group.

#### Description

`/glassfish-ejb-jar/security-role-mapping` maps roles to users or groups in the currently active realm.

The role mapping element maps a role, as specified in the EJB JAR `role-name` entries, to an environment-specific user or group. If the value maps to a user, then it must be a concrete user which exists in the current realm who can log into the server using the current authentication method. If the value maps to a group, then the realm must support groups and the group must be a concrete group that exists in the current realm. In order to be productive, there must be at least one user in that realm belonging to that group.

#### Repetition pattern

0 or more times

### 3.9.3 /glassfish-ejb-jar/security-role-mapping/role-name

`/glassfish-ejb-jar/security-role-mapping/role-name` specifies `role-name` in the `security-role` element of the corresponding standard DD.

#### Description

`/glassfish-ejb-jar/security-role-mapping/role-name` specifies `role-name` in the `security-role` element of the corresponding standard DD.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.4 /glassfish-ejb-jar/security-role-mapping/principal-name

`/glassfish-ejb-jar/security-role-mapping/principal-name` contains a principal (user) name in the current realm.

### Description

`/glassfish-ejb-jar/security-role-mapping/principal-name` contains a principal (user) name in the current realm. In an enterprise bean, the principal must have the `run-as` role specified.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Dependencies of elements and attributes

`group-name`

### Repetition pattern

1 or more times, if `group-name` is not used.

Else 0 or more times.

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `class-name` | Specifies the `custom principal implementation class` value for the named principal. | Type: `String`<br>Any class (sub-class) name which implements | `org.glassfish.security.common.PrincipalImpl` | N/A | 0 or 1 time |

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| | | the interface `java.security.Principal` | | | |

Legend:

N/A: Not applicable

#: Default value that is set when a definition item is excluded.

## 3.9.5 /glassfish-ejb-jar/security-role-mapping/group-name

`/glassfish-ejb-jar/security-role-mapping/group-name` specifies a group name in the current realm.

### Description

`/glassfish-ejb-jar/security-role-mapping/group-name` specifies a group name in the current realm.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Dependencies of elements and attributes

`principal-name`

### Repetition pattern

1 or more times, if the `principal-name` is not used.

Else 0 or more times.

## 3.9.6 /glassfish-ejb-jar/enterprise-beans

`/glassfish-ejb-jar/enterprise-beans` describes all the runtime properties for an EJB JAR file in the application.

### Description

`/glassfish-ejb-jar/enterprise-beans` describes all the runtime properties for an EJB JAR file in the application.

### Repetition pattern

Only one time

## 3.9.7 /glassfish-ejb-jar/enterprise-beans/name

`/glassfish-ejb-jar/enterprise-beans/name` specifies the name of the entity.

### Description

`/glassfish-ejb-jar/enterprise-beans/name` specifies the name of the entity.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.9.8 /glassfish-ejb-jar/enterprise-beans/ejb

`/glassfish-ejb-jar/enterprise-beans/ejb` defines the runtime properties for a single enterprise bean within the application.

### Description

The following list of sub-elements that apply to particular enterprise beans are:

- All types of beans: `ejb-name`, `ejb-ref`, `resource-ref`, `resource-env-ref`, `ior-security-config`, `jndi-name`, `message-destination-ref`, `service-ref`.
- Stateless session beans: `bean-pool`, `webservice-endpoint`.
- Stateful session beans: `webservice-endpoint`.
- Entity beans: `commit-option`, `bean-pool`.
- Message-driven beans: `mdb-resource-adapter`, `mdb-connection-factory`, `jms-durable-subscription-name`, `jms-max-messages-load`, `bean-pool`.

### Repetition pattern

0 or more times

## 3.9.9 /glassfish-ejb-jar/enterprise-beans/ejb/ejb-name

/glassfish-ejb-jar/enterprise-beans/ejb/ejb-name matches the ejb-name entry in the corresponding ejb-jar.xml file.

### Description

In the glassfish-ejb-jar.xml file, /glassfish-ejb-jar/enterprise-beans/ejb/ejb-name matches the ejb-name with the corresponding entry in the ejb-jar.xml file. The name must be unique among the names of the enterprise beans in the same EJB JAR file.

### Specifiable values

Type: String

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.10 /glassfish-ejb-jar/enterprise-beans/ejb/jndi-name

/glassfish-ejb-jar/enterprise-beans/ejb/jndi-name specifies the absolute JNDI-name.

### Description

/glassfish-ejb-jar/enterprise-beans/ejb/jndi-name specifies the absolute JNDI-name of a URL resource or a resource.

For entity beans and session beans, this value specifies the global JNDI name of the EJBHome object. Only when the entity or session bean exposes a remote view, this value is required.

### Specifiable values

Type: String

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or more times

## 3.9.11 /glassfish-ejb-jar/enterprise-beans/ejb/ejb-ref

`/glassfish-ejb-jar/enterprise-beans/ejb/ejb-ref` maps the absolute `JNDI name` to the `ejb-ref` element in the corresponding standard DD.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/ejb-ref` maps `ejb-ref-name` in the corresponding standard DD `ejb-ref` entry to the absolute `JNDI name` of a resource. The `ejb-ref` element is used for the declaration of a reference to `EJBHome`. It applies to the session beans or entity beans.

### Repetition pattern

0 or more times

## 3.9.12 /glassfish-ejb-jar/enterprise-beans/ejb/ejb-ref/ejb-ref-name

`/glassfish-ejb-jar/enterprise-beans/ejb/ejb-ref/ejb-ref-name` specifies `ejb-ref-name` in the `ejb-ref` entry of the corresponding standard DD.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/ejb-ref/ejb-ref-name` specifies `ejb-ref-name` in the `ejb-ref` entry of the corresponding standard DD.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.13 /glassfish-ejb-jar/enterprise-beans/ejb/ejb-ref/jndi-name

`/glassfish-ejb-jar/enterprise-beans/ejb/ejb-ref/jndi-name` specifies the absolute `JNDI name` of a resource.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/ejb-ref/jndi-name` specifies the absolute `JNDI name` of a URL resource or a resource.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.14 /glassfish-ejb-jar/enterprise-beans/ejb/resource-ref

`/glassfish-ejb-jar/enterprise-beans/ejb/resource-ref` maps the absolute `JNDI name` to the `resource-ref` element in the corresponding standard DD.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/resource-ref` maps `res-ref-name` to the `resource-ref` entry in the corresponding standard DD. `/glassfish-ejb-jar/enterprise-beans/ejb/resource-ref` also tags the `res-ref-name` element to the absolute `JNDI name` of a resource.

Note:

The connections acquired from the JMS connection factories are not shareable in the current release of the Java EE Server. The `res-sharing-scope` element in the `ejb-jar.xml` file `resource-ref` element is ignored for the JMS connection factories. When the `resource-ref` element specifies the JMS connection factory for the Message Queue, the `default-resource-principal (name/password)` must exist in the Message Queue user repository.

### Repetition pattern

0 or more times

## 3.9.15 /glassfish-ejb-jar/enterprise-beans/ejb/resource-ref/res-ref-name

`/glassfish-ejb-jar/enterprise-beans/ejb/resource-ref/res-ref-name` specifies `res-ref-name` in the corresponding standard DD `resource-ref` entry.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/resource-ref/res-ref-name` specifies `res-ref-name` in the corresponding standard DD `resource-ref` entry. The `res-ref-name` element specifies the name of the resource manager connection factory reference. The name must be unique within an enterprise bean.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

Only one time

## 3.9.16 /glassfish-ejb-jar/enterprise-beans/ejb/resource-ref/jndi-name

`/glassfish-ejb-jar/enterprise-beans/ejb/resource-ref/jndi-name` specifies the absolute `JNDI name` of a resource.

### Description

Specifies the absolute `jndi-name` of a URL resource or a resource.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

Only one time

## 3.9.17 /glassfish-ejb-jar/enterprise-beans/ejb/resource-ref/default-resource-principal

`/glassfish-ejb-jar/enterprise-beans/ejb/resource-ref/default-resource-principal` specifies the default principal (user) for the resource.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/resource-ref/default-resource-principal` specifies the default principal (user) for the resource.

If this element is used in conjunction with the `JMS Connection Factory` resource, then the `name` and `password` sub-elements must be valid entries in the Message Queue broker user repository.

### Repetition pattern

0 or 1 time

## 3.9.18 /glassfish-ejb-jar/enterprise-beans/ejb/resource-ref/default-resource-principal/name

`/glassfish-ejb-jar/enterprise-beans/ejb/resource-ref/default-resource-principal/name` specifies the default resource principal name used to sign in to the resource manager.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/resource-ref/default-resource-principal/name` specifies the default resource principal name used to sign in to the resource manager.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.19 /glassfish-ejb-jar/enterprise-beans/ejb/resource-ref/default-resource-principal/password

`/glassfish-ejb-jar/enterprise-beans/ejb/resource-ref/default-resource-principal/password` specifies the password of the default resource principal.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/resource-ref/default-resource-principal/password` specifies the password of the default resource principal.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.20 /glassfish-ejb-jar/enterprise-beans/ejb/resource-env-ref

`/glassfish-ejb-jar/enterprise-beans/ejb/resource-env-ref` maps the absolute `JNDI name` to the `resource-env-ref` in the corresponding standard DD.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/resource-env-ref` maps `res-ref-name` in the corresponding standard DD `resource-env-ref` entry to the absolute `JNDI name` of a resource.

### Repetition pattern

0 or more times

## 3.9.21 /glassfish-ejb-jar/enterprise-beans/ejb/resource-env-ref/resource-env-ref-name

`/glassfish-ejb-jar/enterprise-beans/ejb/resource-env-ref/resource-env-ref-name` specifies `res-ref-name` in the corresponding standard DD `resource-env-ref` entry.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/resource-env-ref/resource-env-ref-name` specifies `res-ref-name` in the corresponding standard DD `resource-env-ref` entry.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.22 /glassfish-ejb-jar/enterprise-beans/ejb/resource-env-ref/jndi-name

`/glassfish-ejb-jar/enterprise-beans/ejb/resource-env-ref/jndi-name` specifies the absolute `JNDI name` of a resource.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/resource-env-ref/jndi-name` specifies the absolute `JNDI name` of a URL resource or a resource.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

Only one time

## 3.9.23 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref` specifies runtime settings for the web service reference.

### Description

Runtime information is required only in the following cases:

- To define the port used to resolve the `container-managed` port.
- To define the default `Stub` or `Call` property settings for the `Stub` objects.
- To define the URL of the final WSDL document to be used instead of the one associated with `service-ref` in the standard DD.

### Repetition pattern

0 or more times

## 3.9.24 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/service-ref-name

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/service-ref-name` specifies the web service reference name relative to `java:comp/env`.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/service-ref-name` specifies the web service reference name relative to `java:comp/env`.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.25 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info` specifies information for a port within a web service reference.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info` specifies either a `service-endpoint-interface` or `wsdl-port` or both. If both are specified, then `wsdl-port` specifies the port that the container chooses for container-managed port selection. The same `wsdl-port` value must not appear in more than one `port-info` element within the same `service-ref`. If a `service-endpoint-interface` is using container-managed port selection, then its value must not appear in more than one `port-info` element within the same `service-ref`.

### Repetition pattern

0 or more times

## 3.9.26 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/service-endpoint-interface

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/service-endpoint-interface` specifies the web service reference name that is relative to `java:comp/env`.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/service-endpoint-interface` specifies the web service reference name that is relative to `java:comp/env`.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.9.27 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/wsdl-port

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/wsdl-port` specifies the WSDL port number.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/wsdl-port` specifies the WSDL port number.

### Repetition pattern

0 or 1 time

## 3.9.28 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/wsdl-port/namespaceURI

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/wsdl-port/namespaceURI` specifies the namespace URI.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/wsdl-port/namespaceURI` specifies the namespace URI.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.29 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/wsdl-port/localpart

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/wsdl-port/localpart` specifies the local part of `QNAME`.

## Description

/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/wsdl-port/localpart specifies the local part of QNAME.

## Specifiable values

Type: String

## Default value

If the definition item is omitted

No default value

## Repetition pattern

Only one time

# 3.9.30 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/stub-property

/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/stub-property specifies the JAX-RPC property values that are set on a javax.xml.rpc.Stub object, before the values are returned to the web service client.

## Description

/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/stub-property specifies the JAX-RPC property values that are set on a javax.xml.rpc.Stub object, before the values are returned to the web service client. The property names can be any of the properties supported by the JAX-RPC stub implementation.

## Repetition pattern

0 or more times

## Specifiable sub-elements

| Element name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| name | Specifies the name of the entity. | Type: String | No default value | N/A | Only one time |
| value | Specifies the value of the related name entity. | Type: String | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.9.31 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/call-property

/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/call-property specifies the JAX-RPC property values that are set on a javax.xml.rpc.Call object, before the values are returned to the web service client.

### Description

/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/call-property specifies the JAX-RPC property values that can be set on a javax.xml.rpc.Call object before the values are returned to the web service client. The property names can be any of the properties supported by the JAX-RPC call implementation.

### Repetition pattern

0 or more times

### Specifiable sub-elements

| Element name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| name | Specifies the name of the entity. | Type: String | No default value | N/A | Only one time |
| value | Specifies the value of the entity. | Type: String | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.9.32 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding

/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding specifies a custom authentication provider binding.

### Description

/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding specifies a custom authentication provider binding for a parent port-info element in either one or both of the following ways:

- By binding to a specific provider.
- By specifying the message security requirements enforced by the provider.

### Repetition pattern

0 or 1 time

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `auth-layer` | Specifies the message layer in which the authentication is performed. | Type: `String`<br>`SOAP` | No default value | N/A | Only one time |
| `provider-id` | Specifies the authentication provider used to meet application-specific message security requirements.<br>If this attribute is not specified, then a default provider is used when it is defined for the message layer.<br>If no default provider is defined, then the authentication requirements defined in `message-security-binding` are not enforced. | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.9.33 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security` specifies the message security requirements.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security` specifies the message security requirements.

As the grandparent element is `port-info`, these requirements correspond to the port of the referenced service.

### Repetition pattern

0 or more times

## 3.9.34 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/message

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/message` specifies the methods or operations to which message security requirements apply.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/message` specifies the methods or operations to which message security requirements apply.

### Repetition pattern

1 or more times

## 3.9.35 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/message/java-method

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/message/java-method` specifies the methods or operations to which the message security requirements apply.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/message/java-method` specifies the methods or operations to which the message security requirements apply.

### Repetition pattern

0 or 1 time

## 3.9.36 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/message/java-method/method-name

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/message/java-method/method-name` specifies a method name.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/message/java-method/method-name` specifies a method name or an asterisk (`*`) for all the methods. If a method is overloaded, then it specifies all the methods with the same name.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.37 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/message/java-method/method-params

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/message/java-method/method-params` specifies the fully qualified Java type names of method parameters.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/message/java-method/method-params` specifies the fully qualified Java type names of method parameters.

### Repetition pattern

0 or 1 time

## 3.9.38 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/message/java-method/method-params/method-param

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/message/java-method/method-params/method-param` specifies the fully qualified Java type name of a method parameter.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/message/java-method/method-params/method-param` specifies the fully qualified Java type name of a method parameter.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or more times

## 3.9.39 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/message/operation-name

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/message/operation-name` specifies the WSDL name of a web service operation.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/message/operation-name` specifies the WSDL name of a web service operation.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.9.40 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/request-protection

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/request-protection` defines the authentication policy requirements for the request processing of an application.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/request-protection` defines the authentication policy requirements for the request processing of an application.

### Repetition pattern

0 or 1 time

## Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| auth-source | Specifies the type of required authentication, either the sender (user name and password) or the content (digital signature). | Type: String {content \| sender} | No default value | N/A | Only one time |
| auth-recipient | Specifies whether the recipient authentication occurs before or after content authentication. | Type: String {before-content \| after-content} | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

# 3.9.41 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/response-protection

/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/response-protection defines the authentication policy requirements for the response processing of the application.

## Description

/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/port-info/message-security-binding/message-security/response-protection defines the authentication policy requirements for the response processing of the application.

## Repetition pattern

0 or 1 time

## Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| auth-source | Specifies the required type of authentication, either the sender (user name and password) or content (digital signature). | Type: String {content \| sender} | No default value | N/A | Only one time |
| auth-recipient | Specifies whether the recipient authentication occurs before or after content authentication. | Type: String {before-content \| after-content} | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.9.42 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/call-property

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/call-property` specifies the `JAX-RPC` property values that are set on a `javax.xml.rpc.Call` object, before the values are returned to the web service client.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/call-property` specifies the `JAX-RPC` property values that can be set on a `javax.xml.rpc.Call` object, before the values are returned to the web service client. The property names can be any of the properties supported by the `JAX-RPC` call implementation.

### Repetition pattern

0 or more times

### Specifiable sub-elements

| Element name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specifies the name of the entity. | Type: `String` | No default value | N/A | Only one time |
| `value` | Specifies the value of the entity. | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.9.43 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/wsdl-override

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/wsdl-override` specifies a valid URL pointing to a final WSDL document.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/wsdl-override` specifies a valid URL pointing to a final WSDL document. If not specified, then the WSDL document associated with `service-ref` in the standard DD is used.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

0 or 1 time

## 3.9.44 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/service-impl-class

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/service-impl-class` specifies the name of the generated service implementation class.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/service-impl-class` specifies the name of the generated service implementation class.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

0 or 1 time

## 3.9.45 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/service-qname

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/service-qname` specifies the WSDL service element that is being referenced.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/service-qname` specifies the WSDL service element that is being referenced.

### Repetition pattern

0 or 1 time

## 3.9.46 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/service-qname/namespaceURI

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/service-qname/namespaceURI` specifies the namespace URI.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/service-qname/namespaceURI` specifies the namespace URI.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.47 /glassfish-ejb-jar/enterprise-beans/ejb/service-ref/service-qname/localpart

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/service-qname/localpart` specifies the local part of `QNAME`.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/service-ref/service-qname/localpart` specifies the local part of `QNAME`.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.48 /glassfish-ejb-jar/enterprise-beans/ejb/message-destination-ref

`/glassfish-ejb-jar/enterprise-beans/ejb/message-destination-ref` specifies the name of a physical message destination.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/message-destination-ref` specifies the name of a physical message destination. This directly binds a message destination reference to the JNDI name of the Queue, Topic, or other physical destinations. Use only when the message destination reference in the standard DD does not specify a `message-destination-link` to a logical message-destination.

### Repetition pattern

0 or more times

## 3.9.49 /glassfish-ejb-jar/enterprise-beans/ejb/message-destination-ref/message-destination-ref-name

`/glassfish-ejb-jar/enterprise-beans/ejb/message-destination-ref/message-destination-ref-name` specifies the name of a physical message destination defined within the standard DD.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/message-destination-ref/message-destination-ref-name` specifies the name of a physical message destination defined within the standard DD.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.50 /glassfish-ejb-jar/enterprise-beans/ejb/message-destination-ref/jndi-name

`/glassfish-ejb-jar/enterprise-beans/ejb/message-destination-ref/jndi-name` specifies the JNDI-name of an associated entity.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/message-destination-ref/jndi-name` specifies the absolute JNDI-name of a URL resource or a resource.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
No default value

### Repetition pattern

Only one time

## 3.9.51 /glassfish-ejb-jar/enterprise-beans/ejb/principal

`/glassfish-ejb-jar/enterprise-beans/ejb/principal` specifies the principal (user) name in an enterprise bean that has the `run-as` role specified.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/principal` defines a user name on the platform.

### Repetition pattern

0 or 1 time

## 3.9.52 /glassfish-ejb-jar/enterprise-beans/ejb/principal/name

`/glassfish-ejb-jar/enterprise-beans/ejb/principal/name` specifies the name of the user.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/principal/name` specifies the name of the user.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
No default value

### Repetition pattern

Only one time

## 3.9.53 /glassfish-ejb-jar/enterprise-beans/ejb/mdb-connection-factory

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-connection-factory` specifies the connection factory associated with the message-driven bean.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-connection-factory` specifies the connection factory associated with the message-driven bean. The Queue or Topic type must be consistent with the Java Message Service Destination type associated with the `message-driven bean` class.

### Repetition pattern

0 or 1 time

## 3.9.54 /glassfish-ejb-jar/enterprise-beans/ejb/mdb-connection-factory/jndi-name

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-connection-factory/jndi-name` specifies the absolute JNDI-name.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-connection-factory/jndi-name` specifies the absolute JNDI-name of a URL resource or a resource.

For JMS message-driven beans, this is the JNDI name of the JMS resource from which the message-driven bean consumes JMS messages.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.55 /glassfish-ejb-jar/enterprise-beans/ejb/mdb-connection-factory/default-resource-principal

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-connection-factory/default-resource-principal` specifies the default sign-on (`name` or `password`) for the resource manager.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-connection-factory/default-resource-principal` specifies the default principal (user) for the resource.

If this element is used in conjunction with the `JMS Connection Factory` resource, then the `name` and `password` sub-elements must be valid entries in the Message Queue broker user repository.

### Repetition pattern

0 or 1 time

## 3.9.56 /glassfish-ejb-jar/enterprise-beans/ejb/mdb-connection-factory/default-resource-principal/name

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-connection-factory/default-resource-principal/name` specifies the default resource principal name used to sign in to a resource manager.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-connection-factory/default-resource-principal/name` specifies the default resource principal name used to sign in to a resource manager.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.57 /glassfish-ejb-jar/enterprise-beans/ejb/mdb-connection-factory/default-resource-principal/password

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-connection-factory/default-resource-principal/password` specifies the password for the default resource principal.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-connection-factory/default-resource-principal/password` specifies the password for the default resource principal.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.58 /glassfish-ejb-jar/enterprise-beans/ejb/jms-durable-subscription-name

`/glassfish-ejb-jar/enterprise-beans/ejb/jms-durable-subscription-name` specifies the durable subscription associated with a message-driven bean.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/jms-durable-subscription-name` specifies the durable subscription associated with a `message-driven bean` class. This property applies only to the `Java Message Service Topic Destination` type, and is applied only when the message-driven bean DD subscription durability is `Durable`.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.9.59 /glassfish-ejb-jar/enterprise-beans/ejb/jms-max-messages-load

`/glassfish-ejb-jar/enterprise-beans/ejb/jms-max-messages-load` specifies the maximum number of messages to be loaded into the Java Message Service session at one time for the `message-driven bean` to complete its processing.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/jms-max-messages-load` specifies the maximum number of messages to be loaded into the Java Message Service session at one time for the `message-driven bean` to complete its processing.

### Specifiable values

Type: `Integer`

`1` to `2147483647`

### Default value

If the definition item is omitted

`1`

### Repetition pattern

0 or 1 time

## 3.9.60 /glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config

`/glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config` specifies the security information for the IOR.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config` specifies the security information for the IOR.

### Repetition pattern

0 or 1 time

## 3.9.61 /glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/transport-config

`/glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/transport-config` specifies the security information for transport.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/transport-config` specifies the security information for transport.

### Repetition pattern

0 or 1 time

## 3.9.62 /glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/transport-config/integrity

`/glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/transport-config/integrity` specifies whether the target supports integrity-protected messages.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/transport-config/integrity` specifies whether the target supports integrity-protected messages.

### Specifiable values

Type: `String`

{`NONE` | `SUPPORTED` | `REQUIRED`}

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.63 /glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/transport-config/confidentiality

`/glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/transport-config/confidentiality` specifies whether the target supports privacy-protected messages.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/transport-config/confidentiality` specifies whether the target supports privacy-protected messages.

### Specifiable values

Type: `String`

{`NONE` | `SUPPORTED` | `REQUIRED`}

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.64 /glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/transport-config/establish-trust-in-target

`/glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/transport-config/establish-trust-in-target` specifies whether the target is capable of authenticating to a client.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/transport-config/establish-trust-in-target` specifies whether the target is capable of authenticating to a client.

### Specifiable values

Type: `String`

{`NONE` | `SUPPORTED` | `REQUIRED`}

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.65 /glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/transport-config/establish-trust-in-client

`/glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/transport-config/establish-trust-in-client` specifies whether the target is capable of authenticating a client.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/transport-config/establish-trust-in-client` specifies whether the target is capable of authenticating a client.

### Specifiable values

Type: `String`

{`NONE` | `SUPPORTED` | `REQUIRED`}

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.66 /glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/as-context

`/glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/as-context` specifies the authentication mechanism used to authenticate the client.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/as-context` specifies the authentication mechanism used to authenticate the client. If specified, then it is `USERNAME_PASSWORD`.

### Repetition pattern

0 or 1 time

## 3.9.67 /glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/as-context/auth-method

`/glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/as-context/auth-method` specifies the authentication method.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/as-context/auth-method` specifies the authentication method.

### Specifiable values

Type: `String`

*`USERNAME_PASSWORD`*

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.68 /glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/as-context/realm

`/glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/as-context/realm` specifies the realm in which the user is authenticated.

## Description

/glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/as-context/realm specifies the name of the realm used to process all authentication requests associated with this application. If this element is not specified or does not match the name of a configured realm, then the default realm is used.

The following realms are supported:

file
: Stores the user information in a file. This is the default realm when you first install the Application Server.

ldap
: Stores the user information in an LDAP directory.

jdbc
: Stores the user information in a database.

  In the JDBC realm, the server gets the user credentials from a database. The Java EE Server uses the database information and the enabled JDBC realm option in the configuration file. For the digest authentication, a JDBC realm must be created with jdbcDigestRealm as the JAAS context.

certificate
: Sets up the user identity in the Java EE Server security context and populates it with the user data obtained from the cryptographically verified client certificates.

## Specifiable values

Type: String

{file|ldap|jdbc|certificate}

## Default value

If the definition item is omitted
: file

## Repetition pattern

Only one time

# 3.9.69 /glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/as-context/required

/glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/as-context/required specifies whether the authentication method specified in the auth-method element must be used for the client authentication.

## Description

/glassfish-ejb-jar/enterprise-beans/ejb/ior-security-config/as-context/required specifies whether the authentication method specified in the auth-method element must be used for the client authentication.

### Specifiable values

Type: `Boolean`

`{true|false}`

### Default value

If the definition item is omitted
`false`

### Repetition pattern

Only one time

## 3.9.70 /glassfish-ejb-jar/enterprise-beans/ejb/commit-option

`/glassfish-ejb-jar/enterprise-beans/ejb/commit-option` specifies the `commit` option, which is used when the transaction has been completed.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/commit-option` specifies the `commit` option, which is used when the transaction has been completed. Valid values for Java EE Server are `B` or `C` and applies to the entity beans.

### Specifiable values

Type: `String`

`{B|C}`

### Default value

If the definition item is omitted
`B`

### Repetition pattern

0 or 1 time

## 3.9.71 /glassfish-ejb-jar/enterprise-beans/ejb/cmt-timeout-in-seconds

`/glassfish-ejb-jar/enterprise-beans/ejb/cmt-timeout-in-seconds` overrides the `Transaction Timeout` setting of the Transaction Service for an individual bean.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/cmt-timeout-in-seconds` overrides the `Transaction Timeout` setting of the Transaction Service for an individual bean. The value `0` specifies that the default Transaction Service timeout is used. If a positive integer value is specified, then this value is used for all methods

in the bean that starts a new `container-managed` transaction. This value is not used if the bean joins a client transaction.

### Specifiable values

Type: `Integer`

`0` to `2147483647`

### Default value

If the definition item is omitted
`0`

### Repetition pattern

0 or 1 time

## 3.9.72 /glassfish-ejb-jar/enterprise-beans/ejb/bean-pool

`/glassfish-ejb-jar/enterprise-beans/ejb/bean-pool` specifies the bean pool properties.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/bean-pool` specifies the bean pool properties. It is used for the stateless session beans, entity beans, and message-driven beans.

### Repetition pattern

0 or 1 time

## 3.9.73 /glassfish-ejb-jar/enterprise-beans/ejb/bean-pool/steady-pool-size

`/glassfish-ejb-jar/enterprise-beans/ejb/bean-pool/steady-pool-size` specifies the initial and minimum number of beans that are maintained in the pool.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/bean-pool/steady-pool-size` specifies the initial and minimum number of bean instances that are maintained in the pool. It applies to the stateless session beans and message-driven beans.

### Specifiable values

Type: `Integer`

`0` to `2147483647`

### Default value

If the definition item is omitted

Configured value of `configs.config.`*`instance-config`*`.ejb-container.steady-pool-size` parameter.

### Repetition pattern

0 or 1 time

## 3.9.74 /glassfish-ejb-jar/enterprise-beans/ejb/bean-pool/resize-quantity

`/glassfish-ejb-jar/enterprise-beans/ejb/bean-pool/resize-quantity` specifies the number of beans to be created if the pool is empty (subject to the `max-pool-size` limit).

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/bean-pool/resize-quantity` specifies the number of bean instances to be:

- Created, when a request arrives and the pool has less than `steady-pool-size` quantity of beans (applies to the pools only for creation). If the pool has more than `steady-pool-size` minus `resize-quantity` of beans, then `resize-quantity` is still created.
- Removed, when the `pool-idle-timeout-in-seconds` timer expires and the cleaner thread removes any unused instances.

### Specifiable values

Type: `Integer`

`0` to `2147483647`

### Default value

If the definition item is omitted

`16`

### Repetition pattern

0 or 1 time

## 3.9.75 /glassfish-ejb-jar/enterprise-beans/ejb/bean-pool/max-pool-size

`/glassfish-ejb-jar/enterprise-beans/ejb/bean-pool/max-pool-size` specifies the maximum number of beans in the pool.

### Description

/glassfish-ejb-jar/enterprise-beans/ejb/bean-pool/max-pool-size specifies the maximum number of beans in the pool.

### Specifiable values

Type: Integer

0 to 2147483647

### Default value

If the definition item is omitted

Configured value of configs.config.*instancename*-config.ejb-container.max-pool-size parameter.

### Repetition pattern

0 or 1 time

## 3.9.76 /glassfish-ejb-jar/enterprise-beans/ejb/bean-pool/pool-idle-timeout-in-seconds

/glassfish-ejb-jar/enterprise-beans/ejb/bean-pool/pool-idle-timeout-in-seconds specifies the maximum time that a bean is allowed to remain idle in the pool.

### Description

/glassfish-ejb-jar/enterprise-beans/ejb/bean-pool/pool-idle-timeout-in-seconds specifies the maximum time (in seconds) that a bean instance is allowed to remain idle in the pool. When this timeout expires, the bean instance in a pool becomes a candidate for passivation or deletion. A value of 0 specifies that idle beans remain in the pool indefinitely.

### Specifiable values

Type: Integer

0 to 2147483647

### Default value

If the definition item is omitted

600

### Repetition pattern

0 or 1 time

## 3.9.77 /glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter` specifies the runtime configuration information for a message-driven bean.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter` specifies the runtime configuration information for a message-driven bean.

### Repetition pattern

0 or 1 time

## 3.9.78 /glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter/resource-adapter-mid

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter/resource-adapter-mid` specifies the module ID of the resource adapter.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter/resource-adapter-mid` specifies the module ID of the resource adapter, which delivers messages to the message-driven bean.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.9.79 /glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter/activation-config

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter/activation-config` specifies the activation configuration.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter/activation-config` specifies the activation configuration, which includes the runtime configuration properties of the message-driven bean in its operational environment. For example, this can include information about the name of a physical JMS destination. It matches and overrides the `activation-config` element in the `ejb-jar.xml` file.

### Repetition pattern

One or more times

## 3.9.80 /glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter/activation-config/description

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter/activation-config/description` specifies the text description of the activation configuration.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter/activation-config/description` specifies the text description of the containing element.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.9.81 /glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter/activation-config/activation-config-property

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter/activation-config/activation-config-property` specifies the `activation configuration` property.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter/activation-config/activation-config-property` specifies the name and value of the `activation configuration` property.

### Repetition pattern

One or more times

## 3.9.82 /glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter/activation-config/activation-config-property/activation-config-property-name

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter/activation-config/activation-config-property/activation-config-property-name` specifies the name of the `activation configuration` property.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter/activation-config/activation-config-property/activation-config-property-name` specifies the name of the `activation configuration` property.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.83 /glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter/activation-config/activation-config-property/activation-config-property-value

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter/activation-config/activation-config-property/activation-config-property-value` specifies the value of the `activation configuration` property.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/mdb-resource-adapter/activation-config/activation-config-property/activation-config-property-value` specifies the value of the `activation configuration` property.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.84 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint` specifies information about a web service endpoint.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint` specifies information about a web service endpoint.

### Repetition pattern

0 or more times

## 3.9.85 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/port-component-name

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/port-component-name` specifies a unique name for a port component within the EJB module.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/port-component-name` specifies a unique name for a port component within the EJB module.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.86 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/endpoint-address-uri

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/endpoint-address-uri` specifies the automatically generated endpoint address.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/endpoint-address-uri` specifies the relative path combined with the web server root to form the fully qualified endpoint address for a web service endpoint. This is a required element for EJB endpoints.

This value must have a fixed pattern (`*` is not allowed).

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.9.87 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/login-config

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/login-config` specifies the authentication configuration for the EJB web service endpoint.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/login-config` specifies the authentication configuration for the EJB web service endpoint. It is not required for the servlet web service endpoints. The servlet security configuration is stored in the `web.xml` file.

### Repetition pattern

0 or 1 time

## 3.9.88 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/login-config/auth-method

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/login-config/auth-method` specifies the authentication method.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/login-config/auth-method` specifies the authentication method.

As a parent element, `login-config` specifies the authentication mechanism for the web service endpoint. As a prerequisite to get access to a web resource protected by an authorization constraint, a user must be authenticated using the configured mechanism.

The authentication types are as follows:

`BASIC`

Uses the built-in Login dialog box of the server. The communication protocol is HTTP (SSL optional). User-credentialed encryption is available only when SSL is used. The Basic type is not considered to be a secure method of user authentication unless it is used in conjunction with some external secure system such as SSL.

`FORM`

The application provides its own custom login and error pages. The communication protocol is HTTP (SSL optional). User-credentialed encryption is available only when SSL is used.

`CLIENT-CERT`

The server authenticates the client using a public key certificate. The communication protocol is HTTPS (HTTP over SSL). User-credentialed encryption is SSL.

`DIGEST`

The server authenticates a user based on the user name and the password. Unlike `BASIC` authentication, the password is never sent over the network. The use of SSL with HTTP Digest is optional.

### Specifiable values

Type: `String`

`{BASIC|DIGEST|FORM|CLIENT-CERT}`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.89 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/login-config/realm

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/login-config/realm` specifies the realm name used to process all the authentication requests.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/login-config/realm` specifies the realm name used to process all the authentication requests associated with this application. If this element is not specified or does not match the name of the configured realm, then the default realm is used.

The following realms are supported:

`file`

Stores the user information in a file. This is the default realm when you first install the Application Server.

`ldap`

Stores the user information in an LDAP directory.

`jdbc`

Stores the user information in a database.

In the `JDBC` realm, the server gets the user credentials from a database. The Java EE Server uses the database information and the enabled `JDBC` realm option in the configuration file. For the digest authentication, a `JDBC` realm must be created with `jdbcDigestRealm` as the JAAS context.

`certificate`

Sets up the user identity in the Java EE Server security context and populates it with the user data obtained from the cryptographically verified client certificates.

### Specifiable values

Type: `String`

`{file|ldap|jdbc|certificate}`

### Default value

If the definition item is omitted

`file`

### Repetition pattern

0 or 1 time

## 3.9.90 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding` specifies the custom authentication provider binding.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding` specifies the custom authentication provider binding for a parent `webservice-endpoint` element in one or both of the following ways:

- By binding to a specific provider.
- By specifying the message security requirements enforced by the provider.

### Repetition pattern

0 or 1 time

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `auth-layer` | Specifies the message layer at which authentication is performed. | Type: `String`<br>`SOAP` | No default value | N/A | Only one time |
| `provider-id` | Specifies the authentication provider used to meet the application-specific message security requirements.<br>If this attribute is not specified, then a default provider is used, if it is defined for the message layer.<br>If no default provider is defined, then the authentication requirements defined in the `message-security-binding` are not enforced. | Type: `String` | No default value | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.9.91 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security` specifies the message security requirements.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security` specifies the message security requirements.

As the grandparent element is `webservice-endpoint`, these requirements correspond to the request and response messages of the endpoint.

### Repetition pattern

0 or more times

## 3.9.92 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/message

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/message` specifies the methods or operations to which the message security requirements apply.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/message` specifies the methods or operations to which the message security requirements apply.

### Repetition pattern

One or more times

## 3.9.93 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/message/java-method

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/message/java-method` specifies the methods or operations to which the message security requirements apply.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/message/java-method` specifies the methods or operations to which the message security requirements apply.

### Repetition pattern

0 or 1 time

## 3.9.94 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/message/java-method/method-name

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/message/java-method/method-name` specifies the method name.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/message/java-method/method-name` specifies the method name or an asterisk (`*`) for all the methods. If a method is overloaded, then all the methods are specified with the same name.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.95 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/message/java-method/method-params

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/message/java-method/method-params` specifies the fully qualified Java type names of the method parameters.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/message/java-method/method-params` specifies the fully qualified Java type names of the method parameters.

### Repetition pattern

0 or 1 time

## 3.9.96 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/message/java-method/method-params/method-param

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/message/java-method/method-params/method-param` specifies the fully qualified Java type name of a method parameter.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/message/java-method/method-params/method-param` specifies the fully qualified Java type name of a method parameter.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or more times

## 3.9.97 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/message/operation-name

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/message/operation-name` specifies the WSDL name of an operation of a web service.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/message/operation-name` specifies the WSDL name of an operation of a webservice.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.9.98 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/request-protection

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/request-protection` specifies the authentication policy requirements for processing the request of the application.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/request-protection` specifies the authentication policy requirements for processing the request of the application.

### Repetition pattern

0 or 1 time

## Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| auth-source | Specifies the type of required authentication, either sender (user name and password) or content (digital signature). | Type: String {content\|sender} | No default value | N/A | Only one time |
| auth-recipient | Specifies whether recipient authentication occurs before or after content authentication. | Type: String {before-content\|after-content} | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

# 3.9.99 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/response-protection

/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/response-protection specifies the authentication policy requirements for processing the response of the application.

## Description

/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/message-security-binding/message-security/response-protection specifies the authentication policy requirements for processing the response of the application.

## Repetition pattern

0 or 1 time

## Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| auth-source | Specifies the type of required authentication, either sender (user name and password) or content (digital signature). | Type: String {content\|sender} | No default value | N/A | Only one time |
| auth-recipient | Specifies whether recipient authentication occurs before or after content authentication. | Type: String {before-content\|after-content} | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.9.100 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/transport-guarantee

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/transport-guarantee` specifies that the communication between client and server is `NONE`, `INTEGRAL`, or `CONFIDENTIAL`.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/transport-guarantee` specifies that the communication between client and server is `NONE`, `INTEGRAL`, or `CONFIDENTIAL`.

`NONE`

`NONE` means that the application does not require any `transport-guarantee`.

`INTEGRAL`

`INTEGRAL` means the application requires that the data between client and server be transmitted in a method that it cannot be changed in transit.

`CONFIDENTIAL`

`CONFIDENTIAL` means the application requires that the data be transmitted in a method that prevents other entities from reading the contents of the transmission.

In most cases, a value of `INTEGRAL` or `CONFIDENTIAL` indicates that the use of SSL is required.

### Specifiable values

Type: `String`

{`NONE` | `INTEGRAL` | `CONFIDENTIAL`}

### Default value

If the definition item is omitted

`NONE`

### Repetition pattern

0 or 1 time

## 3.9.101 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/service-qname

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/service-qname` specifies the WSDL service element that is being referred to.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/service-qname` specifies the WSDL service element that is being referred to.

### Repetition pattern

0 or 1 time

## 3.9.102 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/service-qname/namespaceURI

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/service-qname/namespaceURI` specifies the namespace URI.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/service-qname/namespaceURI` specifies the namespace URI.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.103 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/service-qname/localpart

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/service-qname/localpart` specifies the local part of a QNAME.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/service-qname/localpart` specifies the local part of a QNAME.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

Only one time

## 3.9.104 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/tie-class

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/tie-class` specifies the automatically generated name of the implementation class for a port component.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/tie-class` specifies the automatically generated name of the implementation class for a port component.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

0 or 1 time

## 3.9.105 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/servlet-impl-class

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/servlet-impl-class` specifies the automatically generated name of the generated servlet implementation class.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/servlet-impl-class` specifies automatically generated name of the generated servlet implementation class.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
No default value

### Repetition pattern

0 or 1 time

## 3.9.106 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/debugging-enabled

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/debugging-enabled` specifies whether the debugging servlet is enabled for this web service endpoint.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/debugging-enabled` specifies whether the debugging servlet is enabled for this web service endpoint.

### Specifiable values

Type: `Boolean`

{`true` | `false`}

### Default value

If the definition item is omitted
`true`

### Dependencies of elements and attributes

`false`

### Repetition pattern

0 or 1 time

## 3.9.107 /glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/property

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/property` specifies the property name and value of `webservice-endpoint` element.

### Description

`/glassfish-ejb-jar/enterprise-beans/ejb/webservice-endpoint/property` specifies the property name and value of `webservice-endpoint` element.

### Repetition pattern

0 or more times

### Specifiable subelements

| Element name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specifies the name of the property. | Type: `String` | No default value | N/A | Only one time |
| `value` | Specifies the value of the property. | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.9.108 /glassfish-ejb-jar/enterprise-beans/message-destination

`/glassfish-ejb-jar/enterprise-beans/message-destination` specifies the name of a logical message-destination.

### Description

`/glassfish-ejb-jar/enterprise-beans/message-destination` specifies the name of a logical message-destination defined within an application.

The `message-destination-name` matches the corresponding `message-destination-name` in the corresponding standard DD.

Use when the message destination reference in the corresponding standard DD specifies a `message-destination-link` to a logical message-destination.

### Repetition pattern

0 or more times

## 3.9.109 /glassfish-ejb-jar/enterprise-beans/message-destination/message-destination-name

`/glassfish-ejb-jar/enterprise-beans/message-destination/message-destination-name` specifies the name of a logical message-destination defined within the standard DD.

### Description

`/glassfish-ejb-jar/enterprise-beans/message-destination/message-destination-name` specifies the name of a logical message-destination defined within the standard DD.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.110 /glassfish-ejb-jar/enterprise-beans/message-destination/jndi-name

`/glassfish-ejb-jar/enterprise-beans/message-destination/jndi-name` specifies the JNDI name of the associated entity.

### Description

`/glassfish-ejb-jar/enterprise-beans/message-destination/jndi-name` specifies the JNDI name of the associated entity.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.111 /glassfish-ejb-jar/enterprise-beans/webservice-description

`/glassfish-ejb-jar/enterprise-beans/webservice-description` specifies a name and optional location for publishing a web service.

### Description

`/glassfish-ejb-jar/enterprise-beans/webservice-description` specifies a name and optional location for publishing a web service.

### Repetition pattern

0 or more times

## 3.9.112 /glassfish-ejb-jar/enterprise-beans/webservice-description/webservice-description-name

`/glassfish-ejb-jar/enterprise-beans/webservice-description/webservice-description-name` specifies a unique name for the web service within an EJB module.

### Description

`/glassfish-ejb-jar/enterprise-beans/webservice-description/webservice-description-name` specifies a unique name for the web service within an EJB module.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.9.113 /glassfish-ejb-jar/enterprise-beans/webservice-description/wsdl-publish-location

`/glassfish-ejb-jar/enterprise-beans/webservice-description/wsdl-publish-location` specifies the URL of a directory to which the WSDL of a web service is published during deployment.

### Description

`/glassfish-ejb-jar/enterprise-beans/webservice-description/wsdl-publish-location` specifies the URL of a directory to which the WSDL of a web service is published during deployment. All required files are published to this directory, maintaining their location relative to the module-specific WSDL directory (`META-INF/wsdl`).

Example:

When you have an `ejb.jar` file whose `wsdl-file` element of the `webservices.xml` file contains the following reference:

```
META-INF/wsdl/a/Foo.wsdl
```

When your `glassfish-ejb.jar` file contains the following element:

```
<wsdl-publish-location>file:/home/user1/publish</wsdl-publish-location>
```

The final WSDL is stored in `/home/user1/publish/a/Foo.wsdl`.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
No default value

### Repetition pattern

0 or 1 time

## 3.9.114 /glassfish-ejb-jar/version-identifier

`/glassfish-ejb-jar/version-identifier` specifies the version information of an EJB module.

### Description

`/glassfish-ejb-jar/version-identifier` specifies the version information of an application or module.

The version identifier is a suffix to the module or application name. It is separated from the name by a colon (`:`). It must begin with a letter or number. It includes alphanumeric characters, underscore (_), dash (-), and period (`.`). The following examples display valid version identifiers for the `foo` application:

```
foo:1
```

```
foo:BETA-2e
```

```
foo:3.8
```

```
foo:patch39875
```

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
No default value

### Repetition pattern

0 or 1 time

# 3.10 glassfish-resources.xml

glassfish-resources.xml is the Java EE RI DD used to specify resource settings.

## Description

glassfish-resources.xml is the DD used to specify resource settings that are unique to Java EE RI.

The root element of glassfish-resources.xml is resources. The element resources contains child elements and attributes, as indicated by "Element hierarchy". These child elements and attributes may further contain their child elements and attributes.

To create a JDBC connection pool, specify the following attributes based on the database to be connected:

- Specify the following attributes to connect to Oracle:

| Attribute | | Value | Remark |
|---|---|---|---|
| The datasource-classname attribute of the /resources/jdbc-connection-pool element. | | oracle.jdbc.pool.OracleDataSource | See #1. |
| | | oracle.jdbc.xa.client.OracleXADataSource | See #2. |
| The res-type attribute of the /resources/jdbc-connection-pool element. | | javax.sql.DataSource | See #1. |
| | | javax.sql.XADataSource | See #2. |
| The connection-validation-method attribute of the /resources/jdbc-connection-pool element. | | custom-validation | See #3. |
| The validation-classname attribute of the /resources/jdbc-connection-pool element. | | org.glassfish.api.jdbc.validation.OracleConnectionValidation | See #3. |
| The /resources/jdbc-connection-pool/property element. | The value attribute in which the name attribute value is databaseName. | *Oracle-SID* | See #5. |
| | The value attribute in which the name attribute value is serverName. | *Oracle-host-name-or-IP-address* | See #5. |
| | The value attribute in which the name attribute value is portNumber. | *port-number* | See #5. |
| | The value attribute in which the name attribute value is user. | *user-name* | - |
| | The value attribute in which the name attribute value is password. | *password* | - |
| | The value attribute in which the name attribute value is driverType. | thin | See #5. |
| | The value attribute in which the name attribute value is url. | jdbc:oracle:thin:@*Oracle-host-name-or-IP-* | See #5. |

| Attribute | | Value | Remark |
|---|---|---|---|
| | | *address*:*port-number*:*Oracle-SID* | |

#1:

Specify this if the XA transactions should not be used.

#2:

Specify this if the XA transactions should be used.

#3:

Specify this only if connection errors should be detected.

#4:

This option specifies whether to enable the auto-commit functionality when the transaction is not a global transaction. If this is not `true`, connection errors are not detected normally. To detect connection errors, specify `true`.

#5:

Specify the four properties (that is, `databaseName`, `serverName`, `portNumber`, and `driverType`) or the `url`. If you specify both, `url` takes effect. However, but the other four properties are ignored.

## Schema

```
<!DOCTYPE resources PUBLIC
"-//GlassFish.org//DTD GlassFish Application Server 3.1 Resource Definitions
//EN" "http://glassfish.org/dtds/glassfish- resources_1_5.dtd">
```

## Storage location

The DD file is stored in the following location:

- *application_ear_name*/META-INF directory.
  *application_ear_name*: Represents the archive name of the application.
- *war_name*/WEB-INF directory.
  *war_name*: Represents the archive name of the web application.
- *ejb_jar_name*/META-INF directory.
  *ejb_jar_name*: Represents the archive name of the ejb application.
- *client_jar_name*/META-INF directory.
  *client_jar_name*: Represents the archive name of the client application.
- *connector_rar_name*/META-INF directory.
  *connector_rar_name*: Represents the archive name of the connector module.

## Element hierarchy

```
resources
. custom-resource
. . description
. . property
. external-jndi-resource
. . description
. . property
```

```
. . . description
. jdbc-resource
. . description
. . property
. . . description
. mail-resource
. . description
. . property
. . . description
. admin-object-resource
. . description
. . property
. . . description
. connector-resource
. . description
. . property
. . . description
. resource-adapter-config
. . property
. . . description
. jdbc-connection-pool
. . description
. . property
. . . description
. connector-connection-pool
. . description
. . security-map
. . . principal
. . . . name
. . . user-group
. . . backend-principal
. . property
. . . description
. work-security-map
. . description
. . principal-map
. . group-map
```

## Examples

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE resources PUBLIC
"-//GlassFish.org//DTD GlassFish Application Server 3.1 Resource Definitions
//EN" "http://glassfish.org/dtds/glassfish- resources_1_5.dtd">
<resources>
       <jdbc-connection-pool>
        <property name="serverName" value="localhost"/>
        <property name="portNumber" value="1527"/>
        <property name="databaseName" value="forest"/>
        <property name="User" value="forest"/>
        <property name="Password" value="forest"/>
        <property name="URL" value="jdbc:oracle://localhost:1527/forest"/>
    </jdbc-connection-pool>
    <jdbc-resource enabled="true" jndi-name="jdbc/forest"
pool-name="oracle_net_forest_forestPool"/>
    <connector-connection-pool associate-with-thread="false"
connection-creation-retry-attempts="0" />
</resources>
```

## 3.11 Details of the elements specified in glassfish-resources.xml

This section describes the elements specified in `glassfish-resources.xml`.

### 3.11.1 /resources

`/resources` specifies the application-scoped resources for an enterprise application.

#### Description

`/resources` specifies application-scoped resources for an enterprise application, web module, EJB module, connector module, or application client module. This is the root element, which can have only one resource element in a `glassfish-resources.xml` file.

#### Repetition pattern

Only one time

### 3.11.2 /resources/custom-resource

`/resources/custom-resource` specifies a custom resource.

#### Description

`/resources/custom-resource` specifies a custom resource, which specifies a custom server-wide resource object factory. Such object factories implement the `javax.naming.spi.ObjectFactory` interface.

#### Repetition pattern

0 or more times

#### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `jndi-name` | Defines a resource that resides in an external JNDI repository. For example, a generic Java object could be stored in an LDAP server. An external JNDI factory must implement the `javax.naming.spi.InitialContextFactory` interface. | Type: `String` | No default value | N/A | Only one time |
| `res-type` | Specifies the fully qualified type of the resource. | Type: `String` | No default value | N/A | Only one time |
| `factory-class` | Specifies the fully qualified name of the user-written factory class, which implements `javax.naming.spi.ObjectFactory`. | Type: `String`<br>Any factory class which implements interface `javax.nam` | No default value | N/A | Only one time |

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| | | `ing.spi.ObjectFactory` | | | |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.3 /resources/custom-resource/description

`/resources/custom-resource/description` specifies a text description of `custom-resource` element.

### Description

`/resources/custom-resource/description` specifies a text description of `custom-resource` element.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.11.4 /resources/custom-resource/property

`/resources/custom-resource/property` specifies the name and value of a property.

### Description

`/resources/custom-resource/property` specifies the name and value of a property.

### Repetition pattern

0 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specifies the name of the property. | Type: `String` | No default value | N/A | Only one time |

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| value | Specifies the value of the property. | Type: String | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.5 /resources/external-jndi-resource

/resources/external-jndi-resource specifies a resource that exists in an external JNDI repository.

### Description

/resources/external-jndi-resource specifies a resource that exists in an external JNDI repository. For example, a generic Java object can be stored in an LDAP server. An external JNDI factory must implement the javax.naming.spi.InitialContextFactory interface.

### Repetition pattern

0 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| jndi-name | Specifies the JNDI name for the resource. | Type: String | No default value | N/A | Only one time |
| jndi-lookup-name | Specifies the JNDI lookup name for the resource. | Type: String | No default value | N/A | Only one time |
| res-type | Specifies the fully qualified type of the resource. | Type: String | No default value | N/A | Only one time |
| factory-class | Specifies the fully qualified name of the factory class, which implements javax.naming.spi.InitialContextFactory. | Type: String<br>Any factory class which implements interface javax.naming.spi.InitialContextFactory | No default value | N/A | Only one time |
| enabled | Determines whether this resource is enabled at runtime. | Type: Boolean<br>{true\|false} | true | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.6 /resources/external-jndi-resource/description

`/resources/external-jndi-resource/description` specifies the text description of the element.

### Description

`/resources/external-jndi-resource/description` specifies the text description of the element.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.11.7 /resources/external-jndi-resource/property

`/resources/external-jndi-resource/property` specifies the name and value of a property.

### Description

`/resources/external-jndi-resource/property` specifies the name and value of a property.

### Repetition pattern

0 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specifies the name of the property. | Type: `String` | No default value | N/A | Only one time |
| `value` | Specifies the value of the property. | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.8 /resources/external-jndi-resource/property/description

`/resources/external-jndi-resource/property/description` specifies an optional text description of a property.

### Description

`/resources/external-jndi-resource/property/description` specifies a text description of the containing element.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.11.9 /resources/jdbc-resource

`/resources/jdbc-resource` defines a Java Database Connectivity (JDBC) resource.

### Description

`/resources/jdbc-resource` defines a JDBC (`javax.sql.DataSource`) resource.

### Repetition pattern

0 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `jndi-name` | Specifies the JNDI name for the resource. | Type: `String` | No default value | N/A | Only one time |
| `pool-name` | Specifies the name of the associated jdbc-connection-pool. | Type: `String` | No default value | N/A | Only one time |
| `enabled` | Determines whether this resource is enabled at runtime. | Type: `Boolean` `{true\|false}` | `true` | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.10 /resources/jdbc-resource/description

`/resources/jdbc-resource/description` contains a text description of `jdbc-resource` element.

### Description

`/resources/jdbc-resource/description` specifies a text description of `jdbc-resource` element.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.11.11 /resources/jdbc-resource/property

`/resources/jdbc-resource/property` specifies the name and value of a property.

### Description

`/resources/jdbc-resource/property` specifies the name and value of a property.

### Repetition pattern

0 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specifies the name of the property. | Type: `String` | No default value | N/A | Only one time |
| `value` | Specifies the value of the property. | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.12 /resources/jdbc-resource/property/description

`/resources/jdbc-resource/property/description` specifies a text description of `property` element.

### Description

`/resources/jdbc-resource/property/description` specifies a text description of `property` element.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.11.13 /resources/mail-resource

`/resources/mail-resource` defines a JavaMail resource.

### Description

`/resources/mail-resource` defines a JavaMail (`javax.mail.Session`) resource.

### Repetition pattern

0 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `jndi-name` | Specifies the JNDI name for the resource. | Type: `String` | No default value | N/A | Only one time |
| `store-protocol` | Specifies the storage protocol service, which connects to a mail server, retrieves messages, and saves messages in folder(s). | Type: `String` {`imap`\|`pop3`\|`imaps`\|`pop3s`} | `imap` | N/A | 0 or 1 time |
| `store-protocol-class` | Specifies the service provider implementation class for storage. | Type: `String` {`com.sun.mail.imap.IMAPStore`\|`com.sun.mail.pop3.POP3Store`\|`com.sun.mail.imap.IMAPSSLStore`\|`com.sun.m` | `com.sun.mail.imap.IMAPStore` | N/A | 0 or 1 time |

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| | | ail.pop3.POP3SSLStore} | | | |
| transport-protocol | Specifies the transport protocol service, which sends messages. | Type: String {smtp\|smtps} | smtp | N/A | 0 or 1 time |
| transport-protocol-class | Specifies the service provider implementation class for transport. | Type: String {com.sun.mail.smtp.SMTPTransport\|com.sun.mail.smtp.SMTPSSLTransport} | com.sun.mail.smtp.SMTPTransport | N/A | 0 or 1 time |
| host | Specifies the mail server host name. | Type: String | No default value | N/A | Only one time |
| user | Specifies the mail server user name. | Type: String | No default value | N/A | Only one time |
| from | Specifies the mail server that uses email address to indicate the message sender. | Type: String | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.14 /resources/mail-resource/description

/resources/mail-resource/description specifies a text description of mail-resource element.

### Description

/resources/mail-resource/description specifies a text description of mail-resource element.

### Specifiable values

Type: String

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.11.15 /resources/mail-resource/property

`/resources/mail-resource/property` specifies a property or a variable.

### Description

`/resources/mail-resource/property` specifies the name and value of a property.

You can set properties for the `mail-resource` element and obtain these properties in a JavaMail Session object later. Each property name must start with the prefix `mail-`. The Java EE Server changes the hyphen (`-`) character to a period (`.`) in the name of the property and then saves the property to `MailConfiguration` and `JavaMail Session` objects. If the name of the property does not start with `mail-`, then the property is ignored.

### Repetition pattern

0 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specifies a name of this property. | Type: `String` | No default value | N/A | Only one time |
| `value` | Specifies the value of the property. | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.16 /resources/mail-resource/property/description

`/resources/mail-resource/property/description` specifies a text description of `property` element.

### Description

`/resources/mail-resource/property/description` specifies a text description of `property` element.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.11.17 /resources/admin-object-resource

`/resources/admin-object-resource` defines an administered object for an inbound resource adapter.

### Description

`/resources/admin-object-resource` defines an administered object for an inbound resource adapter.

### Repetition pattern

0 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `jndi-name` | Specifies the JNDI name for a resource. | Type: `String` | No default value | N/A | Only one time |
| `res-type` | Specifies the fully qualified type of a resource. | Type: `String` | No default value | N/A | Only one time |
| `class-name` | When more than one implementation class is specified for same `res-type` in `resource-adapter`, `class-name` must be specified. | Type: `String` | No default value | N/A | Only one time |
| `res-adapter` | Specifies the inbound resource adapter name. | Type: `String` | No default value | N/A | Only one time |
| `enabled` | Determines if this resource is enabled at runtime. | Type: `Boolean` `{true\|false}` | `true` | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.18 /resources/admin-object-resource/description

`/resources/admin-object-resource/description` specifies a text description of the `admin-object-resource` element.

### Description

`/resources/admin-object-resource/description` specifies a text description of the containing element.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.11.19 /resources/admin-object-resource/property

`/resources/admin-object-resource/property` specifies a property or variable.

### Description

`/resources/admin-object-resource/property` specifies the name and value of a property.

### Repetition pattern

0 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specifies the name of the property. | Type: `String` | No default value | N/A | Only one time |
| `value` | Specifies the value of the property. | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.20 /resources/admin-object-resource/property/description

`/resources/admin-object-resource/property/description` specifies an optional text description of a property.

### Description

`/resources/admin-object-resource/property/description` specifies a text description of the containing element.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.11.21 /resources/connector-resource

`/resources/connector-resource` defines a connector (resource adapter) resource.

### Description

`/resources/connector-resource` defines the connection factory object of a specific connection definition in a connector (resource adapter).

### Repetition pattern

0 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `jndi-name` | Specifies the `JNDI name` for the resource. | Type: `String` | No default value | N/A | Only one time |
| `pool-name` | Specifies the name of the associated connector-connection-pool. | Type: `String` | No default value | N/A | Only one time |
| `enabled` | Determines whether this resource is enabled at runtime. | Type: `Boolean {true \| false}` | `true` | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.22 /resources/connector-resource/description

`/resources/connector-resource/description` contains a text description of this element.

### Description

`/resources/connector-resource/description` specifies a text description of the containing element.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.11.23 /resources/connector-resource/property

`/resources/connector-resource/property` specifies a property or a variable.

### Description

`/resources/connector-resource/property` specifies the name and value of a property.

### Repetition pattern

0 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specifies the name of the property. | Type: `String` | No default value | N/A | Only one time |
| `value` | Specifies the value of the property. | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.24 /resources/connector-resource/property/description

`/resources/connector-resource/property/description` specifies the text description of `property` element.

### Description

`/resources/connector-resource/property/description`specifies the text description of `property` element.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.11.25 /resources/resource-adapter-config

`/resources/resource-adapter-config` defines the resource adapter configuration.

### Description

`/resources/resource-adapter-config` defines the resource adapter configuration. It stores the configuration information for the resource adapter JavaBean in the `property` sub-elements.

### Repetition pattern

0 or more times.

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `resource-adapter-name` | Specifies the name of a deployed connector module or application. If the resource adapter is embedded in an application, then it is *`app_name`*`#`*`rar_name`*. | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.26 /resources/resource-adapter-config/property

`/resources/resource-adapter-config/property` specifies the name and value of a property.

### Description

`/resources/resource-adapter-config/property` specifies the name and value of a property.

### Repetition pattern

0 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specifies the name of the property. | Type: `String` | No default value | N/A | Only one time |
| `value` | Specifies the value of the property. | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.27 /resources/resource-adapter-config/property/description

`/resources/resource-adapter-config/property/description` specifies a text description of `property` element.

### Description

`/resources/resource-adapter-config/property/description` specifies a text description of `property` element.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.11.28 /resources/jdbc-connection-pool

`/resources/jdbc-connection-pool` defines properties that are required for creating a JDBC connection pool.

### Description

`/resources/jdbc-connection-pool` defines attributes and properties that are required for creating a JDBC connection pool.

### Repetition pattern

0 or more times.

## Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specifies the name of the connection pool. This name refers to the `pool-name` attribute of a `jdbc-resource` element | Type: `String` | No default value | N/A | Only one time |
| `datasource-classname` | Specifies the class name of the associated vendor-supplied data source. This class must implement `javax.sql.DataSource`, `javax.sql.XADataSource`, `javax.sql.ConnectionPoolDatasource`, or a combination. | Type: `String` | No default value | N/A | 0 or 1 time |
| `res-type` | Specifies the interface that the data source class implements.<br>To support the configuration of JDBC drivers and applications that use `java.sql.Driver` implementations, set this attribute to `java.sql.Driver`. This attribute must be specified to avoid ambiguity when a data source class implements two or more of these interfaces or when a driver-classname is specified. An error occurs if this attribute has a legal value and the indicated interface is not implemented by the data source class. | Type: `String`<br>{`javax.sql.DataSource`\|<br>`javax.sql.XADataSource`\|<br>`javax.sql.ConnectionPoolDatasource`\|<br>`java.sql.Driver`} | No default value | N/A | 0 or 1 time |
| `driver-classname` | Specifies the vendor-supplied JDBC driver class name. This driver must implement the `java.sql.Driver` interface. | Type: `String`<br>Any class (sub-class) name which implements the interface `java.sql.Driver` | No default value | N/A | 0 or 1 time |
| `ping` | Specifies whether to ping the pool during pool creation or reconfiguration to identify and warn of any incorrect attribute values. | Type: `Boolean`<br>{`true`\|<br>`false`} | `false` | N/A | 0 or 1 time |
| `steady-pool-size` | Specifies the initial and minimum number of connections maintained in the pool. | Type: `Integer`<br>`0` to `2147483647` | `24` | N/A | 0 or 1 time |
| `max-pool-size` | Specifies the maximum number of connections that can be created to satisfy client requests. | Type: `Integer`<br>`1` to `2147483647` | `24` | N/A | 0 or 1 time |
| `max-wait-time-in-millis` | Specifies the amount of time, in milliseconds, that a caller is willing to wait for a connection. If 0 milliseconds, then the caller is blocked indefinitely until a resource is available or an error occurs. | Type: `Integer`<br>`0` to `2147483647` | `60000` | N/A | 0 or 1 time |

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| pool-resize-quantity | Specifies the number of idle connections to be destroyed if the existing number of connections is above the steady-pool-size (subject to the max-pool-size limit).<br>This is enforced periodically at the idle-timeout-in-seconds interval. An idle connection is one that has not been used for a period of idle-timeout-in-seconds. When the pool size reaches steady-pool-size, connection removal stops. | Type: Integer<br>1 to 2147483647 | 2 | N/A | 0 or 1 time |
| idle-timeout-in-seconds | Specifies the maximum time that a connection can remain idle in the pool. After this amount of time, the pool can close this connection.<br>This timeout value must be kept smaller than the server side (database) timeout value to prevent the accumulation of unusable connections in the application. | Type: Integer<br>0 to 2147483647 | 300 | N/A | 0 or 1 time |
| transaction-isolation-level | Specifies the transaction isolation level on the pooled database connections.<br>Transaction Isolation Level: read-uncommitted<br>Description: Dirty reads, non-repeatable reads, and phantom reads can occur.<br>Transaction Isolation Level: read-committed<br>Description: Dirty reads are prevented; non-repeatable reads and phantom reads can occur.<br>Transaction Isolation Level: repeatable-read<br>Description: Dirty reads and non-repeatable reads are prevented; phantom reads can occur.<br>Transaction Isolation Level: serializable<br>Description: Dirty reads, non-repeatable reads and phantom reads are prevented. | Type: String<br>{read-uncommitted\|read-committed\|repeatable-read\|serializable} | *Default JDBC driver isolation level* | N/A | 0 or 1 time |
| is-isolation-level-guaranteed | Applicable only when transaction-isolation-level is explicitly set. If true, then every connection obtained from the pool is guaranteed to have the desired isolation level. This might impact performance on some JDBC drivers. Set this attribute to false only if you are certain that the hosted applications do not return connections with altered isolation levels. | Type: Boolean<br>{true\|false} | true | N/A | 0 or 1 time |
| is-connection-validation-required | Specifies whether connections have to be validated before being given to the application. If a resource's validation fails, it is destroyed, and then a new resource is created and returned. | Type: Boolean<br>{true\|false} | false | N/A | 0 or 1 time |
| connection-validation-method | Legal values are as follows:<br>• auto-commit: uses Connection.setAutoCommit(Connection.getAutoCommit())<br>• meta-data: uses Connection.getMetaData()<br>• table: performs a query on a table specified in the validation-table-name attribute.<br>• custom-validation: uses a user-defined validation mechanism specified by the custom implementation class in validation-classname. | Type: String<br>{auto-commit\|meta-data\|table\|custom-validation} | table | N/A | 0 or 1 time |

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| | As many JDBC drivers cache the results of auto-commit and meta-data calls, they do not always provide reliable validations. Verify with the driver vendor to determine whether these calls are cached or not.<br>The table must exist and be accessible, but it does not require any rows. Do not use an existing table that has a large number of rows or a table that is already frequently accessed. | | | | |
| validation-table-name | Specifies the table name to be used to perform a query to validate a connection. This parameter is mandatory only if the connection-validation-method is set to table. | Type: String | No default value | N/A | 0 or 1 time |
| validation-classname | Specifies the custom validation implementation class name. This parameter is mandatory if connection-validation-method is set to custom-validation. The class name provided must be accessible to the Java EE Server. | Type: String<br>Any class (sub-class) name which implements the interface org.glassfish.api.jdbc.ConnectionValidation | No default value | N/A | 0 or 1 time |
| non-transactional-connections | If true, then non-transactional connections can be made to the JDBC connection pool. These connections are not automatically enlisted with the transaction manager. | Type: Boolean<br>{true\|false} | false | N/A | 0 or 1 time |
| validate-atmost-once-period-in-seconds | Specifies the time interval within which a connection is validated at most once. Minimizes the number of validation calls. A value of zero implies that Java EE Server does not attempt to minimize the number of validation requests by a connection. That is, a value of zero disables this attribute. | Type: Integer<br>0 to 2147483647 | 0 | N/A | 0 or 1 time |
| connection-leak-timeout-in-seconds | Detects potential connection leaks by the application. A connection that is not returned back to the pool by the application within the specified period is assumed to be potentially leaking, and a stack trace of the caller is logged. A zero value disables leak detection. A non zero value enables leak tracing. Use this attribute along with connection-leak-reclaim to avoid potential connection leaks from the application. | Type: Integer<br>0 to 2147483647 | 0 | N/A | 0 or 1 time |
| connection-leak-reclaim | If true, then the pool reclaims a connection after connection-leak-timeout-in-seconds occurs. | Type: Boolean<br>{true\|false} | false | N/A | 0 or 1 time |
| connection-creation-retry-attempts | Specifies the number of attempts to create a new connection in case of a failure. | Type: Integer<br>0 to 2147483647 | 0 | N/A | 0 or 1 time |

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| connection-creation-retry-interval-in-seconds | Specifies the time interval between attempts to create a connection when connection-creation-retry-attempts is greater than 0. | Type: Integer<br>0 to 2147483647 | 10 | N/A | 0 or 1 time |
| statement-timeout-in-seconds | Sets the query timeout property of a statement to enable termination of abnormally long running queries.-1 disables this feature. An abnormally long running JDBC query executed by an application may leave it in a hanging state unless a timeout is explicitly set on the statement. This attribute guarantees that all queries automatically time out if not completed within the specified period. When statements are created, the queryTimeout is set according to the value specified in this attribute. This works only when the underlying JDBC driver supports queryTimeout for Statement, PreparedStatement, CallableStatement, and ResultSet. | Type: Integer<br>-1 to 2147483647 | -1 | N/A | 0 or 1 time |
| lazy-connection-enlistment | If true, then a connection is not enlisted in a transaction until it is used. If false, then any connection object available to a transaction is enlisted in the transaction. | Type: Boolean<br>{true\|false} | false | N/A | 0 or 1 time |
| lazy-connection-association | If true, then a physical connection is not associated with a logical connection until it is used. If false, then a physical connection is associated with a logical connection even before it is used. | Type: Boolean<br>{true\|false} | false | N/A | 0 or 1 time |
| match-connections | Specifies whether a connection that is selected from the pool should be matched with the connections with certain credentials. If true, then it enables connection matching. You can set to false if connections are homogeneous. If the connection pool is used by applications that have multiple user credentials, then match-connections must be true.<br>The connection pool matches the request credential with the connections in the pool and returns a matched connection for use. For new requests with different credentials, unmatched free connections are automatically purged to provide new connections to satisfy the new requests.<br>This attribute need not be true if it is known that there is only one credential used by the applications and therefore the pool has homogeneous connections. | Type: Boolean<br>{true\|false} | false | N/A | 0 or 1 time |
| max-connection-usage-count | Specifies the number of times a connections is reused by the pool, after which it is closed. A zero value disables this feature. By limiting the maximum number of times a connection can be reused, you can avoid statement leaks if the application does not close statements. | Type: Integer<br>0 to 2147483647 | 0 | N/A | 0 or 1 time |

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `statement-cache-size` | Specifies the number of statements to be cached using the lru (Least Recently Used) caching mechanism. Value of 0 disables statement caching. | Type: `Integer`<br>`0` to `2147483647` | `0` | N/A | 0 or 1 time |
| `pooling` | Specifies whether connection is pooled or not. | Type: `Boolean`<br>`{true\|false}` | `true` | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.29 /resources/jdbc-connection-pool/description

`/resources/jdbc-connection-pool/description` specifies a text description of the `jdbc-connection-pool` element.

### Description

`/resources/jdbc-connection-pool/description` specifies a text description of the stored element.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.11.30 /resources/jdbc-connection-pool/property

`/resources/jdbc-connection-pool/property` specifies a property or a variable.

### Description

`/resources/jdbc-connection-pool/property` specifies the name and value of a property.

For this element, specify the `DataSource` property supported by the JDBC driver and the specified property. For details on properties that can be specified, verify the documentation of the database that is being used.

## Repetition pattern

0 or more times

## Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specify the property name of "Specifiable properties". | Type: `String` | No default value | N/A | Only one time |
| `value` | Specify the value of "Specifiable properties" (specifiable value). | Type: `String` | No default value. | N/A | Only one time. |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## Specifiable properties

The following properties can be specified for "Specifiable attributes":

| Property name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `dynamic-reconfiguration-wait -timeout-in-seconds` | Specifies the timeout for the dynamic reconfiguration of the pool. The in-progress connection requests must complete before this timeout expires or they must be retried. New connection requests wait for this timeout to expire before acquiring connections to the reconfigured pool. If this property exists and has a positive value, it is enabled. If this property is not set and the pool reconfiguration results in pool recreation, the in-progress connection requests must be retried. | Type: `Integer` `0` to `2147483647` | No default value | N/A | Only one time |
| `user` | Specifies the user name for connecting to the database. | Type: `String` | No default value | N/A | Only one time |
| `password` | Specifies the password for connecting to the database. | Type: `String` | No default value | N/A | Only one time |
| `databaseName` | Specifies the database for this connection pool. | Type: `String` | No default value | N/A | Only one time |
| `serverName` | Specifies the database server for this connection pool. | Type: `String` | No default value | N/A | Only one time |
| `portNumber` | Specifies the port on which the database server listens for requests. | Type: `Integer` `1` to `65535` | No default value | N/A | Only one time |
| `networkProtocol` | Specifies the communication protocol. | Type: `String` | No default value | N/A | Only one time |
| `roleName` | Specifies the initial SQL role name. | Type: `String` | No default value | N/A | Only one time |
| `datasourceName` | Specifies an underlying `XADataSource` or a `ConnectionPoolDataSource` if connection pooling is done. | Type: `String` | No default value | N/A | Only one time |

| Property name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| description | Specifies the text description. | Type: String | No default value | N/A | Only one time |
| url | Specifies the URL for this connection pool. Although this is not a standard property, it is commonly used. | Type: String | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.31 /resources/jdbc-connection-pool/property/description

/resources/jdbc-connection-pool/property/description specifies an text description of property element.

### Description

/resources/jdbc-connection-pool/property/description specifies a text description of the containing element.

### Specifiable values

Type: String

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.11.32 /resources/connector-connection-pool

/resources/connector-connection-pool defines a connector connection pool.

### Description

/resources/connector-connection-pool defines the properties that are required for creating a connector connection pool.

### Repetition pattern

0 or more times

## Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specifies the name of the connection pool. A connector-resource element pool-name attribute refers to this name. | Type: `String` | No default value | N/A | Only one time |
| `resource-adapter-name` | Specifies the name of the deployed connector module or application. If no name is specified during deployment, then the name of the .rar file is used. If the resource adapter is embedded in an application, then it is *app_name*#*rar_name*. | Type: `String` | No default value | N/A | Only one time |
| `connection-definition-name` | Specifies a unique name, identifying the connection-definition element of a resource adapter in the `ra.xml` file. This is usually the connectionfactory-interface of the connection-definition element. | Type: `String` | No default value | N/A | Only one time |
| `steady-pool-size` | Specifies the initial and minimum number of connections maintained in the pool. | Type: `Integer`<br>`0` to `2147483647` | `24` | N/A | 0 or 1 time |
| `max-pool-size` | Specifies the maximum number of connections that can be created to satisfy client requests. | Type: `Integer`<br>`1` to `2147483647` | `24` | N/A | 0 or 1 time |
| `max-wait-time-in-millis` | Specifies the amount of time, in milliseconds, that the caller is willing to wait for a connection. If 0 millisecond, then the caller is blocked indefinitely until a resource is available or an error occurs. | Type: `Integer`<br>`0` to `2147483647` | `60000` | N/A | 0 or 1 time |
| `pool-resize-quantity` | Specifies the number of idle connections to be destroyed if the existing number of connections is above the steady-pool-size (subject to the max-pool-size limit).<br>This is enforced periodically at the idle-timeout-in-seconds interval. An idle connection is one that has not been used for a period of idle-timeout-in-seconds. When the pool size reaches steady-pool-size, the process of connection removal stops. | Type: `Integer`<br>`1` to `2147483647` | `2` | N/A | 0 or 1 time |
| `idle-timeout-in-seconds` | Specifies the maximum time that a connection can remain idle in the pool. After this amount of time, the pool can close this connection. | Type: `Integer`<br>`1` to `2147483647` | `300` | N/A | 0 or 1 time |
| `transaction-support` | Specifies the transaction support for this connection pool. It overrides the transaction support defined in the resource adapter in a downward compatible way to support a transaction level lower than or equal to the resource adapter, but not higher.<br>• XATransaction<br>Supports distributed transactions.<br>• LocalTransaction<br>Supports local transactions only | Type: `String`<br>{`XATransaction`\|`LocalTransaction`\|`NoTransaction`} | No default value | N/A | 0 or 1 time |

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| | • NoTransaction<br>No transaction support. | | | | |
| is-connection-validation-required | Specifies whether connections have to be validated before being given to the application. If the validation of a resource fails, then it is destroyed, and a new resource is created and returned.<br>The connection failure detection at a regular interval is always enabled, regardless of the specified value. | Type: Boolean<br>{true\|false} | false | N/A | 0 or 1 time |
| validate-atmost-once-period-in-seconds | Specifies the time interval within which a connection is validated at most once. Minimizes the number of validation calls. A value of zero allows unlimited validation calls. | Type: Integer<br>0 to 2147483647 | 0 | N/A | Only one time |
| connection-leak-timeout-in-seconds | Detects potential connection leaks by the application. A connection that is not returned back to the pool by the application within the specified period is assumed to be potentially leaking, and a stack trace of the caller is logged. A zero value disables leak detection. A value other than zero enables leak tracing. | Type: Integer<br>0 to 2147483647 | 0 | N/A | Only one time |
| connection-leak-reclaim | If true, then the pool reclaims a connection after connection-leak-timeout-in-seconds occurs. | Type: Boolean<br>{true\|false} | false | N/A | Only one time |
| connection-creation-retry-attempts | Specifies the number of attempts of creating a new connection. | Type: Integer<br>0 to 2147483647 | 0 | N/A | Only one time |
| connection-creation-retry-interval-in-seconds | Specifies the time interval between attempts to create a connection when connection-creation-retry-attempts is greater than 0. | Type: Integer<br>0 to 2147483647 | 10 | N/A | Only one time |
| lazy-connection-enlistment | If true, then a connection is not enlisted in a transaction until it is used. If false, then any connection object available to a transaction is enlisted in the transaction. | Type: Boolean<br>{true\|false} | false | N/A | Only one time |
| lazy-connection-association | If true, then a physical connection is not associated with a logical connection until it is used. If false, then a physical connection is associated with a logical connection even before it is used. | Type: Boolean<br>{true\|false} | false | N/A | Only one time |
| match-connections | If true, then enables connection matching. It can be set to false if connections are homogeneous. | Type: Boolean<br>{true\|false} | true | N/A | Only one time |

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| max-connection-usage-count | Specifies the number of times a connections is reused by the pool, after which it is closed. A zero value disables this feature. | Type: Integer<br>0 to 2147483647 | 0 | N/A | Only one time |
| ping | Specifies whether to ping the pool during pool creation or reconfiguration to identify and warn of any erroneous attribute values. | Type: Boolean<br>{true\|false} | false | N/A | 0 or 1 time |
| pooling | If false, then disables connection pooling. | Type: Boolean<br>{true\|false} | true | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.33 /resources/connector-connection-pool/description

/resources/connector-connection-pool/description specifies a text description of connector-connection-pool element.

### Description

/resources/connector-connection-pool/description specifies a text description of the stored element.

### Specifiable values

Type: String

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.11.34 /resources/connector-connection-pool/security-map

/resources/connector-connection-pool/security-map maps the principal received during servlet or EJB authentication to the credentials accepted by the EIS.

### Description

`/resources/connector-connection-pool/security-map` maps the principal received during servlet or EJB authentication to the credentials accepted by the EIS. This mapping is optional. It is possible to map multiple Java EE Server principals to the same backend principal.

### Repetition pattern

0 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specifies a name for the security mapping. | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.35 /resources/connector-connection-pool/security-map/principal

`/resources/connector-connection-pool/security-map/principal` defines the user name on the platform.

### Description

`/resources/connector-connection-pool/security-map/principal` specifies the principal of the servlet or EJB client.

### Repetition pattern

One or more times

## 3.11.36 /resources/connector-connection-pool/security-map/principal/name

`/resources/connector-connection-pool/security-map/principal/name` specifies the name of the user.

### Description

`/resources/connector-connection-pool/security-map/principal/name` specifies the name of the entity.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

Only one time

## 3.11.37 /resources/connector-connection-pool/security-map/user-group

`/resources/connector-connection-pool/security-map/user-group` specifies the group to which the principal belongs.

### Description

`/resources/connector-connection-pool/security-map/user-group` specifies the group to which the principal belongs.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

One or more times

## 3.11.38 /resources/connector-connection-pool/security-map/backend-principal

`/resources/connector-connection-pool/security-map/backend-principal` specifies the user name and password required by Enterprise Information System (EIS).

### Description

`/resources/connector-connection-pool/security-map/backend-principal` specifies the user name and password required by EIS.

### Repetition pattern

Only one time

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `user-name` | Specifies the user name required by the EIS. | Type: `String` | No default value | N/A | Only one time |
| `password` | Specifies the password required by the EIS. | Type: `String` | No default value | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.39 /resources/connector-connection-pool/property

`/resources/connector-connection-pool/property` specifies a property or a variable.

### Description

`/resources/connector-connection-pool/property` specifies the name and value of a property.

This element can be used to overwrite the setting value retained by the `ManagedConnectionFactory` class based on the JavaBeans specifications.

Specify the property name according to the JavaBeans specifications that corresponds to "setter" method of the `ManagedConnectionFactory` class specified in the `managedconnectionfactory-class` element of the `ra.xml` file.

If the same property is set to this element and the `config-property` element of `ra.xml`, this element takes priority.

### Repetition pattern

0 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specify the property name of "Specifiable properties". | Type: `String` | No default value | N/A | Only one time |
| `value` | Specify the value of "Specifiable properties" (specifiable value). | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

### Specifiable properties

The following properties can be specified for "Specifiable attributes":

| Property name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| AddressList | Specifies a list of host/port combinations of the Message Queue software. For JMS resources of the type, specify javax.jms.TopicConnectionFactory or javax.jms.QueueConnectionFactory. | Type: String | No default value | N/A | Only one time |
| ClientId | Specifies the JMS Client Identifier to be associated with a connection created using the createTopicConnection method of the TopicConnectionFactory class. For JMS resources of the type javax.jms.TopicConnectionFactory, durable subscription names are unique and valid only within the scope of a client identifier.<br>To create or reactivate a durable subscriber, the connection must have a valid client identifier. The JMS specification ensures that the client identifiers are unique and that the given client identifier is allowed to be used by only one active connection at a time. | Type: String | No default value | N/A | Only one time |
| UserName | Specifies the user name used to connect to the Message Queue software.<br>This property is used for JMS resources of the type javax.jms.TopicConnectionFactory or javax.jms.QueueConnectionFactory. | Type: String | guest | N/A | Only one time |
| Password | Specifies the password to connect to the Message Queue software.<br>This property is used for JMS resources of the type javax.jms.TopicConnectionFactory or javax.jms.QueueConnectionFactory. | Type: String | guest | N/A | Only one time |
| ReconnectAttempts | Specifies the number of attempts to connect (or reconnect) for each address in the imqAddressList before the client runtime moves on to try the next address in the list. A value of -1 indicates that the number of reconnect attempts is unlimited (the client runtime attempts to connect to the first address until it succeeds). | Type: Integer<br>-1 to 2147483647 | 6 | N/A | Only one time |
| ReconnectInterval | Specifies the interval between reconnect attempts in milliseconds. This applies to attempts on each address in the imqAddressList and on successive addresses in the list. If too short, this time interval does not give a broker time to recover. If too long, the reconnect might represent an unacceptable delay. | Type: Integer<br>1 to 2147483647 | 30000 | N/A | Only one time |
| ReconnectEnabled | If true, specifies that the client runtime attempts to reconnect to the message server (or the list of addresses specified in imqAddressList) when a connection is lost. | Type: Boolean<br>{true\|false} | false | N/A | Only one time |
| AddressListBehavior | Specifies whether connection attempts are in the order of addresses in the imqAddressList attribute (priority) or in a random order (random).<br>If many clients are attempting a connection using the same connection factory, use a random order to prevent them from all being connected to the same address. | Type: String<br>{priority\|random} | priority | N/A | Only one time |

| Property name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| | The following values can be specified:<br>PRIORITY<br>To enable the parallel-broker reconnection, set the imqAddressListBehavior attribute to PRIORITY. Specify no more than a pair of brokers for this type of reconnection. In this way, the messages are published to one broker and all the clients fail together from the first broker to the second.<br>RANDOM<br>To enable the clustered-broker reconnection, set the imqAddressListBehavior attribute to RANDOM. In this way, the client runtime randomizes the connection attempts across the list and the client connections are distributed evenly across the broker cluster. | | | | |
| AddressListIterations | Specifies the number of times the client runtime iterates through the imqAddressList in an effort to establish (or reestablish) a connection. A value of -1 indicates that the number of attempts is unlimited | Type: Integer<br>-1 to 2147483647 | -1 | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.40 /resources/connector-connection-pool/property/description

/resources/connector-connection-pool/property/description specifies a text description of property element.

### Description

/resources/connector-connection-pool/property/description specifies a text description of property element.

### Specifiable values

Type: String

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.11.41 /resources/work-security-map

`/resources/work-security-map` defines a work security map.

### Description

`/resources/work-security-map` defines a work security map, which maps a principal associated with an incoming work instance to a principal in the Java EE server's server instance.

### Repetition pattern

0 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specifies a unique name for the work security map. | Type: `String` | No default value | N/A | Only one time |
| `resource-adapter-name` | Specifies the name of a deployed connector module or application. If the resource adapter is embedded in an application, then it is *`app_name`*`#`*`rar_name`*. | Type: `String` | No default value | N/A | Only one time |
| `enabled` | Determines whether this resource is enabled at runtime. | Type: `Boolean` `{true\|false}` | `true` | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.42 /resources/work-security-map/description

`/resources/work-security-map/description` specifies a text description of `work-security-map` element.

### Description

`/resources/work-security-map/description` specifies a text description of the stored element.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.11.43 /resources/work-security-map/principal-map

`/resources/work-security-map/principal-map` maps an EIS principal to a principal defined in the Java EE Server's server instance.

### Description

`/resources/work-security-map/principal-map` maps an EIS principal to a principal defined in the Java EE Server's server instance.

### Repetition pattern

0 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `eis-principal` | Specifies an EIS principal. | Type: `String` | No default value | N/A | Only one time |
| `mapped-principal` | Specifies a principal defined in the Java EE Server's server instance. | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.11.44 /resources/work-security-map/group-map

`/resources/work-security-map/group-map` maps an EIS group to a group defined in the Java EE Server's server instance.

### Description

`/resources/work-security-map/group-map` maps an EIS group to a group defined in the Java EE Server's server instance.

### Repetition pattern

0 or more times

## Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `eis-group` | Specifies an EIS group. | Type: `String` | No default value | N/A | Only one time |
| `mapped-group` | Specifies a group defined in the Java EE Server's server instance. | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.12 glassfish-web.xml

`glassfish-web.xml` is the Java EE RI DD used to specify the web application (WAR) settings.

### Description

`glassfish-web.xml` is the DD used to specify the web application (WAR) settings, which are unique to Java EE RI.

The root element of the `glassfish-web.xml` file is `glassfish-web-app`. The element `glassfish-web-app` contains child elements and attributes as indicated by the "Element hierarchy". These child elements and attributes may further contain their child elements and attributes.

### Schema

```
<!DOCTYPE glassfish-web-app PUBLIC
"-//GlassFish.org//DTD GlassFish Application Server 3.1 Servlet 3.0//EN"
"http://glassfish.org/dtds/glassfish-web-app_3_0-1.dtd">
```

### Storage location

The DD file is stored in the following location:

*war_name*`/WEB-INF` directory.

*war_name*: Represents the archive name of the web application.

### Element hierarchy

```
glassfish-web-app
. context-root
. security-role-mapping
. . role-name
. . principal-name
. . group-name
. servlet
. . servlet-name
. . principal-name
. . webservice-endpoint
. . . port-component-name
. . . endpoint-address-uri
. . . login-config
. . . . auth-method
. . . message-security-binding
. . . . message-security
. . . . . message
. . . . . java-method
. . . . . method-name
. . . . . method-params
. . . . . . method-param
. . . . . operation-name
. . . . . request-protection
. . . . . response-protection
. . . transport-guarantee
. . . service-qname
. . . . namespaceURI
. . . . localpart
. . . tie-class
```

```
. . . servlet-impl-class
. . . debugging-enabled
. idempotent-url-pattern
. session-config
. . session-manager
. . . manager-properties
. . . . property
. . . . . description
. . session-properties
. . . property
. . . . description
. . cookie-properties
. . . property
. . . . description
. ejb-ref
. . ejb-ref-name
. . jndi-name
. resource-ref
. . res-ref-name
. . jndi-name
. . default-resource-principal
. . . name
. . . password
. resource-env-ref
. . resource-env-ref-name
. . jndi-name
. service-ref
. . service-ref-name
. . port-info
. . . service-endpoint-interface
. . . wsdl-port
. . . . namespaceURI
. . . . localpart
. . . stub-property
. . . call-property
. . . message-security-binding
. . . . message-security
. . . . . message
. . . . . java-method
. . . . . method-name
. . . . . method-params
. . . . . method-param
. . . . . operation-name
. . . . . request-protection
. . . . . response-protection
. . call-property
. . wsdl-override
. . service-impl-class
. . service-qname
. . . namespaceURI
. . . localpart
. message-destination-ref
. . message-destination-ref-name
. . jndi-name
. class-loader
. . property
. . . description
. jsp-config
. . property
. . . description
. property
. . description
. valve
. . description
```

```
. . property
. . . description
. message-destination
. . message-destination-name
. . jndi-name
. webservice-description
. . webservice-description-name
. . wsdl-publish-location
. version-identifier
```

## Examples

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE glassfish-web-app PUBLIC
"-//GlassFish.org//DTD GlassFish Application Server 3.1 Servlet 3.0//EN"
"http://glassfish.org/dtds/glassfish-web-app_3_0-1.dtd">
<glassfish-web-app>
     <session-config>
         <session-manager/>
     </session-config>
     <resource-ref>
         <res-ref-name>mail/Session</res-ref-name>
         <jndi-name>mail/Session</jndi-name>
     </resource-ref>
     <jsp-config/>
</glassfish-web-app>
```

## 3.13 Details of the elements specified in glassfish-web.xml

This section describes the elements specified in `glassfish-web.xml`.

### 3.13.1 /glassfish-web-app

`/glassfish-web-app` defines Java EE Server specific configurations for a web module.

#### Description

`/glassfish-web-app` defines Java EE Server specific configurations for a web module. This is the root element, there can be only one `glassfish-web-app` element in a `glassfish-web.xml` file.

#### Repetition pattern

Only one time

#### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `httpservlet-security-provider` | This attribute is used to bind the message security provider to use the application.<br>By defining the `httpservlet-security-provider` attribute in the DD file of the corresponding application by setting the value of the attribute to the provider name assigned to the message security provider.<br>For example, if you use MySAM when you create the message security provider the<br>entry will be `httpservlet-security-provider="MySAM"`. | Type: `String` | No default value | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

### 3.13.2 /glassfish-web-app/context-root

`/glassfish-web-app/context-root` contains the web context root for the web module.

#### Description

`/glassfish-web-app/context-root` contains the web context root for the application or web application that was packaged as a WAR file. It overrides the corresponding element in the `application.xml` file.

If you are setting up the load balancing, then the web module context roots must be unique within a server instance.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

*name of the WAR file excluding the .war suffix*

### Repetition pattern

0 or 1 time

## 3.13.3 /glassfish-web-app/security-role-mapping

`/glassfish-web-app/security-role-mapping` maps roles to users or groups in the currently active realm.

### Description

`/glassfish-web-app/security-role-mapping` maps roles to users or groups in the currently active realm. The role mapping element maps a role, to an environment-specific user or a group.

If it maps to a user, then it must be a concrete user which exists in the current realm that can log into the server using the current authentication method.

If it maps to a group, then the realm must support groups and the group must be a concrete group which exists in the current realm. To be useful, there must be at least one user in that realm belonging to that group.

### Repetition pattern

0 or more times

## 3.13.4 /glassfish-web-app/security-role-mapping/role-name

`/glassfish-web-app/security-role-mapping/role-name` contains the `role-name` in the `security-role` element of the corresponding Java EE RI DD file.

### Description

`/glassfish-web-app/security-role-mapping/role-name` contains the role-name in the security-role element of the corresponding Java EE RI DD file.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.13.5 /glassfish-web-app/security-role-mapping/principal-name

`/glassfish-web-app/security-role-mapping/principal-name` contains a principal (user) name in the current realm.

### Description

`/glassfish-web-app/security-role-mapping/principal-name` contains a principal (user) name in the current realm.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

1 or more times if `group-name` is not specified.

Else, 0 or more times.

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `class-name` | Specifies the custom principal implementation class corresponding to the named principal. | Type: `String`<br>Any class (sub-class) name which implements the `java.security.Principal` interface. | `com.sun.enterprise.deployment.PrincipalImpl` | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.13.6 /glassfish-web-app/security-role-mapping/group-name

`/glassfish-web-app/security-role-mapping/group-name` specifies a group name in the current realm.

### Description

`/glassfish-web-app/security-role-mapping/group-name` specifies a group name in the current realm.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

1 or more times if `principal-name` is not specified.

Else, 0 or more times.

## 3.13.7 /glassfish-web-app/servlet

`/glassfish-web-app/servlet` specifies a principal name for a servlet, which is used for the `run-as` role defined in the `web.xml` file.

### Description

`/glassfish-web-app/servlet` specifies a principal name for a servlet, which is used for the `run-as` role defined in the `web.xml` file.

### Repetition pattern

0 or more times

## 3.13.8 /glassfish-web-app/servlet/servlet-name

`/glassfish-web-app/servlet/servlet-name` specifies the name of a servlet, which is matched to `servlet-name` in the `web.xml` file.

### Description

`/glassfish-web-app/servlet/servlet-name` specifies the name of a servlet, which is matched to `servlet-name` in the `web.xml` file. This name must be available in the `web.xml` file.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.13.9 /glassfish-web-app/servlet/principal-name

`/glassfish-web-app/servlet/principal-name` specifies the principal (user) name in the current realm.

### Description

`/glassfish-web-app/servlet/principal-name` specifies the principal (user) name in the current realm.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

1 or more times if `group-name` is not specified.

Else, 0 or more times.

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `class-name` | Specifies the custom principal implementation class corresponding to the named principal. | Type: `String`<br>Any class (sub-class) name which implements the `java.security.Principal` interface. | `com.sun.enterprise.deployment.PrincipalImpl` | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.13.10 /glassfish-web-app/servlet/webservice-endpoint

`/glassfish-web-app/servlet/webservice-endpoint` specifies information about a web service endpoint.

### Description

`/glassfish-web-app/servlet/webservice-endpoint` specifies information about a web service endpoint.

### Repetition pattern

0 or more times

## 3.13.11 /glassfish-web-app/servlet/webservice-endpoint/port-component-name

`/glassfish-web-app/servlet/webservice-endpoint/port-component-name` specifies a unique name for a port component within a web module.

### Description

`/glassfish-web-app/servlet/webservice-endpoint/port-component-name` specifies a unique name for a port component within a web module.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.13.12 /glassfish-web-app/servlet/webservice-endpoint/endpoint-address-uri

`/glassfish-web-app/servlet/webservice-endpoint/endpoint-address-uri` specifies the automatically generated endpoint address.

### Description

`/glassfish-web-app/servlet/webservice-endpoint/endpoint-address-uri` specifies the relative path appended to the web server root to form the fully qualified endpoint address for a web service endpoint.

This is an optional element for servlet endpoints.

For servlet endpoints, this value is relative to the web application context root. The context root portion must not conflict with the context root of any web application deployed to the same web server.

This value must have a fixed pattern (`*` is not allowed).

If the web service endpoint is a servlet that implements only a single endpoint and has only one `url-pattern`, then it is not necessary to set this value, because the web container derives it from the `web.xml` file.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.13.13 /glassfish-web-app/servlet/webservice-endpoint/login-config

`/glassfish-web-app/servlet/webservice-endpoint/login-config` specifies the authentication configuration for an EJB web service endpoint.

### Description

`/glassfish-web-app/servlet/webservice-endpoint/login-config` specifies the authentication configuration for an EJB web service endpoint. This configuration is not required for servlet web service endpoints. A servlet's security configuration is stored in the `web.xml` file.

### Repetition pattern

0 or 1 time

## 3.13.14 /glassfish-web-app/servlet/webservice-endpoint/login-config/auth-method

`/glassfish-web-app/servlet/webservice-endpoint/login-config/auth-method` specifies the authentication method.

## Description

/glassfish-web-app/servlet/webservice-endpoint/login-config/auth-method specifies the authentication mechanism for the web service endpoint. As a prerequisite to gain access to any web resources protected by an authorization constraint, you must be authenticated using the configured mechanism.

The Authentication Types are as follows:

BASIC
: Uses the server's built-in login dialog box. The communication protocol is HTTP (SSL optional). User-credentialed encryption is not available unless SSL is used. This is not considered to be a secure method of user authentication, unless used in conjunction with some external secure system, such as SSL.

FORM
: The application provides custom login and error pages. The communication protocol is HTTP (SSL optional). User-credentialed encryption is not available unless SSL is used.

CLIENT-CERT
: The server authenticates the client using a public key certificate. The communication protocol is HTTPS (HTTP over SSL). User-credentialed encryption is SSL.

DIGEST
: The server authenticates the user based on a user name and a password. Unlike the BASIC authentication, the password is never sent over the network. The use of SSL with HTTP Digest is optional.

## Specifiable values

Type: String

{BASIC | DIGEST | FORM | CLIENT-CERT}

## Default value

If the definition item is omitted
: No default value

## Repetition pattern

Only one time

# 3.13.15 /glassfish-web-app/servlet/webservice-endpoint/message-security-binding

/glassfish-web-app/servlet/webservice-endpoint/message-security-binding specifies a custom authentication provider binding.

## Description

/glassfish-web-app/servlet/webservice-endpoint/message-security-binding specifies a custom authentication provider binding for a parent webservice-endpoint element in one or both of the following ways:

- By binding to a specific provider.

- By specifying the message security requirements enforced by the provider.

### Repetition pattern

0 or 1 time

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `auth-layer` | Specifies the message layer at which authentication is performed. | Type: `String`<br>`SOAP` | No default value | N/A | Only one time |
| `provider-id` | Specifies the authentication provider used to meet application-specific message security requirements.<br>If this attribute is not specified, then a default provider is used, if it is defined for the message layer. If no default provider is defined, then authentication requirements defined in the `message-security-binding` are not enforced. | Type: `String` | No default value | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.13.16 /glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security

`/glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security` specifies the message security requirements.

### Description

`/glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security` specifies the message security requirements.

As the grandparent element is `webservice-endpoint`, these requirements correspond to the request and response messages of the endpoint.

### Repetition pattern

0 or more times

## 3.13.17 /glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/message

`/glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/message` specifies the methods or operations to which message security requirements apply.

### Description

`/glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/message` specifies the methods or operations to which message security requirements apply.

### Repetition pattern

One or more times

## 3.13.18 /glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/message/java-method

`/glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/message/java-method` specifies the methods or operations to which the message security requirements apply.

### Description

`/glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/message/java-method` specifies the methods or operations to which the message security requirements apply.

### Repetition pattern

0 or 1 time

## 3.13.19 /glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/message/java-method/method-name

`/glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/message/java-method/method-name`specifies a method name.

### Description

`/glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/message/java-method/method-name` specifies a method name or an asterisk (`*`) for all methods. If a method is overloaded, then it specifies all methods with the same name.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.13.20 /glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/message/java-method/method-params

`/glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/message/java-method/method-params` specifies the fully qualified Java type names of method parameters.

### Description

`/glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/message/java-method/method-params` specifies the fully qualified Java type names of method parameters.

### Repetition pattern

0 or 1 time

## 3.13.21 /glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/message/java-method/method-params/method-param

`/glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/message/java-method/method-params/method-param` specifies the fully qualified Java type name of a method parameter.

### Description

`/glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/message/java-method/method-params/method-param` specifies the fully qualified Java type name of a method parameter.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or more times

## 3.13.22 /glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/message/operation-name

`/glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/message/operation-name` specifies the WSDL name of the operation of a web service.

### Description

`/glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/message/operation-name` specifies the WSDL name of the operation of a web service.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.13.23 /glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/request-protection

`/glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/request-protection` specifies the authentication policy requirements for processing the request of the application.

### Description

`/glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/request-protection` specifies the authentication policy requirements for processing the request of the application.

### Repetition pattern

0 or 1 time

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `auth-source` | Specifies the type of required authentication, either `sender` (user name and password) or `content` (digital signature). | Type: `String`<br>`{content\|sender}` | No default value | N/A | Only one time |

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `auth-recipient` | Specifies whether recipient authentication occurs before or after content authentication. | Type: `String`<br>`{before-content\|after-content}` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.13.24 /glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/response-protection

`/glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/response-protection` specifies the authentication policy requirements for processing the response of the application.

### Description

`/glassfish-web-app/servlet/webservice-endpoint/message-security-binding/message-security/response-protection` specifies the authentication policy requirements for processing the response of the application.

### Repetition pattern

0 or 1 time

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `auth-source` | Specifies the type of required authentication, either `sender` (user name and password) or `content` (digital signature). | Type: `String`<br>`{content\|sender}` | No default value | N/A | Only one time |
| `auth-recipient` | Specifies whether recipient authentication occurs before or after content authentication. | Type: `String`<br>`{before-content\|after-content}` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.13.25 /glassfish-web-app/servlet/webservice-endpoint/transport-guarantee

/glassfish-web-app/servlet/webservice-endpoint/transport-guarantee specifies that the communication between client and server is NONE, INTEGRAL, or CONFIDENTIAL.

### Description

/glassfish-web-app/servlet/webservice-endpoint/transport-guarantee specifies that the communication between client and server is NONE, INTEGRAL, or CONFIDENTIAL.

NONE

NONE means that the application does not require any transport-guarantee.

INTEGRAL

INTEGRAL means the application requires that the data between client and server be transmitted in a method that it cannot be changed in transit.

CONFIDENTIAL

CONFIDENTIAL means the application requires that the data be transmitted in a method that prevents other entities from reading the contents of the transmission.

In most cases, a value of INTEGRAL or CONFIDENTIAL indicates that the use of SSL is required.

### Specifiable values

Type: String

{NONE | INTEGRAL | CONFIDENTIAL}

### Default value

If the definition item is omitted

NONE

### Repetition pattern

0 or 1 time

## 3.13.26 /glassfish-web-app/servlet/webservice-endpoint/service-qname

/glassfish-web-app/servlet/webservice-endpoint/service-qname specifies the WSDL service element that is being referred to.

### Description

/glassfish-web-app/servlet/webservice-endpoint/service-qname specifies the WSDL service element that is being referred to.

### Repetition pattern

0 or 1 time

## 3.13.27 /glassfish-web-app/servlet/webservice-endpoint/service-qname/namespaceURI

`/glassfish-web-app/servlet/webservice-endpoint/service-qname/namespaceURI` specifies the namespace URI.

### Description

`/glassfish-web-app/servlet/webservice-endpoint/service-qname/namespaceURI` specifies the namespace URI.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.13.28 /glassfish-web-app/servlet/webservice-endpoint/service-qname/localpart

`/glassfish-web-app/servlet/webservice-endpoint/service-qname/localpart` specifies the local part of the QNAME.

### Description

`/glassfish-web-app/servlet/webservice-endpoint/service-qname/localpart` specifies the local part of the QNAME.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.13.29 /glassfish-web-app/servlet/webservice-endpoint/tie-class

`/glassfish-web-app/servlet/webservice-endpoint/tie-class` specifies automatically generated name of a tie-implementation class for a port component.

### Description

`/glassfish-web-app/servlet/webservice-endpoint/tie-class` specifies automatically generated name of a tie-implementation class for a port component.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.13.30 /glassfish-web-app/servlet/webservice-endpoint/servlet-impl-class

`/glassfish-web-app/servlet/webservice-endpoint/servlet-impl-class` specifies the automatically generated name of the generated servlet implementation class.

### Description

`/glassfish-web-app/servlet/webservice-endpoint/servlet-impl-class` specifies the automatically generated name of the generated servlet implementation class.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.13.31 /glassfish-web-app/servlet/webservice-endpoint/debugging-enabled

`/glassfish-web-app/servlet/webservice-endpoint/debugging-enabled` specifies whether the debugging servlet is enabled for this web service endpoint.

### Description

`/glassfish-web-app/servlet/webservice-endpoint/debugging-enabled` specifies whether the debugging servlet is enabled for this web service endpoint.

### Specifiable values

Type: `String`

{`true` | `false`}

### Default value

If the definition item is omitted

`true`

### Repetition pattern

0 or 1 time

## 3.13.32 /glassfish-web-app/idempotent-url-pattern

`/glassfish-web-app/idempotent-url-pattern` specifies a URL pattern for the `idempotent` requests.

### Description

`/glassfish-web-app/idempotent-url-pattern` specifies a URL pattern for the `idempotent` requests.

### Repetition pattern

0 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `url-pattern` | The URL pattern must confirm the mappings specified in the Servlet specification.<br>Allowed `url-pattern` values are as per Servlet specification. | Type: `String`<br>Allowed patterns are as follows:<br>1. A string that begins with a "`/`" character and ends | No default value | N/A | Only one time |

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| | | with a "/*" suffix is used for path mapping.<br>2. A string that begins with a "*." prefix is used as an extension mapping.<br>3. A string that contains only the "/" character indicates the "default" servlet of the application. In this case the servlet path is the request URI minus the context path and the path info is null.<br>4. All other strings are used for exact matches only. | | | |
| no-of-retries | Specifies the number of times the load balancer retries an idempotent request. A value of -1 indicates infinite retries. | Type: Integer<br>-1 to 2147483647 | -1 | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.13.33 /glassfish-web-app/session-config

`/glassfish-web-app/session-config` specifies the session manager, session cookie, and other session-related information.

### Description

`/glassfish-web-app/session-config` specifies the session configuration information and overrides the web container settings for an individual web module.

### Repetition pattern

0 or 1 time

## 3.13.34 /glassfish-web-app/session-config/session-manager

`/glassfish-web-app/session-config/session-manager` specifies the session manager configuration information.

### Description

`/glassfish-web-app/session-config/session-manager` specifies the session manager configuration information.

### Repetition pattern

0 or 1 time

## 3.13.35 /glassfish-web-app/session-config/session-manager/manager-properties

`/glassfish-web-app/session-config/session-manager/manager-properties` specifies the session manager properties.

### Description

`/glassfish-web-app/session-config/session-manager/manager-properties` specifies the session manager properties.

### Repetition pattern

0 or 1 time

## 3.13.36 /glassfish-web-app/session-config/session-manager/manager-properties/property

`/glassfish-web-app/session-config/session-manager/manager-properties/property` specifies the property, which has a name and a value.

## Description

`/glassfish-web-app/session-config/session-manager/manager-properties/property` specifies the property, which has a name and a value.

## Repetition pattern

0 or more times

## Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specify the property name of "Specifiable properties". | Type: `String` | No default value | N/A | Only one time |
| `value` | Specify the value of "Specifiable properties" (specifiable value). | Type: `String` | No default value | N/A | Only one time |

Legend

N/A: Not applicable.

#

This is the default value that is set when a definition item is excluded.

## Specifiable properties

The following properties can be specified for "Specifiable attributes":

| Property name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `reapIntervalSeconds` | Specifies the number of seconds between checks for the expired sessions. This is also the interval at which sessions are passivated if `maxSessions` is exceeded. | Type: `Integer`<br>`1` to `2147483647` | `60` | N/A | 0 or 1 time |
| `maxSessions` | Specifies the maximum number of sessions that are permitted in the cache or `-1` for no limit. After defining the value, an attempt to create a new session causes an `IllegalStateException` to be thrown. | Type: `Integer`<br>`-1` to `2147483647` | `-1` | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

# 3.13.37 /glassfish-web-app/session-config/session-manager/manager-properties/property/description

`/glassfish-web-app/session-config/session-manager/manager-properties/property/description` specifies the optional text description of a property.

### Description

`/glassfish-web-app/session-config/session-manager/manager-properties/property/description` specifies the optional text description of a property.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.13.38 /glassfish-web-app/session-config/session-properties

`/glassfish-web-app/session-config/session-properties` specifies the session properties.

### Description

`/glassfish-web-app/session-config/session-properties` specifies the session properties.

### Repetition pattern

0 or 1 time

## 3.13.39 /glassfish-web-app/session-config/session-properties/property

`/glassfish-web-app/session-config/session-properties/property` specifies the property, which has a name and a value.

### Description

`/glassfish-web-app/session-config/session-properties/property` specifies the property, which has a name and a value.

### Repetition pattern

0 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specify the property name of "Specifiable properties". | Type: `String` | No default value | N/A | Only one time |

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| value | Specify the value of "Specifiable properties" (specifiable value). | Type: String | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## Specifiable properties

The following properties can be specified for "Specifiable attributes":

| Property name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| timeoutSeconds | Specifies the default maximum inactive interval (in seconds) for all sessions created in the web module.<br>If set to 0 or less, sessions in this web module never expire.<br>If a session-timeout element is specified in the web.xml file, the session-timeout value overrides any timeoutSeconds value. If neither session-timeout nor timeoutSeconds is specified, the default timeoutSeconds is used.<br>Note that the session-timeout element in the web.xml file is specified in minutes, not seconds. | Type: Integer<br>-2147483648 to 2147483647 | Configured value of configs.config.<name>.web-container.session-config.session-properties.timeout-in-seconds. | N/A | 0 or 1 time |
| enableCookies | Uses cookies for session tracking if set to true. | Type: Boolean<br>{true\|false} | true | N/A | 0 or 1 time |
| enableURLRewriting | This provides session tracking via URL rewriting when the browser does not accept cookies. You must also use an encodeURL or encodeRedirectURL call in the servlet or JSP. | Type: Boolean<br>{true\|false} | true | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

# 3.13.40 /glassfish-web-app/session-config/session-properties/property/description

/glassfish-web-app/session-config/session-properties/property/description specifies the optional text description of a property.

## Description

/glassfish-web-app/session-config/session-properties/property/description specifies the optional text description of a property.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.13.41 /glassfish-web-app/session-config/cookie-properties

`/glassfish-web-app/session-config/session-properties/property/description` specifies the session cookie properties.

### Description

`/glassfish-web-app/session-config/session-properties/property/description` specifies the session cookie properties.

If the cookie settings are defined in the `web.xml` file, then the cookie properties specified in `/glassfish-web-app/session-config/cookie-properties` take precedence. If the cookie settings are defined through programs using the `javax.servlet.SessionCookieConfig` methods, then those cookie settings take precedence over the cookie properties specified in `/glassfish-web-app/session-config/cookie-properties`.

### Repetition pattern

0 or 1 time

## 3.13.42 /glassfish-web-app/session-config/cookie-properties/property

`/glassfish-web-app/session-config/cookie-properties/property` specifies the property, which has a name and a value.

### Description

`/glassfish-web-app/session-config/cookie-properties/property` specifies the property, which has a name and a value.

### Repetition pattern

0 or more times

## Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specify the property name of "Specifiable properties". | Type: `String` | No default value | N/A | Only one time |
| `value` | Specify the value of "Specifiable properties" (specifiable value). | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## Specifiable properties

The following properties can be specified for "Specifiable attributes":

| Property name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `cookieName` | Specifies the cookie name.<br>Note:<br>When changing the HTTP cookie name that indicates the session ID.<br>• While changing the cookie name, you cannot specify `csfcfc` as the cookie name.<br>• You can use the characters that meet the following requirements. Using these characters ensure that the session works correctly.<br>- You can use ASCII characters. However, the following characters cannot be used:<br>`#`, `(`, `)`, `<`, `>`, `@`, `,`, `;`, `:`, `\`, `/`, `"`, `[`, `]`, `?`, `=`, `{`, `}`,<br>- You cannot use spaces and control characters.<br>- You cannot use "`$`" as the first character of a character string.<br>When HTTP cookie names that can be used for the web applications:<br>• If the web application uses HTTP cookies, the following names cannot be specified. Names are case-insensitive.<br>- The HTTP cookie name used by the session ID of an HTTP session. The default value is "`JSESSIONID`".<br>- The HTTP cookie name "`csfcfc`", which is used in the Java EE server. | Type: `String` | `JSESSIONID` | N/A | 0 or 1 time |
| `cookiePath` | The browser sends the cookie if the pathname for the request contains this pathname. If set to slash (/), the browser sends cookies to all URLs served by Java EE Server. Set the path to a narrower mapping to limit the request URLs to which the browser sends cookies. | Type: `String` | *<Context path at which the web module is installed>* | N/A | 0 or 1 time |
| `cookieMaxAgeSeconds` | Specifies the expiration time (in seconds) after which the browser expires the cookie. If this value is not set, the cookie does not expire. | Type: `Integer` | No default value | N/A | 0 or 1 time |

| Property name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| | | 1 to 2147483647 | | | |
| cookieDomain | Specifies the domain for which the cookie is valid. | Type: String | No default value. | N/A | 0 or 1 time |
| cookieComment | Specifies the comment that identifies the session tracking cookie in the cookie file. | Type: String | No default value. | N/A | 0 or 1 time |
| cookieSecure | Allowed values are as follows:<br>• true - Sets Secure to true.<br>• false - Sets Secure to false.<br>• dynamic - The JSESSIONID cookie inherits the Secure setting of the request that initiated the session.<br>To set the Secure attribute of a JSESSIONIDSSO cookie, use the ssoCookieSecure virtual-server property. | Type: String<br>{true\|false\|dynamic} | dynamic | N/A | 0 or 1 time |
| cookieHttpOnly | Specifies that the cookie is marked HTTP only. | Type: Boolean<br>{true\|false} | No default value | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.13.43 /glassfish-web-app/session-config/cookie-properties/property/description

/glassfish-web-app/session-config/cookie-properties/property/description specifies the optional text description of a property.

### Description

/glassfish-web-app/session-config/cookie-properties/property/description specifies the optional text description of a property.

### Specifiable values

Type: String

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.13.44 /glassfish-web-app/ejb-ref

`/glassfish-web-app/ejb-ref` maps the absolute `JNDI name` to `ejb-ref` in the corresponding Java EE RI DD file.

### Description

`/glassfish-web-app/ejb-ref` maps `ejb-ref-name` in the corresponding Java EE RI DD file `ejb-ref` entry to the absolute `JNDI name` of a resource. The `ejb-ref` element is used to declare of a reference to an `EJBHome` object.

### Repetition pattern

0 or more times

## 3.13.45 /glassfish-web-app/ejb-ref/ejb-ref-name

`/glassfish-web-app/ejb-ref/ejb-ref-name` specifies the corresponding value to the `ejb-ref-name` entry in the `ejb-ref entry` of Java EE RI DD file.

### Description

`/glassfish-web-app/ejb-ref/ejb-ref-name` specifies the corresponding value to the `ejb-ref-name` entry in the `ejb-ref entry` of Java EE RI DD file.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.13.46 /glassfish-web-app/ejb-ref/jndi-name

`/glassfish-web-app/ejb-ref/jndi-name` specifies the absolute `JNDI name` of a URL resource or a resource.

### Description

/glassfish-web-app/ejb-ref/jndi-name specifies the absolute JNDI name of a URL resource or a resource.

For the entity beans and session beans, this value specifies the global JNDI name of the EJBHome object. It is required only when the entity bean or session bean exposes a remote view.

### Specifiable values

Type: String

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.13.47 /glassfish-web-app/resource-ref

/glassfish-web-app/resource-ref maps the absolute JNDI name to resource-ref in the corresponding Java EE XML file.

### Description

/glassfish-web-app/resource-ref maps the absolute JNDI name to resource-ref in the corresponding Java EE XML file.

### Repetition pattern

0 or more times

## 3.13.48 /glassfish-web-app/resource-ref/res-ref-name

/glassfish-web-app/resource-ref/res-ref-name specifies res-ref-name in the corresponding Java EE RI DD file resource-ref entry.

### Description

/glassfish-web-app/resource-ref/res-ref-name specifies res-ref-name in the corresponding Java EE RI DD file resource-ref entry.

The name must be unique within an enterprise bean.

### Specifiable values

Type: String

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

Only one time

## 3.13.49 /glassfish-web-app/resource-ref/jndi-name

`/glassfish-web-app/resource-ref/jndi-name` specifies the absolute `JNDI name` of a URL resource or a resource.

### Description

`/glassfish-web-app/resource-ref/jndi-name` specifies the absolute `JNDI name` of a URL resource or a resource.

For the entity beans and session beans, this value specifies the global `JNDI name` of the `EJBHome` object. It is required only when the entity bean or session bean exposes a remote view.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

Only one time

## 3.13.50 /glassfish-web-app/resource-ref/default-resource-principal

`/glassfish-web-app/resource-ref/default-resource-principal` specifies the default principal (user) for the resource.

### Description

`/glassfish-web-app/resource-ref/default-resource-principal` specifies the default principal (user) for the resource.

### Repetition pattern

0 or 1 time

## 3.13.51 /glassfish-web-app/resource-ref/default-resource-principal/name

`/glassfish-web-app/resource-ref/default-resource-principal/name` specifies the default resource principal name.

### Description

`/glassfish-web-app/resource-ref/default-resource-principal/name` specifies the default resource principal name used to sign on to a resource manager.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.13.52 /glassfish-web-app/resource-ref/default-resource-principal/password

`/glassfish-web-app/resource-ref/default-resource-principal/password` specifies the password of the default resource principal.

### Description

`/glassfish-web-app/resource-ref/default-resource-principal/password` specifies the password of the default resource principal.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.13.53 /glassfish-web-app/resource-env-ref

`/glassfish-web-app/resource-env-ref` maps the absolute JNDI name to the `resource-env-ref` in the corresponding Java EE XML file.

### Description

`/glassfish-web-app/resource-env-ref` maps the absolute JNDI name to the `resource-env-ref` in the corresponding Java EE XML file.

### Repetition pattern

0 or more times

## 3.13.54 /glassfish-web-app/resource-env-ref/resource-env-ref-name

`/glassfish-web-app/resource-env-ref/resource-env-ref-name` specifies the `res-ref-name` in the corresponding Java EE RI DD file `resource-env-ref` entry.

### Description

`/glassfish-web-app/resource-env-ref/resource-env-ref-name` specifies the `res-ref-name` in the corresponding Java EE RI DD file `resource-env-ref` entry.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.13.55 /glassfish-web-app/resource-env-ref/jndi-name

`/glassfish-web-app/resource-env-ref/jndi-name` specifies the absolute JNDI-name of a URL resource or a resource.

### Description

`/glassfish-web-app/resource-env-ref/jndi-name` specifies the absolute JNDI-name of a URL resource or a resource.

For entity beans and session beans, this value specifies the global JNDI name of the `EJBHome` object. It is only needed if the entity or session bean exposes a remote view.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.13.56 /glassfish-web-app/service-ref

`/glassfish-web-app/service-ref` specifies runtime settings for a web service reference.

### Description

`/glassfish-web-app/service-ref` specifies runtime settings for a web service reference. Runtime information is needed only in the following cases:

- To define the port used to resolve a container-managed port.
- To define the default `Stub/Call` property settings for Stub objects.
- To define the URL of a final WSDL document to be used instead of the one associated with the `service-ref` in the standard DD.

### Repetition pattern

0 or more times

## 3.13.57 /glassfish-web-app/service-ref/service-ref-name

`/glassfish-web-app/service-ref/service-ref-name` specifies the web service reference name relative to `java:comp/env`.

### Description

`/glassfish-web-app/service-ref/service-ref-name` specifies the web service reference name relative to `java:comp/env`.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.13.58 /glassfish-web-app/service-ref/port-info

`/glassfish-web-app/service-ref/port-info` specifies information for a port within a web service reference.

### Description

`/glassfish-web-app/service-ref/port-info` specifies information for a port within a web service reference.

### Repetition pattern

0 or more times

## 3.13.59 /glassfish-web-app/service-ref/port-info/service-endpoint-interface

`/glassfish-web-app/service-ref/port-info/service-endpoint-interface` specifies the web service reference name relative to `java:comp/env`.

### Description

`/glassfish-web-app/service-ref/port-info/service-endpoint-interface` specifies the web service reference name relative to `java:comp/env`.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.13.60 /glassfish-web-app/service-ref/port-info/wsdl-port

`/glassfish-web-app/service-ref/port-info/wsdl-port` specifies the WSDL port.

### Description

`/glassfish-web-app/service-ref/port-info/wsdl-port` specifies the WSDL port.

### Repetition pattern

0 or 1 time

## 3.13.61 /glassfish-web-app/service-ref/port-info/wsdl-port/namespaceURI

`/glassfish-web-app/service-ref/port-info/wsdl-port/namespaceURI` specifies the namespace URI.

### Description

`/glassfish-web-app/service-ref/port-info/wsdl-port/namespaceURI` specifies the namespace URI.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.13.62 /glassfish-web-app/service-ref/port-info/wsdl-port/localpart

`/glassfish-web-app/service-ref/port-info/wsdl-port/localpart` specifies the local part of a QNAME.

### Description

`/glassfish-web-app/service-ref/port-info/wsdl-port/localpart` specifies the local part of a QNAME.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.13.63 /glassfish-web-app/service-ref/port-info/stub-property

/glassfish-web-app/service-ref/port-info/stub-property specifies the JAX-RPC property values that are set on a javax.xml.rpc.Stub object before it is returned to the web service client.

### Description

/glassfish-web-app/service-ref/port-info/stub-property specifies the JAX-RPC property values that are set on a javax.xml.rpc.Stub object before it is returned to the web service client. The property names can be any properties supported by the JAX-RPC Stub implementation.

### Repetition pattern

0 or more times

### Specifiable sub-elements

| Element name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| name | Specifies the name of the entity. | Type: String | No default value | N/A | Only one time |
| value | Specifies the value of the related name entity. | Type: String | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.13.64 /glassfish-web-app/service-ref/port-info/call-property

/glassfish-web-app/service-ref/port-info/call-property specifies the JAX-RPC property values that are set on a javax.xml.rpc.Call object before it is returned to the web service client.

### Description

/glassfish-web-app/service-ref/port-info/call-property specifies the JAX-RPC property values that can be set on a javax.xml.rpc.Call object before it is returned to the web service client. The property names can be any properties supported by the JAX-RPC Call implementation.

### Repetition pattern

0 or more times

## Specifiable subelements

| Element name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specifies the name of the entity. | Type: `String` | No default value | N/A | Only one time |
| `value` | Specifies the value of the entity. | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

# 3.13.65 /glassfish-web-app/service-ref/port-info/message-security-binding

`/glassfish-web-app/service-ref/port-info/message-security-binding` specifies a custom authentication provider binding.

## Description

`/glassfish-web-app/service-ref/port-info/message-security-binding` specifies a custom authentication provider binding for a parent `port-info` element in one or both of these ways:

- By binding to a specific provider.
- By specifying the message security requirements enforced by the provider.

## Repetition pattern

0 or 1 time

## Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `auth-layer` | Specifies the message layer at which authentication is performed. | Type: `String`<br>`SOAP` | No default value | N/A | Only one time |
| `provider-ID` | Specifies the authentication provider that is used to satisfy application-specific message security requirements.<br>If this attribute is not specified, then a default provider is used, if it is defined for the message layer.<br>If no default provider is defined, then authentication requirements that are defined in the message-security-binding are not enforced. | Type: `String` | No default value | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.13.66 /glassfish-web-app/service-ref/port-info/message-security-binding/message-security

`/glassfish-web-app/service-ref/port-info/message-security-binding/message-security` specifies the message security requirements.

### Description

`/glassfish-web-app/service-ref/port-info/message-security-binding/message-security` specifies the message security requirements.

- As the grandparent element is `port-info`, these requirements correspond to the port of the referenced service.

### Repetition pattern

0 or more times

## 3.13.67 /glassfish-web-app/service-ref/port-info/message-security-binding/message-security/message

`/glassfish-web-app/service-ref/port-info/message-security-binding/message-security/message` specifies the methods or operations to which the message security requirements are applicable.

### Description

`/glassfish-web-app/service-ref/port-info/message-security-binding/message-security/message` specifies the methods or operations to which the message security requirements are applicable.

### Repetition pattern

One or more times

## 3.13.68 /glassfish-web-app/service-ref/port-info/message-security-binding/message-security/message/java-method

`/glassfish-web-app/service-ref/port-info/message-security-binding/message-security/message/java-method` specifies the methods or operations on which the message security requirements apply.

### Description

`/glassfish-web-app/service-ref/port-info/message-security-binding/message-security/message/java-method` specifies the methods or operations on which the message security requirements apply.

### Repetition pattern

0 or 1 time

## 3.13.69 /glassfish-web-app/service-ref/port-info/message-security-binding/message-security/message/java-method/method-name

`/glassfish-web-app/service-ref/port-info/message-security-binding/message-security/message/java-method/method-name` specifies a method name.

### Description

`/glassfish-web-app/service-ref/port-info/message-security-binding/message-security/message/java-method/method-name` specifies a method name or an asterisk (`*`) for all methods. If a method is overloaded, then all methods with the same name are specified.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.13.70 /glassfish-web-app/service-ref/port-info/message-security-binding/message-security/message/java-method/method-params

`/glassfish-web-app/service-ref/port-info/message-security-binding/message-security/message/java-method/method-params` specifies the fully qualified Java type names of method parameters.

### Description

`/glassfish-web-app/service-ref/port-info/message-security-binding/message-security/message/java-method/method-params` specifies the fully qualified Java type names of method parameters.

### Repetition pattern

0 or 1 time

## 3.13.71 /glassfish-web-app/service-ref/port-info/message-security-binding/message-security/message/java-method/method-params/method-param

`/glassfish-web-app/service-ref/port-info/message-security-binding/message-security/message/java-method/method-params/method-param` specifies the fully qualified Java type name of a method parameter.

### Description

`/glassfish-web-app/service-ref/port-info/message-security-binding/message-security/message/java-method/method-params/method-param` specifies the fully qualified Java type name of a method parameter.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or more times

## 3.13.72 /glassfish-web-app/service-ref/port-info/message-security-binding/message-security/message/operation-name

`/glassfish-web-app/service-ref/port-info/message-security-binding/message-security/message/operation-name` specifies the WSDL name of an operation of a web service.

### Description

`/glassfish-web-app/service-ref/port-info/message-security-binding/message-security/message/operation-name` specifies the WSDL name of an operation of a web service.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.13.73 /glassfish-web-app/service-ref/port-info/message-security-binding/message-security/request-protection

`/glassfish-web-app/service-ref/port-info/message-security-binding/message-security/request-protection` defines the authentication policy requirements for processing the request of the application.

### Description

`/glassfish-web-app/service-ref/port-info/message-security-binding/message-security/request-protection` defines the authentication policy requirements for processing the request of the application.

### Repetition pattern

0 or 1 time

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `auth-source` | Specifies the type of required authentication, either the `sender` (user name and password) or the `content` (digital signature). | Type: `String` `{content\|sender}` | No default value | N/A | Only one time |
| `auth-recipient` | Specifies whether recipient authentication occurs before or after content authentication. | Type: `String` `{before-content\|after-content}` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.13.74 /glassfish-web-app/service-ref/port-info/message-security-binding/message-security/response-protection

`/glassfish-web-app/service-ref/port-info/message-security-binding/message-security/response-protection` defines the authentication policy requirements for processing the response of the application.

### Description

`/glassfish-web-app/service-ref/port-info/message-security-binding/message-security/response-protection` defines the authentication policy requirements for processing the response of the application.

### Repetition pattern

0 or 1 time

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| auth-source | Specifies the type of required authentication, either sender (user name and password) or content (digital signature). | Type: String {content \| sender} | No default value | N/A | Only one time |
| auth-recipient | Specifies whether recipient authentication occurs before or after content authentication. | Type: String {before-content \| after-content} | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.13.75 /glassfish-web-app/service-ref/call-property

/glassfish-web-app/service-ref/call-property specifies the JAX-RPC property values that are set on a javax.xml.rpc.Call object before it is returned to the web service client.

### Description

/glassfish-web-app/service-ref/call-property specifies the JAX-RPC property values that are set on a javax.xml.rpc.Call object before it is returned to the web service client.

The property names can be any properties supported by the JAX-RPC Call implementation.

### Repetition pattern

0 or more times

### Specifiable sub-elements

| Element name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| name | Specifies the name of the entity. | Type: String | No default value | N/A | Only one time |
| value | Specifies the value of the entity. | Type: String | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.13.76 /glassfish-web-app/service-ref/wsdl-override

`/glassfish-web-app/service-ref/wsdl-override` specifies a valid URL pointing to a final WSDL document.

### Description

`/glassfish-web-app/service-ref/wsdl-override` specifies a valid URL pointing to a final WSDL document. If a URL is not specified, then the WSDL document associated with `service-ref` in the standard DD is used.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.13.77 /glassfish-web-app/service-ref/service-impl-class

`/glassfish-web-app/service-ref/service-impl-class` specifies the name of the generated service implementation class.

### Description

`/glassfish-web-app/service-ref/service-impl-class` specifies the name of the generated service implementation class.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.13.78 /glassfish-web-app/service-ref/service-qname

`/glassfish-web-app/service-ref/service-qname` specifies the WSDL service element that is being referred to.

### Description

`/glassfish-web-app/service-ref/service-qname` specifies the WSDL service element that is being referred to.

### Repetition pattern

0 or 1 time

## 3.13.79 /glassfish-web-app/service-ref/service-qname/namespaceURI

`/glassfish-web-app/service-ref/service-qname/namespaceURI` specifies the namespace URI.

### Description

`/glassfish-web-app/service-ref/service-qname/namespaceURI` specifies the namespace URI.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

Only one time

## 3.13.80 /glassfish-web-app/service-ref/service-qname/localpart

`/glassfish-web-app/service-ref/service-qname/localpart` specifies the local part of a QNAME.

### Description

`/glassfish-web-app/service-ref/service-qname/localpart` specifies the local part of a QNAME.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

Only one time

## 3.13.81 /glassfish-web-app/message-destination-ref

`/glassfish-web-app/message-destination-ref` specifies the name of a physical message destination.

### Description

`/glassfish-web-app/message-destination-ref` specifies the name of a physical message destination. It directly binds a message destination reference to the JNDI name of a Queue, Topic, or other physical destinations.

Use only when the message destination reference in the corresponding Java EE RI DD file does not specify a `message-destination-link` to a logical message-destination.

### Repetition pattern

0 or more times

## 3.13.82 /glassfish-web-app/message-destination-ref/message-destination-ref-name

`/glassfish-web-app/message-destination-ref/message-destination-ref-name` specifies the name of a physical message destination defined within the corresponding Java EE RI DD file.

### Description

`glassfish-web-app/message-destination-ref/message-destination-ref-name` specifies the name of a physical message destination defined within the corresponding Java EE RI DD file.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    No default value

### Repetition pattern

Only one time

## 3.13.83 /glassfish-web-app/message-destination-ref/jndi-name

`/glassfish-web-app/message-destination-ref/jndi-name` specifies the absolute JNDI-name of a URL resource or a resource.

### Description

Specifies the absolute JNDI-name of a URL resource or a resource.

For entity beans and session beans, this value specifies the global JNDI name of the `EJBHome` object. It is only needed if the entity or session bean exposes a remote view.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.13.84 /glassfish-web-app/class-loader

`/glassfish-web-app/class-loader` specifies the class loader configuration information.

### Description

`/glassfish-web-app/class-loader` configures the class loader for a web module.

### Repetition pattern

0 or 1 time

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `extra-class-path` | Specifies a colon (`:`) or semicolon (`;`) separated list of additional classpaths for this web module. Paths can be absolute or relative to the web module root. | Type: `String` | No default value | N/A | 0 or 1 time |
| `delegate` | If set to `true`, then the web module follows the standard class loader delegation model and delegates to its parent class loader first before looking in the local class loader. Set this to `true` for a web module that accesses the EJB components or that acts as a web service client or endpoint.<br>If set to `false`, then the web module follows the delegation model specified in the Servlet | Type: `Boolean` {`true`\|`false`} | `true` | N/A | 0 or 1 time |

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| | specification and looks in its class loader before looking in the parent class loader. It is safe to set this to `false` only for a web module that does not interact with any other modules.<br>For a number of packages, including `java.*` and `javax.*`, symbol resolution is always delegated to the parent class loader regardless of the delegate setting. This prevents applications from overriding the core Java runtime classes or changing the API versions of specifications that are part of the Java EE platform. | | | | |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.13.85 /glassfish-web-app/class-loader/property

`/glassfish-web-app/class-loader/property` specifies the property, which has a name and a value.

### Description

`/glassfish-web-app/class-loader/property` specifies the property, which has a name and a value.

### Repetition pattern

0 or more times.

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specify the property name of "Specifiable properties". | Type: `String` | No default value | N/A | Only one time |
| `value` | Specify the value of "Specifiable properties" (specifiable value). | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

### Specifiable properties

The following properties can be specified for "Specifiable attributes":

| Property name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| ignoreHiddenJarFiles | If true, specifies that all JAR and ZIP files in the WEB-INF/lib directory that start with a period (.) are ignored by the class loader. | Type: Boolean {true\|false} | false | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.13.86 /glassfish-web-app/class-loader/property/description

/glassfish-web-app/class-loader/property/description specifies the optional text description of a property.

### Description

/glassfish-web-app/class-loader/property/description specifies the optional text description of a property.

### Specifiable values

Type: String

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.13.87 /glassfish-web-app/jsp-config

/glassfish-web-app/jsp-config specifies the JSP configuration information.

### Description

/glassfish-web-app/jsp-config specifies the JSP configuration information.

### Repetition pattern

0 or 1 time

## 3.13.88 /glassfish-web-app/jsp-config/property

`/glassfish-web-app/jsp-config/property` specifies the property, which has a name and a value.

### Description

`/glassfish-web-app/jsp-config/property` specifies the property, which has a name and a value.

### Repetition pattern

0 or more times.

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specify the property name of "Specifiable properties". | Type: `String` | No default value | N/A | Only one time |
| `value` | Specify the value of "Specifiable properties" (specifiable value). | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

### Specifiable properties

The following properties can be specified for "Specifiable attributes":

| Property name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `checkInterval` | If development property of `jsp-config` is set to `false` and `checkInterval` is greater than zero, background compilations are enabled. `checkInterval` is the time in seconds between checks to see if a JSP file needs to be recompiled. | Type: `Integer` `0` to `2147483647` | `0` | N/A | 0 or 1 time |
| `classdebuginfo` | Specifies whether the generated Java servlets are compiled with the debug option set (`-g` for `javac`). | Type: `Boolean` {`true`\|`false`} | `true` | N/A | 0 or 1 time |
| `classpath` | Specifies the classpath to use while compiling the generated servlets. | Type: `String` | *<classpath based on the current web application>* | N/A | 0 or 1 time |
| `compiler` | Specifies the compiler `Ant` uses to compile the JSP files | Type: `String` | `javac` | N/A | 0 or 1 time |
| `compilerSourceVM` | Specifies the JDK release with which source compatibility of the generated servlets is provided. It is same as the `-source` release option of `javac`. | Type: `String` | Depends on Java VM | N/A | 0 or 1 time |
| `compilerTargetVM` | Specifies the Virtual Machine for the Java platform (JVM software) version for which the servlet class | Type: `String` | Depends on Java VM | N/A | 0 or 1 time |

| Property name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| | files are generated. It is same as the `-target` release option of `javac`. | | | | |
| `defaultBufferNone` | If set to `true`, the default for the buffer attribute of the page directive is `none`. | Type: `Boolean` {`true`\|`false`} | `false` | N/A | 0 or 1 time |
| `development` | If set to `true`, enables the development mode, which allows JSP files to be checked for modification.<br>Specifies the frequency at which the JSP files are checked using the `modificationTestInterval` property. | Type: `Boolean` {`true`\|`false`} | `true` | N/A | 0 or 1 time |
| `dumpSmap` | If set to `true`, dumps the `SMAP` information for `JSR 45` debugging to a file. Set to `false` if `suppressSmap` is `true`. | Type: `Boolean` {`true`\|`false`} | `false` | N/A | 0 or 1 time |
| `enablePooling` | If set to `true`, tag handler pooling is enabled. | Type: `Boolean` {`true`\|`false`} | `true` | N/A | 0 or 1 time |
| `enableTldValidation` | If set to `true`, all the Tag Library Descriptor (TLD) files referenced by the web application are validated against their underlying schema or DTD file. | Type: `Boolean` {`true`\|`false`} | `false` | N/A | 0 or 1 time |
| `errorOnUseBeanInvalidClassAttribute` | If set to `true`, issues an error when the value of the class attribute in a `useBean` action is not a valid bean class. | Type: `Boolean` {`true`\|`false`} | `false` | N/A | 0 or 1 time |
| `fork` | Specifies that `Ant` forks the compilation of the JSP files using a JVM machine separate from the one in which the Application Server is running. | Type: `Boolean` {`true`\|`false`} | `true` | N/A | 0 or 1 time |
| `genStrAsByteArray` | If set to `true`, text strings are generated as bytes (encoded with the page encoding), if the page is not buffered. | Type: `Boolean` {`true`\|`false`} | `true` | N/A | 0 or 1 time |
| `genStrAsCharArray` | If set to `true`, generates text strings as char arrays, which improves performance in some cases. | Type: `Boolean` {`true`\|`false`} | `false` | N/A | 0 or 1 time |
| `httpMethods` | Specifies a comma separated list of the HTTP methods supported by the `JspServlet`. | Type: `String` | *<*(for all methods)>* | N/A | 0 or 1 time |
| `ieClassId` | Specifies the Java plug-in COM class ID for the Internet Explorer that is used by the `<jsp:plugin>` tags. | Type: `String` | `clsid:8AD9C840-044E-11D1-B3E9-00805F499D93` | N/A | 0 or 1 time |

| Property name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| ignoreJspFragmentErrors | If set to true, instructs the compiler to ignore any JSP precompilation errors pertaining to statically included JSP segments that despite not being top level JSP files use the .jsp or .jspx extension (instead of the recommended .jspf). | Type: Boolean {true\|false} | false | N/A | 0 or 1 time |
| initialCapacity | Specifies the initial capacity of the HashMap that maps the JSP files to their corresponding servlets. | Type: Integer 0 to 2147483647 | 32 | N/A | 0 or 1 time |
| javaEncoding | Specifies the encoding for the generated Java servlet.<br>This encoding is passed to the Java compiler that is used to compile the servlet as well. The web container tries to use the UTF8. If that fails, it tries to use the java encoding value. | Type: String | UTF8 | N/A | 0 or 1 time |
| keepgenerated | If set to true, keeps the generated Java files. If set to false, deletes the Java files. | Type: Boolean {true\|false} | true | N/A | 0 or 1 time |
| mappedfile | If set to true, generates static content with one print statement per input line to ease debugging. | Type: Boolean {true\|false} | true | N/A | 0 or 1 time |
| modificationTestInterval | Specifies the frequency in seconds at which JSPs are checked for modification.<br>A value of 0 causes the JSP to be checked on every access. Used only if development is set to true. | Type: Integer 0 to 2147483647 | 0 | N/A | 0 or 1 time |
| reload-interval | Specifies the frequency in seconds at which JSP files are checked for modifications. Setting this value to 0 checks the JSP files for modifications on every request. Setting this value to -1 disables checks for JSP modifications and JSP recompilation. | Type: Integer -1 to 2147483647 | 0 | N/A | 0 or 1 time |
| saveBytecode | If set to true, generated byte code is saved to .class files. This option is meaningful only when the Java compiler API, JSR 199 (available with and used as the default on Java 6) is used for javac compilations. | Type: Boolean {true\|false} | <true for jspc, otherwise false> | N/A | 0 or 1 time |
| scratchdir | Specifies the working directory created for storing all the generated code. | Type: String | <*Default work directory for the web application*> | N/A | 0 or 1 time |
| suppressSmap | If set to true, generation of the SMAP information for JSR 45 debugging is suppressed. | Type: Boolean {true\|false} | false | N/A | 0 or 1 time |
| trimSpaces | If set to true, trims white spaces in template text between actions or directives. | Type: Boolean | false | N/A | 0 or 1 time |

| Property name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| | | {true\|false} | | | |
| usePrecompiled | If set to true, an accessed JSP file is not compiled and its precompiled servlet class is used instead.<br>It is assumed that JSP files have been precompiled and their corresponding servlet classes have been bundled in the web application WEB-INF/lib or WEB-INF/classes directory. | Type: Boolean<br>{true\|false} | false | N/A | 0 or 1 time |
| xpoweredBy | If set to true, the X-Powered-By response header is added by the generated servlet. | Type: Boolean<br>{true\|false} | true | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.13.89 /glassfish-web-app/jsp-config/property/description

/glassfish-web-app/jsp-config/property/description specifies the optional text description of a property.

### Description

/glassfish-web-app/jsp-config/property/description specifies the optional text description of a property.

### Specifiable values

Type: String

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.13.90 /glassfish-web-app/property

/glassfish-web-app/property specifies the property, which has a name and value.

### Description

/glassfish-web-app/property specifies the property, which has a name and value.

## Repetition pattern

0 or more times

## Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specify the property name of "Specifiable properties". | Type: `String` | No default value | N/A | Only one time |
| `value` | Specify the value of "Specifiable properties" (specifiable value). | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## Specifiable properties

The following properties can be specified for "Specifiable attributes":

| Property name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `allowLinking` | If set as `true`, resources in this web application that are symbolic links are served. You can also define this property for a virtual server.<br>Web applications on the virtual server that do not define this property use the value of the virtual server.<br>Caution: Setting this property to `true` on Windows systems exposes the JSP source code. | Type: `Boolean`<br>{`true`\|`false`} | `false` | N/A | 0 or 1 time |
| `alternatedocroot_n` | Specifies an alternate document root (`docroot`), where `n` is a positive `integer`. The alternate docroots allow the web applications to serve requests for certain resources from outside their own `docroot`, based on whether those requests match one (or more) of the URI patterns of the alternate docroots corresponding to the web applications.<br>If a request matches an alternate `docroot` URI pattern, it is mapped to the alternate `docroot` by appending the request URI (minus the web application context root) to the alternate docroot physical location (directory). If a request matches multiple URI patterns, the alternate docroot is determined according to the following precedence order:<br>• Exact match<br>• Longest path match<br>• Extension match | Type: `String` | No default value | N/A | 0 or 1 time |
| `crossContextAllowed` | Specify "`true`" to allow the web application to access the contexts of the other web applications using the `ServletContext.getContext()` method. | Type: `Boolean`<br>{`true`\|`false`} | `true` | N/A | 0 or 1 time. |

| Property name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| relativeRedirectAllowed | Specify true to allow this web application to send a relative URL to the client using HttpServletResponse.sendRedirect( ) and instructs the web container not to translate any relative URLs to fully qualified ones. | Type: Boolean {true\|false} | false | N/A | 0 or 1 time. |
| reuseSessionID | Specify "true" to enable the sessions generated for this web application to use the session ID specified in the request. | Type: Boolean {true\|false} | false | N/A | 0 or 1 time |
| securePagesWithPragma | Specify "false", to ensure that the web application file downloads using the SSL work properly in the Internet Explorer.<br>Set this property for all the web applications on a specific virtual server. | Type: Boolean {true\|false} | true | N/A | 0 or 1 time |
| singleThreadedServletPoolSize | Specifies the maximum number of servlet instances allocated for each SingleThreadModel servlet in the web application. | Type: Integer<br>1 to 2147483647 | 5 | N/A | 0 or 1 time |
| tempdir | Specifies a temporary directory to be used by the web module. This value is used to construct the value of the javax.servlet.context.tempdir context attribute.<br>The compiled JSP files are also placed in this directory. | Type: String | <domain-dir/generated/app-name><br>or<br><domain-dir/generated/module-name> | N/A | 0 or 1 time |
| useResponseCTForHeaders | Specify "true" to enable the response headers are encoded using the response charset instead of the default (UTF-8). | Type: Boolean {true\|false} | false | N/A | 0 or 1 time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.13.91 /glassfish-web-app/property/description

/glassfish-web-app/property/description specifies the optional text description of a property.

### Description

/glassfish-web-app/property/description specifies the optional text description of a property.

### Specifiable values

Type: String

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.13.92 /glassfish-web-app/valve

`/glassfish-web-app/valve` specifies the custom valve.

### Description

`/glassfish-web-app/valve` specifies the custom valve for a web application. A valve for all the web applications on a specific virtual server can be defined.

### Repetition pattern

0 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specifies a unique name for the valve. | Type: `String` | No default value | N/A | Only one time |
| `class-name` | Specifies the fully qualified class name of the valve. The valve class must implement the `org.glassfish.web.valve.GlassFishValve` interface. | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.13.93 /glassfish-web-app/valve/description

`/glassfish-web-app/valve/description` specifies the optional text description of a property.

### Description

`/glassfish-web-app/valve/description` specifies the optional text description of a property.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.13.94 /glassfish-web-app/valve/property

`/glassfish-web-app/valve/property` specifies a property, which has a name and value.

### Description

`/glassfish-web-app/valve/property` specifies a property, which has a name and value.

### Repetition pattern

0 or more times

### Specifiable attributes

| Attribute name | Description | Specifiable values | Default value# | Dependencies | Repetition pattern |
|---|---|---|---|---|---|
| `name` | Specifies the name of the property. | Type: `String` | No default value | N/A | Only one time |
| `value` | Specifies the value of the property. | Type: `String` | No default value | N/A | Only one time |

Legend:

N/A: Not applicable

#: This is the default value that is set when a definition item is excluded.

## 3.13.95 /glassfish-web-app/valve/property/description

`/glassfish-web-app/valve/property/description` specifies the optional text description of a property.

### Description

`/glassfish-web-app/valve/property/description` specifies the optional text description of a property.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

0 or 1 time

## 3.13.96 /glassfish-web-app/message-destination

`/glassfish-web-app/message-destination` specifies the name of the logical message destination.

### Description

`/glassfish-web-app/message-destination` specifies the name of the logical message destination defined within an application. The `message-destination-name` matches the corresponding `message-destination-name` in the Java EE RI DD file.

Use `/glassfish-web-app/message-destination` when the message destination reference in the corresponding Java EE RI DD file specifies `message-destination-link` to a logical `message-destination`.

### Repetition pattern

0 or more times

## 3.13.97 /glassfish-web-app/message-destination/message-destination-name

`/glassfish-web-app/message-destination/message-destination-name` specifies the name of a logical message destination defined within the corresponding Java EE RI DD file.

### Description

`/glassfish-web-app/message-destination/message-destination-name` specifies the name of a logical message destination defined within the corresponding Java EE RI DD file.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.13.98 /glassfish-web-app/message-destination/jndi-name

/glassfish-web-app/message-destination/jndi-name specifies the absolute JNDI name of the associated entity.

### Description

/glassfish-web-app/message-destination/jndi-name specifies the absolute JNDI name of a URL resource or a resource.

For the entity beans and session beans, this value specifies the global JNDI name of the EJBHome object. You must specify the global JNDI name of the EJBHome object when the entity bean or session bean exposes a remote view.

### Specifiable values

Type: String

### Default value

If the definition item is omitted

No default value

### Repetition pattern

Only one time

## 3.13.99 /glassfish-web-app/webservice-description

/glassfish-web-app/webservice-description specifies a name and optional publish location for the web service.

### Description

/glassfish-web-app/webservice-description specifies a name and optional publish location for the web service.

### Repetition pattern

0 or more times

## 3.13.100 /glassfish-web-app/webservice-description/webservice-description-name

/glassfish-web-app/webservice-description/webservice-description-name specifies a unique name for the web service within a web.

### Description

/glassfish-web-app/webservice-description/webservice-description-name specifies a unique name for the web service within a web.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
No default value

### Repetition pattern

Only one time

## 3.13.101 /glassfish-web-app/webservice-description/wsdl-publish-location

`/glassfish-web-app/webservice-description/wsdl-publish-location` specifies the URL of a directory to which a web service WSDL is published during deployment.

### Description

`/glassfish-web-app/webservice-description/wsdl-publish-location` specifies the URL of a directory to which a web service WSDL is published during deployment.

The required files are published to this directory, preserving their location relative to the module-specific WSDL directory (`META-INF/wsdl` or `WEB-INF/wsdl`).

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
No default value

### Repetition pattern

0 or 1 time

## 3.13.102 /glassfish-web-app/version-identifier

`/glassfish-web-app/version-identifier` contains the version information for a web application.

### Description

`/glassfish-web-app/version-identifier` contains the version information for an application or module. The version identifier is a suffix to the module or application name. The version identifier is separated from the name by a colon (`:`). It must begin with a letter or number. It can contain alphanumeric characters, underscore (_), hyphen (-), and period (`.`).

The following examples display valid version identifiers for the `foo` application:

- *application name*:1
- *application name*:BETA-2e
- *application name*:3.8
- *application name*:patch39875

## Specifiable values

Type: `String`

## Default value

If the definition item is omitted
No default value

## Repetition pattern

0 or 1 time

## 3.14 hitachi-application.xml

`hitachi-application.xml` is the specific DD to set up the Java EE application.

### Description

`hitachi-application.xml` is the DD to carry out the original setup of the Java EE Server in relation to the Java EE application.

### Schema

```
<!DOCTYPE hitachi-application PUBLIC
'-//Hitachi, Ltd.//DTD Hitachi Java EE Server 10.0//EN'
'hitachi-application_10_00_00.dtd'>
```

### Storage Location

*EAR's_root*/META-INF/hitachi-application.xml

### Element hierarchy

```
hitachi-application
```

### Example

```
<!DOCTYPE hitachi-application PUBLIC
'-//Hitachi, Ltd.//DTD Hitachi Java EE Server 10.0//EN'
'hitachi-application_10_00_00.dtd'>
<hitachi-application>
</hitachi-application>
```

### Note

In addition to the elements described here, the elements of the Java EE RI DD can be described.

## 3.15 Details of the elements written in hitachi-application.xml

This section describes the elements written in `hitachi-application.xml`.

### 3.15.1 /hitachi-application

`/hitachi-application` is the root element.

#### Description

`/hitachi-application` is the root element of the specific DD (application).

#### Repetition pattern

One time

## 3.16 hitachi-application-client.xml

`hitachi-application-client.xml` is the specific DD to set up an application client.

### Description

`hitachi-application-client.xml` is the DD to carry out the original setup of the Java EE Server in relation to the application client.

### Schema

```
<!DOCTYPE hitachi-application-client PUBLIC
'-//Hitachi, Ltd.//DTD Hitachi Java EE Server 10.0//EN'
'hitachi-application-client_10_00_00.dtd'>
```

### Storage Location

*application_client_JAR's_root*/META-INF/hitachi-application-client.xml

### Element hierarchy

```
hitachi-application-client
```

### Example

```
<!DOCTYPE hitachi-application-client PUBLIC
'-//Hitachi, Ltd.//DTD Hitachi Java EE Server 10.0//EN'
'hitachi-application-client_10_00_00.dtd'>
<hitachi-application-client>
</hitachi-application-client>
```

### Note

In addition to the elements described here, the elements of the Java EE RI DD can be described.

## 3.17 Details of the elements written in hitachi-application-client.xml

This section describes the elements written in `hitachi-application-client.xml`.

### 3.17.1 /hitachi-application-client

`/hitachi-application-client` is the root element.

#### Description

`/hitachi-application-client` is the root element of the specific DD (application client).

#### Repetition pattern

One time

## 3.18 hitachi-ejb-jar.xml

`hitachi-ejb-jar.xml` is the specific DD to set up EJB-JAR.

### Description

`hitachi-ejb-jar.xml` is the DD to carry out the original setup of the Java EE Server in relation to EJB-JAR.

### Schema

```
<!DOCTYPE hitachi-ejb-jar PUBLIC
'-//Hitachi, Ltd.//DTD Hitachi Java EE Server 10.0//EN'
'hitachi-ejb-jar_10_00_00.dtd'>
```

### Storage Location

*EJB-JAR's_root*/META-INF/hitachi-ejb-jar.xml

*WAR's_root*/WEB-INF/hitachi-ejb-jar.xml

### Element hierarchy

```
hitachi-ejb-jar
```

### Example

```
<!DOCTYPE hitachi-ejb-jar PUBLIC
'-//Hitachi, Ltd.//DTD Hitachi Java EE Server 10.0//EN'
'hitachi-ejb-jar_10_00_00.dtd'>
<hitachi-ejb-jar>
</hitachi-ejb-jar>
```

### Note

In addition to the elements described here, the elements of the Java EE RI DD can be described.

## 3.19 Details of the elements written in hitachi-ejb-jar.xml

This section describes the elements written in `hitachi-ejb-jar.xml`.

### 3.19.1 /hitachi-ejb-jar

`/hitachi-ejb-jar` is the root element.

#### Description

`/hitachi-ejb-jar` is the root element of the specific DD (EJB-JAR).

#### Repetition pattern

One time

## 3.20 hitachi-ra.xml

`hitachi-ra.xml` is the specific DD to set up the resource.

### Description

`hitachi-ra.xml` is the DD to carry out the original setup of the Java EE Server in relation to the resource.

### Schema

```
<!DOCTYPE hitachi-ra PUBLIC
'-//Hitachi, Ltd.//DTD Hitachi Java EE Server 10.0//EN'
'hitachi-ra_10_00_00.dtd'>
```

### Storage Location

*RAR's_root*/META-INF/hitachi-ra.xml

### Element hierarchy

```
hitachi-ra
```

### Example

```
<!DOCTYPE hitachi-ra PUBLIC
'-//Hitachi, Ltd.//DTD Hitachi Java EE Server 10.0//EN'
'hitachi-ra_10_00_00.dtd'>
<hitachi-ra>
</hitachi-ra>
```

### Note

In addition to the elements described here, the elements of the Java EE RI DD can be described.

## 3.21 Details of the elements written in hitachi-ra.xml

This section describes the elements written in `hitachi-ra.xml`.

### 3.21.1 /hitachi-ra

`/hitachi-ra` is the root element.

#### Description

`/hitachi-ra` is the root element of the specific DD (resource adapter).

#### Repetition pattern

One time

## 3.22 hitachi-web.xml

`hitachi-web.xml` is the specific DD to set up the web application (WAR).

### Description

`hitachi-web.xml` is the DD to carry out the original setup of the Java EE Server in relation to the web application (WAR).

### Schema

```
<!DOCTYPE hitachi-web PUBLIC
'-//Hitachi, Ltd.//DTD Hitachi Java EE Server 10.0//EN'
'hitachi-web_10_00_00.dtd'>
```

### Storage Location

*WAR's_root*/WEB-INF/hitachi-web.xml

### Element hierarchy

```
hitachi-web
```

### Example

```
<!DOCTYPE hitachi-web PUBLIC
'-//Hitachi, Ltd.//DTD Hitachi Java EE Server 10.0//EN'
'hitachi-web_10_00_00.dtd'>
<hitachi-web>
</hitachi-web>
```

### Note

In addition to the elements described here, the elements of the Java EE RI DD can be described.

## 3.23 Details of the elements written in hitachi-web.xml

This section describes the elements written in `hitachi-web.xml`.

### 3.23.1 /hitachi-web

`/hitachi-web` is the root element.

#### Description

`/hitachi-web` is the root element of the specific DD (WAR).

#### Repetition pattern

One time

# 3.24 Details of the proprietary parameters that can be set in a standard DD

This section describes the proprietary parameters that can be set in a standard DD.

## 3.24.1 jersey.config.server.provider.classnames

`jersey.config.server.provider.classnames` defines the resource and provider for the servlet of JAX-RS.

### Description

`jersey.config.server.provider.classnames` defines the resource and provider for the servlet of JAX-RS. Specify this parameter in the `init-param` element.

The following shows how to set up the parameter:

```
<init-param>
    <param-name>jersey.config.server.provider.classnames</param-name>
    <param-value>specified_value</param-value>
</init-param>
```

For *specified_value*, specify one or more class paths. Use a delimiter when specifying multiple class paths. You can use spaces, commas (`,`), semicolons (`;`), and `\n` as delimiters.

If you want to output the telegram header in the log on the JAX-RS server side, specify `org.glassfish.jersey.filter.LoggingFilter` for the *specified_value*.

### File to which this parameter applies

`web.xml`

### Element to which this parameter applies

`/web-app/servlet/init-param`

### Specifiable value

`org.glassfish.jersey.filter.LoggingFilter`

# 4 System properties used in Java EE servers

This chapter describes the properties used to configure an operating environment for Java EE servers.

# 4.1 List of system properties used in Java EE servers

The following tables provide an overview of all of the system properties used in Java EE servers.

## System properties used in server instances

| System property | Overview | Details |
|---|---|---|
| 4.2.1 ALLOW_MULTIPLE_ENLISTS_DELISTS | Enabling `multipleEnlistDelists` | If `multipleEnlistDelists` is set to `true` in the transaction then for the same connection, multiple enlistments and delistments may occur. |
| 4.2.2 ASADMIN_LISTENER_PORT | Specifying port number of HTTP port or HTTPS port through which DAS connects to the instance | `ASADMIN_LISTENER_PORT` specifies the port number of the HTTP port or HTTPS port through which the DAS connects to the instance and manages it. |
| 4.2.3 com.hitachi.software.javaee.util.prf.PRFID | PRF identifier of PRF daemon of connection destination | Specify the PRF identifier of the PRF demon used with the performance analysis trace displayed of an application client. |
| 4.2.4 com.sun.appserv.transaction.nofdsync | Disabling file synchronization of logs | Set the `com.sun.appserv.transaction.nofdsync` system property in JVM options to disable the file synchronization of logs. |
| 4.2.5 com.sun.corba.ee.ORBVAAHost | Setting public address host | `com.sun.corba.ee.ORBVAAHost` sets the public address host. |
| 4.2.6 com.sun.corba.ee.ORBVAAPort | Setting public address port | `com.sun.corba.ee.ORBVAAPort` sets the public address port. |
| 4.2.7 com.sun.enterprise.in-progress-local-transaction.completion-mode | Whether Java EE Server commits or revert non-XA transactions (such as JTA transactions) during server shutdown | When you shut down a Server instance, all the database connections are closed. If the Oracle JDBC driver-based database connection is closed in the middle of a non-XA transaction, then all the pending changes are committed. Other databases usually revert the pending changes when a connection is closed before the changes are explicitly committed. |
| 4.2.8 com.sun.jts.dblogging.deletequery | Deleting stored transaction logs from database | `com.sun.jts.dblogging.deletequery` defines the SQL to be used by the transaction manager to delete the stored transaction logs from the database. |
| 4.2.9 com.sun.jts.dblogging.insertquery | Storing transaction logs in database | `com.sun.jts.dblogging.insertquery` defines the SQL to be used by the transaction manager to store transaction logs in the database. |
| 4.2.10 com.sun.jts.dblogging.selectquery | Retrieving stored transaction logs from database | `com.sun.jts.dblogging.selectquery` defines the SQL to be used by the transaction manager to retrieve the stored transaction logs from a database. |
| 4.2.11 com.sun.jts.dblogging.selectservernamequery | Retrieving server name of stored transaction logs from database | `com.sun.jts.dblogging.selectservernamequery` defines the SQL to be used by the transaction manager while retrieving the server name of the stored transaction logs from a database. |
| 4.2.12 com.sun.jts.dblogging.use.nontx.connection.for.add | Storing non-transactional connection log records in database | `com.sun.jts.dblogging.use.nontx.connection.for.add` stores the non-transactional connection logs in a database and uses the non-transactional connections for the INSERT statements. |
| 4.2.13 com.sun.xml.ws.spi.db.BindingContextFactory | Data binding provider for Java Virtual Machine (JVM) | `com.sun.xml.ws.spi.db.BindingContextFactory` specifies the data binding provider for the JVM. |

| System property | Overview | Details |
|---|---|---|
| 4.2.14 com.sun.xml.ws.transport.http.client.HttpTransportPipe.dump | Enabling function that sends JAX-WS request or response to standard output on client side | Set the `com.sun.xml.ws.transport.http.client.HttpTransportPipe.dump` system property to `true` to enable the function that sends the `JAX-WS` request or response to the standard output on the client side. |
| 4.2.15 com.sun.xml.ws.transport.http.HttpAdapter.dump | Enabling function that sends JAX-WS request or response to standard output on server side | Set the `com.sun.xml.ws.transport.http.HttpAdapter.dump` system property to `true` to enable the function that sends the `JAX-WS` request or response to the standard output on the server side. |
| 4.2.16 eclipselink.security.usedoprivileged | EclipseLink persistence provider which is required if security manager is enabled for Java Persistence API | If the security manager is enabled and uses the Java Persistence API by calling `Persistence.createEMF()`, then the `EclipseLink` persistence provider requires that you set this property to `true`. |
| 4.2.17 EXTERNAL-ADDR | Configuring external and GMS IP addresses while creating clustered instances | `EXTERNAL-ADDR` configures the external and GMS IP addresses while creating the clustered instances. |
| 4.2.18 GMS-BIND-INTERFACE-ADDRESS-*cluster-name* | System property if instance is managed by GMS and resides on node that represents multihome hostt | Specify the `GMS-BIND-INTERFACE-ADDRESS-`*`cluster-name`* system property if the instance is managed by GMS and resides on a node that represents a `multihome` host. |
| 4.2.19 GMS_LISTENER_PORT-*cluster-name* | Port number of port on which cluster listens for messages from GMS | `GMS_LISTENER_PORT-`*`cluster-name`* specifies the port number of the port on which the cluster listens for the messages from GMS. |
| 4.2.20 HTTP_LISTENER_PORT | Specifying port number of port that is used to listen to HTTP requests | The `HTTP_LISTENER_PORT` property specifies the port number of the port that is used to listen to the HTTP requests. |
| 4.2.21 HTTP_SSL_LISTENER_PORT | Specifying port number of port that is used to listen to HTTP requests | The `HTTP_SSL_LISTENER_PORT` property specifies the port number of the port that is used to listen to the HTTP requests. |
| 4.2.22 IIOP_LISTENER_PORT | Port number of port that is used in IIOP connections | The `IIOP_LISTENER_PORT` property specifies the port number of the port that is used in the IIOP connections. |
| 4.2.23 IIOP_SSL_LISTENER_PORT | Specifying port number of port that is used to secure IIOP connections | The `IIOP_SSL_LISTENER_PORT` property specifies the port number of the port that is used to secure the IIOP connections. |
| 4.2.24 IIOP_SSL_MUTUALAUTH_PORT | Specifying port number of port that is used to secure IIOP connections with client authentication | The `IIOP_SSL_MUTUALAUTH_PORT` property specifies the port number of the port that is used to secure the IIOP connections with client authentication. |
| 4.2.25 java.security.auth.login.config | Order in which the login modules (if more than one) must be used and conditions to use them | The `java.security.auth.login.config` configuration file specifies the order in which the login modules (if more than one) must be used and conditions to use them. |
| 4.2.26 java.security.policy | Location of the `server.policy` file | `java.security.policy` specifies the location of the `server.policy` file. |
| 4.2.27 JAVA_DEBUGGER_PORT | Specifying port number of port that is used to connect to Java Platform Debugger Architecture (JPDA) debugger | The `JAVA_DEBUGGER_PORT` property specifies the port number of the port that is used to connect to the JPDA debugger. |
| 4.2.28 JMS_PROVIDER_PORT | Specifying port number of Java Message Service (JMS) provider | The `JMS_PROVIDER_PORT` property specifies the port number of the JMS provider. |

| System property | Overview | Details |
|---|---|---|
| 4.2.29 JMX_SYSTEM_CONNECTOR_PORT | Specifying port number on which Java Management Extensions (JMX) connector listens | The `JMX_SYSTEM_CONNECTOR_PORT` property specifies the port number on which the JMX connector listens. |
| 4.2.30 sun.rmi.dgc.client.gcInterval | Maximum interval for periodic GC | `sun.rmi.dgc.client.gcInterval` specifies the maximum interval for periodic GC. GC may occur periodically as remote objects are referenced. The unit is milliseconds. Note that `sun.rmi.dgc.server.gcInterval` must also be specified. |
| 4.2.31 sun.rmi.dgc.server.gcInterval | Maximum interval for periodic GC | `sun.rmi.dgc.server.gcInterval` specifies the maximum interval for periodic GC. GC may occur periodically as remote objects are referenced. The unit is milliseconds. Note that `sun.rmi.dgc.client.gcInterval` must be specified. |
| 4.2.32 TX-LOG-DIR | Setting transaction log directory to absolute path of shared file system directory | `TX-LOG-DIR` is used to set the transaction log directory to an absolute path of a shared file system directory. In this case, `LOG-ROOT` is ignored for transaction logs. |

## System properties used in application clients

| System property | Overview | Details |
|---|---|---|
| 4.3.1 org.glassfish.appclient.acc.maxLoginRetries | Determining number of login retries allowed when Application Client Container (ACC) attempts to perform injection | `org.glassfish.appclient.acc.maxLoginRetries` determines the number of login retries that are allowed. |

## 4.2 Details of the system properties used for server instances

This section describes the properties used for setting the operating environment of server instances.

### 4.2.1 ALLOW_MULTIPLE_ENLISTS_DELISTS

When the ALLOW_MULTIPLE_ENLISTS_DELISTS system property is set to true, it enables multipleEnlistDelists.

#### Description

If multipleEnlistDelists is set to true in the transaction then for the same connection, multiple enlistments and delistments may occur. Setting the system property ALLOW_MULTIPLE_ENLISTS_DELISTS to true enables multipleEnlistDelists.

#### Specifiable values

Type: Boolean

{true | false}

#### Initial value

Not specified

#### Default value

If the definition item is omitted
   false

#### Example

```
asadmin> set server-config.transaction-service.property
.ALLOW_MULTIPLE_ENLISTS_DELISTS=true
```

#### Notes

Used in the server

### 4.2.2 ASADMIN_LISTENER_PORT

ASADMIN_LISTENER_PORT specifies the port number of the HTTP port or HTTPS port through which the domain administration server (DAS) connects to the instance and manages it.

#### Description

ASADMIN_LISTENER_PORT specifies the port number of the HTTP port or HTTPS port through which the DAS connects to the instance and manages it. The valid values are 1 to 65535.

On UNIX, creating sockets that listen on ports 1 to 1024 requires superuser privileges.

### Specifiable values

Type: Integer

1 to 65535

### Initial value

24848

### Default value

If the definition item is omitted
   4848

### Example

```
asadmin> set servers.server.pmdsainst.system-property
.ASADMIN_LISTENER_PORT.value=24859
```

### Notes

Used in the server

## 4.2.3 com.hitachi.software.javaee.util.prf.PRFID

com.hitachi.software.javaee.util.prf.PRFID specifies the PRF identifier of the PRF daemon of the connection destination.

### Description

com.hitachi.software.javaee.util.prf.PRFID specifies the PRF identifier of the PRF demon that is used for output of the performance-based trace analysis of an application client.

### Default value

If the definition item is omitted
   PRF_ID

If the value is omitted
   PRF_ID

### Example

```
appclient -Dcom.hitachi.software.javaee.util.prf.PRFID=MyPrfId Test
```

## 4.2.4 com.sun.appserv.transaction.nofdsync

`com.sun.appserv.transaction.nofdsync` disables file synchronization of logs.

### Description

Set the `com.sun.appserv.transaction.nofdsync` system property in JVM options to disable the file synchronization of logs.

### Specifiable values

Type: `String`

### Initial value

Not specified

### Default value

If the definition item is omitted

No default value

### Examples

```
asadmin> create-jvm-options --target instance1
-Dcom.sun.appserv.transaction.nofdsync
```

### Notes

Used in the server

## 4.2.5 com.sun.corba.ee.ORBVAAHost

`com.sun.corba.ee.ORBVAAHost` sets the public address host.

### Description

`com.sun.corba.ee.ORBVAAHost` sets the public address host.

### Specifiable values

Type: `String`

### Initial value

Not specified

### Default value

If the definition item is omitted

No default value

### Examples

```
asadmin> create-jvm-options --target instance1
-Dcom.sun.corba.ee.ORBVAAHost=192.155.35.4
```

### Notes

Used in the server

## 4.2.6 com.sun.corba.ee.ORBVAAPort

`com.sun.corba.ee.ORBVAAPort` sets the public address port.

### Description

`com.sun.corba.ee.ORBVAAPort` sets the public address port.

### Specifiable values

Type: `Integer`

`1` to `65535`

### Initial value

Not specified

### Default value

If the definition item is omitted

No default value

### Examples

```
asadmin> create-jvm-options --target instance1
-Dcom.sun.corba.ee.ORBVAAPort=9090
```

### Notes

Used in the server

## 4.2.7 com.sun.enterprise.in-progress-local-transaction.completion-mode

`com.sun.enterprise.in-progress-local-transaction.completion-mode` specifies whether the Java EE Server commits or revert non-XA transactions (such as JTA transactions) during server shutdown.

### Description

When you shut down a Server instance, all the database connections are closed. If the Oracle JDBC driver-based database connection is closed in the middle of a non-XA transaction, then all the pending changes are committed. Other databases usually revert the pending changes when a connection is closed before the changes are explicitly committed.

To explicitly specify whether Java EE Server commits or reverts non-XA transactions during server shutdown, set the `com.sun.enterprise.in-progress-local-transaction.completion-mode JVM` option to either `commit` or `rollback` using the `create-jvm-options` subcommand.

### Specifiable values

Type: `String`

`{commit|rollback}`

### Initial value

`rollback`

### Default value

If the definition item is omitted

Neither `commit` nor `rollback` is executed.

### Examples

```
asadmin> create-jvm-options --target instance1
-Dcom.sun.enterprise.in-progress-local-transaction.completion-mode=rollback
```

### Notes

Used in the server

## 4.2.8 com.sun.jts.dblogging.deletequery

`com.sun.jts.dblogging.deletequery` deletes the stored transaction logs from the database.

### Description

`com.sun.jts.dblogging.deletequery` defines the SQL to be used by the transaction manager to delete the stored transaction logs from the database.

### Specifiable values

Type: `String`

### Initial value

Not specified

### Default value

If the definition item is omitted

```
delete from txn_log_table where localtid = ? and servername = ?
```

### Examples

```
asadmin> create-jvm-options --target instance1
'-Dcom.sun.jts.dblogging.deletequery=delete from txn_log_table where localtid =
? and servername = ?'
```

### Notes

Used in the server

## 4.2.9 com.sun.jts.dblogging.insertquery

`com.sun.jts.dblogging.insertquery` stores the transaction logs in a database.

### Description

`com.sun.jts.dblogging.insertquery` defines the SQL to be used by the transaction manager to store transaction logs in the database.

### Specifiable values

Type: `String`

### Initial value

Not specified

### Default value

If the definition item is omitted

```
insert into txn_log_table values ( ?, ?, ?, ? )
```

### Examples

```
asadmin> create-jvm-options --target instance1
'-Dcom.sun.jts.dblogging.insertquery=insert into txn_log_table values
( ?,?, ?, ? )'
```

### Notes

Used in the server

## 4.2.10 com.sun.jts.dblogging.selectquery

`com.sun.jts.dblogging.selectquery` retrieves the stored transaction logs from a database.

### Description

`com.sun.jts.dblogging.selectquery` defines the SQL to be used by the transaction manager to retrieve the stored transaction logs from a database.

### Specifiable values

Type: `String`

### Initial value

Not specified

### Default value

If the definition item is omitted

```
select * from txn_log_table where servername = ?
```

### Examples

```
asadmin> create-jvm-options --target instance1
'-Dcom.sun.jts.dblogging.selectquery=
select * from txn_log_table where servername = ?'
```

### Notes

Used in the server

## 4.2.11 com.sun.jts.dblogging.selectservernamequery

`com.sun.jts.dblogging.selectservernamequery` retrieves the server name of the stored transaction logs from a database.

### Description

`com.sun.jts.dblogging.selectservernamequery` defines the SQL to be used by the transaction manager while retrieving the server name of the stored transaction logs from a database.

### Specifiable values

Type: `String`

### Initial value

Not specified

### Default value

If the definition item is omitted

```
select distinct servername from txn_log_table where instancename = ?
```

### Examples

```
asadmin> create-jvm-options --target instance1
'-Dcom.sun.jts.dblogging.selectservernamequery=
select distinct servername from txn_log_table where instancename = ?'
```

### Notes

Used in the server

## 4.2.12 com.sun.jts.dblogging.use.nontx.connection.for.add

`com.sun.jts.dblogging.use.nontx.connection.for.add` stores the non-transactional connection log records in a database.

### Description

`com.sun.jts.dblogging.use.nontx.connection.for.add` stores the non-transactional connection logs in a database and uses the non-transactional connections for the INSERT statements.

Set `true` or `false` values:

`false`: Logs are not inserted into the table for the non-transactional connections.

`true`: Logs are inserted into the table for the non-transactional connections.

### Specifiable values

Type: `Boolean`

{`true` | `false`}

### Initial value

Not specified

### Default value

If the definition item is omitted
`false`

### Examples

```
asadmin> create-jvm-options --target instance1
-Dcom.sun.jts.dblogging.use.nontx.connection.for.add=true
```

### Notes

Used in the server

## 4.2.13 com.sun.xml.ws.spi.db.BindingContextFactory

`com.sun.xml.ws.spi.db.BindingContextFactory` specifies the data binding provider for the Java Virtual Machine (JVM).

### Description

`com.sun.xml.ws.spi.db.BindingContextFactory` specifies the data binding provider for the JVM.

To specify the data binding provider for the JVM, set the `com.sun.xml.ws.spi.db.BindingContextFactory JVM` property to one of the following values:

`com.sun.xml.ws.db.glassfish.JAXBRIContextFactory`
Specifies the JAXB reference implementation. This is the default value.

`com.sun.xml.ws.db.toplink.JAXBContextFactory`
Specifies the Eclipselink MOXy JAXB binding.

### Specifiable values

Type: `String`

`{com.sun.xml.ws.db.glassfish.JAXBRIContextFactory |`
`com.sun.xml.ws.db.toplink.JAXBContextFactory}`

### Initial value

Not specified

### Default value

If the definition item is omitted
`com.sun.xml.ws.db.glassfish.JAXBRIContextFactory`

### Examples

```
asadmin> create-jvm-options --target instance1
-Dcom.sun.xml.ws.spi.db.BindingContextFactory=
com.sun.xml.ws.db.toplink.JAXBContextFactory
```

### Notes

Used in the server.

The data binding provider for `JAXB`, which is specified by this property, affects only the `JAX-WS` web services.

## 4.2.14 com.sun.xml.ws.transport.http.client.HttpTransportPipe.dump

Set the `com.sun.xml.ws.transport.http.client.HttpTransportPipe.dump` system property to `true` to enable the function that sends the JAX-WS request or response to the standard output on the client side.

### Description

Set the com.sun.xml.ws.transport.http.client.HttpTransportPipe.dump system property to true to enable the function that sends the JAX-WS request or response to the standard output on the client side.

### Specifiable values

Type: Boolean

{true | false}

### Initial value

Not specified

### Default value

If the definition item is omitted
   false

### Examples

```
asadmin> create-system-properties --target instance1
com.sun.xml.ws.transport.http.client.HttpTransportPipe.dump=true
```

### Notes

Used in the server

## 4.2.15 com.sun.xml.ws.transport.http.HttpAdapter.dump

Set the com.sun.xml.ws.transport.http.HttpAdapter.dump system property to true to enable the function that sends the JAX-WS request or response to the standard output on the server side.

### Description

Set the com.sun.xml.ws.transport.http.HttpAdapter.dump system property to true to enable the function that sends the JAX-WS request or response to the standard output on the server side.

### Specifiable values

Type: Boolean

{true | false}

### Initial value

Not specified

### Default value

If the definition item is omitted
    `false`

### Example

```
asadmin> create-system-properties --target instance1
com.sun.xml.ws.transport.http.HttpAdapter.dump=true
```

### Notes

Used in the server

## 4.2.16 eclipselink.security.usedoprivileged

`eclipselink.security.usedoprivileged` is the `EclipseLink` persistence provider, which is required if the security manager is enabled for the Java Persistence API.

### Description

If the security manager is enabled and uses the Java Persistence API by calling `Persistence.createEMF()`, then the `EclipseLink` persistence provider requires that you set this property to `true`.

### Specifiable values

Type: `Boolean`

`{true}|false`

### Initial value

Not specified

### Default value

If the definition item is omitted
    No default value

### Examples

```
asadmin> create-jvm-options --target instance1
-Declipselink.security.usedoprivileged=true
```

### Notes

Used in the server

## 4.2.17 EXTERNAL-ADDR

EXTERNAL-ADDR configures the external and GMS IP addresses while creating the clustered instances.

### Description

EXTERNAL-ADDR configures the external and GMS IP addresses while creating the clustered instances.

### Specifiable values

Type: String

### Initial value

Not specified

### Default value

If the definition item is omitted

No default value

### Examples

```
asadmin> create-system-properties --target instance1 server EXTERNAL-
ADDR=192.155.35.4
```

### Notes

Used in the server

## 4.2.18 GMS-BIND-INTERFACE-ADDRESS-*cluster-name*

Specify the GMS-BIND-INTERFACE-ADDRESS-*cluster-name* system property if the instance is managed by GMS and resides on a node that represents a multihome host.

### Description

Specify the GMS-BIND-INTERFACE-ADDRESS-*cluster-name* system property if the instance is managed by GMS and resides on a node that represents a multihome host.

### Specifiable values

Type: String

### Initial value

Not specified

### Default value

If the definition item is omitted

```
${GMS-BIND-INTERFACE-ADDRESS-cluster-name}
```

### Examples

```
asadmin> create-system-properties --target instance1
GMS-BIND-INTERFACE-ADDRESS-c1=10.12.152.20
```

### Notes

Used in the server

## 4.2.19 GMS_LISTENER_PORT-*cluster-name*

GMS_LISTENER_PORT-*cluster-name* specifies the port number of the port on which the cluster listens for the messages from GMS.

### Description

GMS_LISTENER_PORT-*cluster-name* specifies the port number of the port on which the cluster listens for the messages from GMS. The default value is a reference to the GMS_LISTENER_PORT-*cluster-name* system property.

By default, this system property is not set. In this situation, GMS selects a free port from the range that is defined by the properties GMS_TCPSTARTPORT and GMS_TCPENDPORT. By default, this range is 9090 to 9200. In most situations, the default behavior must suffice.

### Specifiable values

Type: Integer

9090 to 9200

### Initial value

Not specified

### Default value

If the definition item is omitted

```
9090
```

### Examples

```
asadmin> create-system-properties --target instance1
GMS_LISTENER_PORT-tcpcluster=9090
```

### Notes

Used in the server

## 4.2.20 HTTP_LISTENER_PORT

The HTTP_LISTENER_PORT property specifies the port number of the port that is used to listen to the HTTP requests.

### Description

The HTTP_LISTENER_PORT property specifies the port number of the port that is used to listen to the HTTP requests. Valid values are 1 to 65535.

On UNIX, creating sockets that listen to ports 1 to 1024 requires superuser privileges.

### Specifiable values

Type: Integer

1 to 65535

### Initial value

Not specified

### Default value

If the definition item is omitted
28080

### Examples

```
asadmin> create-instance --node localhost-domain1
--systemproperties HTTP_LISTENER_PORT=58294
pmdcpinst
```

### Notes

Used in the server

## 4.2.21 HTTP_SSL_LISTENER_PORT

The HTTP_SSL_LISTENER_PORT property specifies the port number of the port that is used to listen to the HTTP requests.

### Description

The HTTP_SSL_LISTENER_PORT property specifies the port number of the port that is used to listen to the HTTP requests. Valid values are 1 to 65535.

On UNIX, creating sockets that listen to ports 1 to 1024 requires superuser privileges.

### Specifiable values

Type: Integer

1 to 65535

### Initial value

28181

### Default value

If the definition item is omitted
   1043

### Examples

```
asadmin> create-instance --node localhost-domain1
--systemproperties HTTP_SSL_LISTENER_PORT=58297  pmdcpinst
```

### Notes

Used in the server

## 4.2.22 IIOP_LISTENER_PORT

The IIOP_LISTENER_PORT property specifies the port number of port that is used in IIOP connections.

### Description

The IIOP_LISTENER_PORT property specifies the port number of the port that is used in the IIOP connections. Valid values are 1 to 65535.

On UNIX, creating sockets that listen to ports 1 to 1024 requires superuser privileges.

### Specifiable values

Type: Integer

1 to 65535

### Initial value

23700

### Default value

If the definition item is omitted
   3700

### Examples

```
asadmin> create-instance --node localhost-domain1
--systemproperties IIOP_LISTENER_PORT=58300  pmdcpinst
```

### Notes

Used in the server

## 4.2.23 IIOP_SSL_LISTENER_PORT

The IIOP_SSL_LISTENER_PORT property specifies the port number of the port that is used to secure the IIOP connections.

### Description

The IIOP_SSL_LISTENER_PORT property specifies the port number of the port that is used to secure the IIOP connections. Valid values are 1 to 65535.

On UNIX, creating sockets that listen to ports 1 to 1024 requires superuser privileges.

### Specifiable values

Type: Integer

1 to 65535

### Initial value

23820

### Default value

If the definition item is omitted

1060

### Examples

```
asadmin> create-instance --node localhost-domain1
--systemproperties IIOP_SSL_LISTENER_PORT=58303  pmdcpinst
```

### Notes

Used in the server

## 4.2.24 IIOP_SSL_MUTUALAUTH_PORT

The IIOP_SSL_MUTUALAUTH_PORT property specifies the port number of the port that is used to secure the IIOP connections with client authentication.

### Description

The IIOP_SSL_MUTUALAUTH_PORT property specifies the port number of the port that is used to secure the IIOP connections with client authentication. Valid values are 1 to 65535.

On UNIX, creating sockets that listen to ports 1 to 1024 requires superuser privileges.

### Specifiable values

Type: Integer

1 to 65535

### Initial value

23920

### Default value

If the definition item is omitted
   1061

### Examples

```
asadmin> create-instance --node localhost-domain1
--systemproperties IIOP_SSL_MUTUALAUTH_PORT=58306  pmdcpinst
```

### Notes

Used in the server

## 4.2.25 java.security.auth.login.config

The java.security.auth.login.config configuration file specifies the order in which the login modules (if more than one) must be used and conditions to use them.

### Description

The java.security.auth.login.config configuration file specifies the order in which the login modules (if more than one) must be used and conditions to use them. The authentication service also supplies a JAAS configuration file containing entries that reference the login modules. The configuration file specifies the order in which the login modules (if more than one) must be used and conditions to use them. When the broker starts, it locates the configuration file by consulting either the java.security.auth.login.config Java system property or the Java security properties file.

### Specifiable values

Type: String

### Initial value

${com.sun.aas.instanceRoot}/config/login.conf

### Default value

If the definition item is omitted

No default value

### Examples

```
asadmin> create-jvm-options --target instance1
-Djava.security.auth.login.config=${com.sun.aas.instanceRoot}/config/login.conf
```

### Notes

Used in the server

## 4.2.26 java.security.policy

`java.security.policy` specifies the location of the `server.policy` file.

### Description

`java.security.policy` specifies the location of the `server.policy` file.

### Specifiable values

Type: `String`

### Initial value

`${com.sun.aas.instanceRoot}/config/server.policy`

### Default value

If the definition item is omitted

No default value

### Examples

```
asadmin> create-jvm-options --target instance1 -Djava.security.policy=
${com.sun.aas.instanceRoot}/config/pmd-config/server.policy
```

### Notes

Used in the server

## 4.2.27 JAVA_DEBUGGER_PORT

The `JAVA_DEBUGGER_PORT` property specifies the port number of the port that is used to connect to the Java Platform Debugger Architecture (JPDA) debugger.

### Description

The JAVA_DEBUGGER_PORT property specifies the port number of the port that is used to connect to the JPDA debugger. Valid values are 1 to 65535.

On UNIX, creating sockets that listen to ports 1 to 1024 requires superuser privileges.

### Specifiable values

Type: Integer

1 to 65535

### Initial value

29009

### Default value

If the definition item is omitted
   29009

### Examples

```
asadmin> create-instance --node localhost-domain1
--systemproperties JAVA_DEBUGGER_PORT=58294 pmdcpinst
```

### Notes

Used in the server

## 4.2.28 JMS_PROVIDER_PORT

The JMS_PROVIDER_PORT property specifies the port number of the Java Message Service (JMS) provider.

### Description

The JMS_PROVIDER_PORT property specifies the port number of the JMS provider. Valid values are 1 to 65535.

On UNIX, creating sockets that listen to ports 1 to 1024 requires superuser privileges.

### Specifiable values

Type: Integer

1 to 65535

### Initial value

27676

### Default value

If the definition item is omitted
   27676

### Examples

```
asadmin> set configs.config.clusterpresets
-config.system-property.JMS_PROVIDER_PORT.value=27678
```

### Notes

Used in the server

## 4.2.29 JMX_SYSTEM_CONNECTOR_PORT

The JMX_SYSTEM_CONNECTOR_PORT property specifies the port number on which the Java Management Extensions (JMX) connector listens.

### Description

The JMX_SYSTEM_CONNECTOR_PORT property specifies the port number on which the JMX connector listens. Valid values are 1 to 65535.

On UNIX, creating sockets that listen to ports 1 to 1024 requires superuser privileges.

### Specifiable values

Type: Integer

1 to 65535

### Initial value

28686

### Default value

If the definition item is omitted
   8686

### Examples

```
asadmin> create-instance --node localhost-domain1
--systemproperties JMX_SYSTEM_CONNECTOR_PORT=58309  pmdcpinst
```

### Notes

Used in the server

## 4.2.30 sun.rmi.dgc.client.gcInterval

`sun.rmi.dgc.client.gcInterval` specifies the maximum interval for periodic GC. GC may occur periodically as remote objects are referenced. The unit is milliseconds. Note that `sun.rmi.dgc.server.gcInterval` must be specified.

### Description

`sun.rmi.dgc.client.gcInterval` specifies the maximum interval for periodic GC. GC may occur periodically as remote objects are referenced. The unit is milliseconds. Note that `sun.rmi.dgc.server.gcInterval` must also be specified.

The default value of `sun.rmi.dgc.server.gcInterval` and `sun.rmi.dgc.client.gcInterval` on the server instance is one day (86,400,000 milliseconds). After you enlarge the full GC interval in these system properties and if the number of times that GC occurs does not decrease, the size of the Java heap may be insufficient. In such a case, you can resolve the problem by tuning the Java heap.

### Specifiable values

Type: `Integer`

`1` to `9223372036854775806`

### Initial value

`86400000`

### Default value

If the definition item is omitted

`3600000`

### Examples

```
asadmin> create-system-properties --target instance1
sun.rmi.dgc.client.gcInterval=43200000
```

### Notes

Used in the server

## 4.2.31 sun.rmi.dgc.server.gcInterval

`sun.rmi.dgc.server.gcInterval` specifies the maximum interval for periodic GC. GC may occur periodically as remote objects are referenced. The unit is milliseconds. Note that `sun.rmi.dgc.client.gcInterval` must be specified.

### Description

sun.rmi.dgc.server.gcInterval specifies the maximum interval for periodic GC. GC may occur periodically as remote objects are referenced. The unit is milliseconds. Note that sun.rmi.dgc.client.gcInterval must be specified.

The default value of sun.rmi.dgc.server.gcInterval and sun.rmi.dgc.client.gcInterval on the server instance is one day (86,400,000 milliseconds). After you enlarge the full GC interval in these system properties and if the number of times that GC occurs does not decrease, the size of the Java heap may be insufficient. In such a case, you can resolve the problem by tuning the Java heap.

### Specifiable values

Type: Integer

1 to 9223372036854775806

### Initial value

86400000

### Default value

If the definition item is omitted
3600000

### Examples

```
asadmin> create-system-properties --target instance1
sun.rmi.dgc.server.gcInterval=43200000
```

### Notes

Used in the server

## 4.2.32 TX-LOG-DIR

TX-LOG-DIR is used to set the transaction log directory to an absolute path of a shared file system directory. In this case, LOG-ROOT is ignored for transaction logs.

### Description

TX-LOG-DIR is used to set the transaction log directory to an absolute path of a shared file system directory. In this case, LOG-ROOT is ignored for transaction logs.

### Specifiable values

Type: String

### Initial value

${com.sun.aas.instanceRoot}/logs

## Default value

If the definition item is omitted

No default value

## Examples

```
asadmin> create-system-properties --target server TX-LOG-DIR=/inst1/logs
```

## Notes

Used in the server

## 4.3 Details of system properties used in application clients

This section describes the properties used to configure an operating environment for client processes.

### 4.3.1 org.glassfish.appclient.acc.maxLoginRetries

`org.glassfish.appclient.acc.maxLoginRetries` determines the number of login retries allowed when the Application Client Container (ACC) attempts to perform injection.

#### Description

`org.glassfish.appclient.acc.maxLoginRetries` determines the number of login retries that are allowed.

If the client main class is annotated (for example, `@Resource`), then the retry loop happens when the ACC performs the injection.

#### Specifiable values

Type: `Integer`

`0` to `2147483647`

#### Initial value

Not specified

#### Default value

If the definition item is omitted
`3`

#### Examples

```
asadmin> create-jvm-options -Dorg.glassfish.appclient.acc.maxLoginRetries=5
```

#### Notes

Used in the AppClient

# 5 Definition files and property files used in Java EE servers

This chapter describes the files used to set connection information and configuration definitions for Java EE servers.

# 5.1 List of definition and property files used in Java EE servers

The following tables describe all of the definition and property files used in Java EE servers.

## Definition and property files used in Java EE servers

| File | Overview | Details |
|---|---|---|
| 5.2 asenv.conf | Environment variable definition file of Java EE Server | File that stores an environment variable specific to the Java EE Server. |
| 5.4 config.properties | Containing property settings for configuring broker | `config.properties` files contain property settings for configuring a broker. |
| 5.6 das.properties | Containing connection information for node agent | `das.properties` file contains the connection information for the node agent, which is connected to the DAS. |

## Environment variables to be specified in asenv.conf

| Environment variable | Overview | Details |
|---|---|---|
| 5.3.1 AS_ADMIN_READTIMEOUT | Specifying HTTP read timeout value to be set for asadmin process and domain administration server | Specifies the HTTP read timeout value (unit: milliseconds) that is applied to communications between the asadmin process and the domain administration server, and between the domain administration server and server instances. |
| 5.3.2 HJES_ASADMIN_CONSOLE_ENABLED | Validity or invalidity of process startup log of `asadmin` utility command | Specify whether to display the process startup log of the `asadmin` utility command. |
| 5.3.3 HJES_ASADMIN_CONSOLE_FILE_NUMBER | Nnumber of process start log files of `asadmin` utility command | Specify the number of log file maintained during the Java EE Server operation of the process start-up log of the `asadmin` utility command. |
| 5.3.4 HJES_ASADMIN_CONSOLE_ROTATION_SIZE | Size of process start log file of `asadmin` utility command | Specify the switching size (unit: byte) of the log output destination file of the process startup log of the `asadmin` utility command. |
| 5.3.5 HJES_ASADMIN_CONSOLE_ROTATION_TIME | Rotation time for process start log file of `asadmin` utility command | Specify the switching time of the log output destination file of the process startup log of the `asadmin` utility command in the HHMMSS format. |
| 5.3.6 HJES_ASADMIN_JVM_OPTIONS | JavaVM options that are applied to `asadmin` utility command process | Specify the JavaVM options that are applied to the `asadmin` utility command process. When specifying multiple JavaVM options, separate it by half-width blank space. |
| 5.3.7 HJES_ASADMIN_LOG_DIVISION | Whether to divide log output destination directory of `asadmin` utility command | Specify whether for every user account of OS the directory is divided and a log of the `asadmin` utility command is displayed. |
| 5.3.8 HJES_ASADMIN_MAINTENANCE_ENABLED | Validity or invalidity of maintenance log of `asadmin` utility command | Specify whether the maintenance log of the `asadmin` utility command is displayed or not. |
| 5.3.9 HJES_ASADMIN_MAINTENANCE_FILE_NUMBER | Number of maintenance log files of `asadmin` utility command | Specify the number of log files maintained during the Java EE Server operation in the process maintenance log of the `asadmin` utility command. |
| 5.3.10 HJES_ASADMIN_MAI | Maintenance log level of `asadmin` utility command | Specify the level of contents displayed in the maintenance log of the `asadmin` utility command. |

| Environment variable | Overview | Details |
|---|---|---|
| NTENANCE_LOG_LEVEL | | |
| 5.3.11 HJES_ASADMIN_MAINTENANCE_ROTATION_SIZE | Size of maintenance log of `asadmin` utility command | Specify the switching size (unit: byte) of the log output destination file of the maintenance log of the `asadmin` utility command. |
| 5.3.12 HJES_ASADMIN_MAINTENANCE_ROTATION_TIME | Rotation time for maintenance log file of `asadmin` utility command | Specify the switching time of the log output destination file of the maintenance log of the `asadmin` utility command in the HHMMSS format. |
| 5.3.13 HJES_ASADMIN_MESSAGE_ENABLED | Validity and invalidity of message log of `asadmin` utility command | Specify whether the message log of the `asadmin` utility command is displayed. |
| 5.3.14 HJES_ASADMIN_MESSAGE_FILE_NUMBER | Number of message log files of `asadmin` utility command | Specify the number of log file maintained during the Java EE Server operation of the message log of the `asadmin` utility command. |
| 5.3.15 HJES_ASADMIN_MESSAGE_LOG_LEVEL | Message log level of `asadmin` utility command | Specify the level of contents displayed in the message log of the `asadmin` utility command. |
| 5.3.16 HJES_ASADMIN_MESSAGE_ROTATION_SIZE | Size of message log file of `asadmin` utility command | Specify the switching size (unit: byte) of the log output destination file of the message log of the `asadmin` utility command. |
| 5.3.17 HJES_ASADMIN_MESSAGE_ROTATION_TIME | Rotation time for message log file of `asadmin` utility command | Specify the switching time of the log output destination file of the message log of the `asadmin` utility command in the HHMMSS format. |
| 5.3.18 HJES_ASADMIN_STACKTRACE_ENABLED | Validity or invalidity of stack trace log of `asadmin` utility command | Specify whether the stack trace log of the `asadmin` utility command is displayed. |
| 5.3.19 HJES_ASADMIN_STACKTRACE_FILE_NUMBER | Number of stack trace log files of `asadmin` utility command | Specify the number of log file maintained during the Java EE Server operation of the stack trace log of the `asadmin` utility command. |
| 5.3.20 HJES_ASADMIN_STACKTRACE_ROTATION_SIZE | Size of stack trace log of `asadmin` utility command | Specify the switching size (unit: byte) of the log output destination file of the stack trace log of the `asadmin` utility command. |
| 5.3.21 HJES_ASADMIN_STACKTRACE_ROTATION_TIME | Rotation time for stack trace log file of `asadmin` utility command | Specify the switching time of the log output destination file of the stack trace log of the `asadmin` utility command in the HHMMSS format. |
| 5.3.22 HJES_LOGSDIR | Output destination directory of Java EE Server log file | Specify when changing the output destination directory of the Java EE Server log file. |
| 5.3.23 TZ | Time zone | Specify the time zone applied to a server process in the TZ environment variable format. |

## Properties to be specified in config.properties

| Property | Overview | Details |
|---|---|---|
| 5.5.1 imq.admincreate.topic.sharedConsumerFlowLimit | Defining maximum number of messages prefetched to topic-shared subscriber or topic consumer in Java EE Server cluster | `imq.admincreate.topic.sharedConsumerFlowLimit` defines the maximum number of messages prefetched to a topic-shared subscriber or topic consumer in a Java EE Server cluster. |
| 5.5.2 imq.authentication.client.response.timeout | Setting interval (in seconds) to wait for client response to authentication requests | `imq.authentication.client.response.timeout` property sets a timeout interval for authentication requests. |
| 5.5.3 imq.autocreate.destination.limitBehavior | Setting broker behaviour on reaching memory-limit threshold | `imq.autocreate.destination.limitBehavior` sets the broker behaviour on reaching the memory-limit threshold. |
| 5.5.4 imq.autocreate.destination.maxBytesPerMsg | Setting maximum size (in bytes) of any single message | `imq.autocreate.destination.maxBytesPerMsg` sets the maximum size (in Bytes) of any single message. |
| 5.5.5 imq.autocreate.destination.maxNumMsgs | Setting maximum number of unconsumed messages | `imq.autocreate.destination.maxNumMsgs` sets the maximum number of unconsumed messages. |
| 5.5.6 imq.autocreate.destination.maxTotalMsgBytes | Setting maximum total memory (in bytes) for unconsumed messages | `imq.autocreate.destination.maxTotalMsgBytes` sets the maximum total memory (in bytes) for unconsumed messages. |
| 5.5.7 imq.autocreate.destination.useDMQ | Enable or disable of sending dead messages to dead message queue | `imq.autocreate.destination.useDMQ` enables or disables sending dead messages to the dead message queue. |
| 5.5.8 imq.autocreate.queue | Enable or disable of auto-creation of queue destinations | `imq.autocreate.queue` enables or disables the auto-creation of the queue destinations. |
| 5.5.9 imq.autocreate.queue.maxNumActiveConsumers | Setting maximum number of active message consumers in load-balanced delivery from queue destination | `imq.autocreate.queue.maxNumActiveConsumers` sets the maximum number of active message consumers in the load-balanced delivery from the queue destination. |
| 5.5.10 imq.autocreate.queue.maxNumBackupConsumers | Setting maximum number of backup message consumers | `imq.autocreate.queue.maxNumBackupConsumers` sets the maximum number of backup message consumers in the load-balanced delivery from the queue destination. |
| 5.5.11 imq.autocreate.topic | Enable or disable of auto-creation of topic destinations | `imq.autocreate.topic` enables or disables the auto-creation of topic destinations. |
| 5.5.12 imq.autocreate.topic.consumerFlowLimit | Setting maximum number of messages delivered to the topic consumer | `imq.autocreate.topic.consumerFlowLimit` sets the maximum number of messages delivered to the topic consumer in a single batch. |
| 5.5.13 imq.autocreate.topic.sharedConsumerFlowLimit | Setting maximum number of messages pre-fetched to a topic-shared subscriber or a topic consumer | `imq.autocreate.topic.sharedConsumerFlowLimit` sets the maximum number of messages pre-fetched to a topic-shared subscriber or a topic consumer in the Java EE Server cluster. |
| 5.5.14 imq.destination.DMQ.truncateBody | Enable or disable of removal of message body | `imq.destination.DMQ.truncateBody` enables or disables removal of the message body before storing it in the dead message queue. |
| 5.5.15 imq.hostname | Setting default host name or IP address for all connection services | `imq.hostname` sets the default host name or IP address for all the connection services. |
| 5.5.16 imq.persist.file.destination.message.filepool.limit | Setting maximum number of free files available for reuse in destination file pool | `imq.persist.file.destination.message.filepool.limit` sets the maximum number of free files available for reuse in the destination file pool. |

| Property | Overview | Details |
|---|---|---|
| 5.5.17 imq.persist.file.message.cleanup | Enabling or disabling cleaning up of files in free file pools on shutdown | `imq.persist.file.message.cleanup` enables or disables the cleaning up of files in the free file pools on shutdown. |
| 5.5.18 imq.persist.file.message.filepool.cleanratio | Defining percentage of files in free file pools to be maintained in clean (empty) state | `imq.persist.file.message.filepool.cleanratio` defines the percentage of files in the free file pools to be maintained in a clean (empty) state. |
| 5.5.19 imq.persist.file.message.max_record_size | Defining maximum-size of message to be added to message storage file | `imq.persist.file.message.max_record_size` defines the maximum-size of the message to be added to the message storage file. |
| 5.5.20 imq.persist.file.sync.enabled | Enabling or disabling synchronize in-memory state with physical storage device | `imq.persist.file.sync.enabled` enables or disables synchronize in-memory state with the physical storage device. |
| 5.5.21 imq.service.activelist | List of connection services to be activated at broker startup | `imq.service.activelist` is the list of connection services to be activated at broker startup, separated by commas. |
| 5.5.22 imq.system.max_count | Setting maximum number of messages held by broker | `imq.system.max_count` sets the maximum number of messages held by the broker. |
| 5.5.23 imq.system.max_size | Setting maximum total size of the messages held by broker | `imq.system.max_size` sets the maximum total size of the messages held by the broker. |
| 5.5.24 imq.txn.reapInterval | Setting interval (in seconds) in which reaper thread reaps or cleans periodically for committed transactions | `imq.txn.reapInterval` sets the interval (in seconds) for the reaper thread to periodically reap or clean the committed transactions. |
| 5.5.25 imq.txt.reapLimit | Specifying maximum number of transactions that were committed last | `imq.txt.reapLimit` specifies the maximum number of transactions that were committed last, to be retained while reaping or cleaning the committed transactions. |
| 5.5.26 java.util.logging.FileHandler.count | Specifying number of output files | `java.util.logging.FileHandler.count` specifies the number of output files to cycle through. |
| 5.5.27 java.util.logging.FileHandler.level | Specifying default level for file handler | `java.util.logging.FileHandler.level` specifies the default level for the file handler. |
| 5.5.28 java.util.logging.FileHandler.limit | Specifying approximate maximum amount to write to any one file | `java.util.logging.FileHandler.limit` specifies an approximate maximum amount to write (in bytes) to any one file. |

## Properties to be specified in das.properties

| Property | Overview | Details |
|---|---|---|
| 5.7.1 agent.das.host | Changing host name or IP address for domain administration server | `agent.das.host` changes the host name or the IP address of the DAS, which administrates the server instance. |

## 5.2 asenv.conf

`asenv.conf` is the environment variable definition file of Java EE Server.

### Description

`asenv.conf` stores environment variables specific to Java EE Server. `asenv.conf` is a shell script.

The environment variables specified in this file have higher priority than the OS environment variables (system environment variables and user environment variables).

If a node exists on the remote host, the domain administration server might execute the `asadmin` utility command on the remote host to perform an operation on the node. To apply environment variables to the asadmin process on this remote host, you need to set the environment variables in `asenv.conf` on the remote host.

### Storage location

*installation_directory_for_Java_EE_Server*/glassfish/config/asenv.conf

### Example

```
HJES_ASADMIN_MESSAGE_ENABLED=true
HJES_ASADMIN_MESSAGE_ROTATION_SIZE=8388608
HJES_ASADMIN_MESSAGE_ROTATION_TIME=121530
HJES_ASADMIN_MESSAGE_FILE_NUMBER=16
```

## 5.3 Details on the environment variables to be specified in asenv.conf

This section describes the environment variables to be specified in `asenv.conf`.

### 5.3.1 AS_ADMIN_READTIMEOUT

`AS_ADMIN_READTIMEOUT` specifies the HTTP read timeout value to be set for the asadmin process and the domain administration server.

#### Description

`AS_ADMIN_READTIMEOUT` specifies the HTTP read timeout value (unit: milliseconds) that is to be applied to communications between the asadmin process and the domain administration server, and between the domain administration server and server instances.

If you specify `0` for the HTTP read timeout value and command processing takes a long time, that command processing might fully occupy the threads that process subcommands of the `asadmin` utility command and that process user requests. Therefore, we recommend that you do not specify `0` (which disables timeout) for the HTTP read timeout value.

#### Specifiable values

Type: `Integer`

An integer from 0 to 2147483647

If you specify `0`, the HTTP read timeout is not set (`0` is not a recommended value).

#### Default value

If the definition item is omitted:

```
900000
```

If the value is omitted:

```
900000
```

#### Overwrite permission

This value can be overwritten.

#### Number of times it occurs

0 or 1

#### Example

```
AS_ADMIN_READTIMEOUT=900000
```

## 5.3.2 HJES_ASADMIN_CONSOLE_ENABLED

HJES_ASADMIN_CONSOLE_ENABLED specifies whether to output the process startup log of the asadmin utility command.

### Description

HJES_ASADMIN_CONSOLE_ENABLED specifies whether to output the process startup log of the asadmin utility command.

### Specifiable values

Type: boolean(ignore)

{true|false}

### Default value

If the definition item is omitted:

true

If the value is omitted:

true

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_ASADMIN_CONSOLE_ENABLED=true
```

## 5.3.3 HJES_ASADMIN_CONSOLE_FILE_NUMBER

HJES_ASADMIN_CONSOLE_FILE_NUMBER specifies the number of process startup log files of the asadmin utility command.

### Description

HJES_ASADMIN_CONSOLE_FILE_NUMBER specifies the number of process startup log files of the asadmin utility command.

### Specifiable values

Type: Integer

An integer from 1 to 64

### Default value

If the definition item is omitted:

8

If the value is omitted:

8

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_ASADMIN_CONSOLE_FILE_NUMBER=16
```

## 5.3.4 HJES_ASADMIN_CONSOLE_ROTATION_SIZE

HJES_ASADMIN_CONSOLE_ROTATION_SIZE specifies the size (in bytes) of the process startup log file of the asadmin utility command.

### Description

HJES_ASADMIN_CONSOLE_ROTATION_SIZE specifies the switching size (in bytes) of the log output destination file of the process startup log of the asadmin utility command.

### Specifiable values

Type: Integer

An integer from 4096 to 16777216

### Default value

If the definition item is omitted:

16777216

If the value is omitted:

16777216

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_ASADMIN_CONSOLE_ROTATION_SIZE=8388608
```

## 5.3.5 HJES_ASADMIN_CONSOLE_ROTATION_TIME

HJES_ASADMIN_CONSOLE_ROTATION_TIME specifies the time when the process startup log files of the asadmin utility command are to be rotated.

### Description

HJES_ASADMIN_CONSOLE_ROTATION_TIME specifies the time (in the *HHMMSS* format) when the log output destination files of the process startup log of the asadmin utility command are to be switched.

### Specifiable values

Type: String

Value from 000000 to 235959 in the *HHMMSS* format

### Default value

If the definition item is omitted:

000000

If the value is omitted:

000000

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_ASADMIN_CONSOLE_ROTATION_TIME=121530
```

## 5.3.6 HJES_ASADMIN_JVM_OPTIONS

HJES_ASADMIN_JVM_OPTIONS specifies the Java VM options that are to be applied to the asadmin utility command process.

### Description

HJES_ASADMIN_JVM_OPTIONS specifies the Java VM options that are to be applied to the asadmin utility command process. To specify multiple Java VM options, delimit the options by using a single-byte space character.

### Specifiable value

Type: `String`

### Default value

If the definition item is omitted:

Nothing is set.

If the value is omitted:

Nothing is set.

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_ASADMIN_JVM_OPTIONS=-Xmx512m -XX:+HitachiThreadDumpToStdout
```

## 5.3.7 HJES_ASADMIN_LOG_DIVISION

`HJES_ASADMIN_LOG_DIVISION` specifies whether to divide the log output destination directory of the `asadmin` utility command.

### Description

`HJES_ASADMIN_LOG_DIVISION` specifies whether to output the `asadmin` utility command log to a different directory for each user account of the OS.

### Specifiable values

Type: `boolean(ignore)`

`{true|false}`

### Default value

If the definition item is omitted:

`false`

If the value is omitted:

`false`

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_ASADMIN_LOG_DIVISION=true
```

## 5.3.8 HJES_ASADMIN_MAINTENANCE_ENABLED

HJES_ASADMIN_MAINTENANCE_ENABLED specifies whether to output the maintenance log of the asadmin utility command.

### Description

HJES_ASADMIN_MAINTENANCE_ENABLED specifies whether to output the maintenance log of the asadmin utility command.

### Specifiable values

Type: boolean(ignore)

{true | false}

### Default value

If the definition item is omitted:

true

If the value is omitted:

true

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_ASADMIN_MAINTENANCE_ENABLED=true
```

## 5.3.9 HJES_ASADMIN_MAINTENANCE_FILE_NUMBER

HJES_ASADMIN_MAINTENANCE_FILE_NUMBER specifies the number of maintenance log files of the asadmin utility command.

### Description

HJES_ASADMIN_MAINTENANCE_FILE_NUMBER specifies the number of maintenance log files of the asadmin utility command.

### Specifiable values

Type: Integer

An integer from 1 to 64

### Default value

If the definition item is omitted:

8

If the value is omitted:

8

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_ASADMIN_MAINTENANCE_FILE_NUMBER=16
```

## 5.3.10 HJES_ASADMIN_MAINTENANCE_LOG_LEVEL

HJES_ASADMIN_MAINTENANCE_LOG_LEVEL specifies the maintenance log level of the asadmin utility command.

### Description

HJES_ASADMIN_MAINTENANCE_LOG_LEVEL specifies the level of the log data to be output to the maintenance log file of the asadmin utility command.

### Specifiable values

Type: Integer

1 or 2

### Default value

If the definition item is omitted:

1

If the value is omitted:

1

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_ASADMIN_MAINTENANCE_LOG_LEVEL=2
```

## 5.3.11 HJES_ASADMIN_MAINTENANCE_ROTATION_SIZE

HJES_ASADMIN_MAINTENANCE_ROTATION_SIZE specifies the size (in bytes) of the maintenance log file of the asadmin utility command.

### Description

HJES_ASADMIN_MAINTENANCE_ROTATION_SIZE specifies the switching size (in bytes) of the log output destination file of the maintenance log of the asadmin utility command.

### Specifiable values

Type: Integer

An integer from 4096 to 16777216

### Default value

If the definition item is omitted:

16777216

If the value is omitted:

16777216

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_ASADMIN_MAINTENANCE_ROTATION_SIZE=8388608
```

## 5.3.12 HJES_ASADMIN_MAINTENANCE_ROTATION_TIME

HJES_ASADMIN_MAINTENANCE_ROTATION_TIME specifies the time when the maintenance log files of the asadmin utility command are to be rotated.

### Description

HJES_ASADMIN_MAINTENANCE_ROTATION_TIME specifies the time (in the *HHMMSS* format) when the log output destination files of the maintenance log of the asadmin utility command are to be switched.

### Specifiable values

Type: String

Value from 000000 to 235959 in the *HHMMSS* format

### Default value

If the definition item is omitted:

000000

If the value is omitted:

000000

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_ASADMIN_MAINTENANCE_ROTATION_TIME=121530
```

## 5.3.13 HJES_ASADMIN_MESSAGE_ENABLED

HJES_ASADMIN_MESSAGE_ENABLED specifies whether to output the message log of the asadmin utility command.

### Description

HJES_ASADMIN_MESSAGE_ENABLED specifies whether to output the message log of the asadmin utility command.

### Specifiable values

Type: boolean(ignore)

{true|false}

### Default value

If the definition item is omitted:

`true`

If the value is omitted:

`true`

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_ASADMIN_MESSAGE_ENABLED=true
```

## 5.3.14 HJES_ASADMIN_MESSAGE_FILE_NUMBER

`HJES_ASADMIN_MESSAGE_FILE_NUMBER` specifies the number of message log files of the `asadmin` utility command.

### Description

`HJES_ASADMIN_MESSAGE_FILE_NUMBER` specifies the number of message log files of the `asadmin` utility command.

### Specifiable values

Type: `Integer`

An integer from 1 to 64

### Default value

If the definition item is omitted:

`8`

If the value is omitted:

`8`

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_ASADMIN_MESSAGE_FILE_NUMBER=16
```

## 5.3.15 HJES_ASADMIN_MESSAGE_LOG_LEVEL

HJES_ASADMIN_MESSAGE_LOG_LEVEL specifies the message log level of the asadmin utility command.

### Description

HJES_ASADMIN_MESSAGE_LOG_LEVEL specifies the level of the log data to be output to the message log file of the asadmin utility command.

### Specifiable values

Type: Integer

1 to 3

### Default value

If the definition item is omitted:

2

If the value is omitted:

2

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_ASADMIN_MESSAGE_LOG_LEVEL=3
```

## 5.3.16 HJES_ASADMIN_MESSAGE_ROTATION_SIZE

HJES_ASADMIN_MESSAGE_ROTATION_SIZE specifies the size (in bytes) of the message log file of the asadmin utility command.

### Description

HJES_ASADMIN_MESSAGE_ROTATION_SIZE specifies the switching size (in bytes) of the log output destination file of the message log of the asadmin utility command.

### Specifiable values

Type: `Integer`

An integer from 4096 to 16777216

### Default value

If the definition item is omitted:

`16777216`

If the value is omitted:

`16777216`

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_ASADMIN_MESSAGE_ROTATION_SIZE=8388608
```

## 5.3.17 HJES_ASADMIN_MESSAGE_ROTATION_TIME

`HJES_ASADMIN_MESSAGE_ROTATION_TIME` specifies the time when the message log files of the `asadmin` utility command are to be rotated.

### Description

`HJES_ASADMIN_MESSAGE_ROTATION_TIME` specifies the time (in the *HHMMSS* format) when the log output destination files of the message log of the `asadmin` utility command are to be switched.

### Specifiable values

Type: `String`

Value from 000000 to 235959 in the *HHMMSS* format

### Default value

If the definition item is omitted:

`000000`

If the value is omitted:

`000000`

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_ASADMIN_MESSAGE_ROTATION_TIME=121530
```

## 5.3.18 HJES_ASADMIN_STACKTRACE_ENABLED

`HJES_ASADMIN_STACKTRACE_ENABLED` specifies whether to output the stack trace log of the `asadmin` utility command.

### Description

`HJES_ASADMIN_STACKTRACE_ENABLED` specifies whether to output the stack trace log of the `asadmin` utility command.

### Specifiable values

Type: `boolean(ignore)`

`{true|false}`

### Default value

If the definition item is omitted:

`true`

If the value is omitted:

`true`

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_ASADMIN_STACKTRACE_ENABLED=true
```

## 5.3.19 HJES_ASADMIN_STACKTRACE_FILE_NUMBER

HJES_ASADMIN_STACKTRACE_FILE_NUMBER specifies the number of stack trace log files of the asadmin utility command.

### Description

HJES_ASADMIN_STACKTRACE_FILE_NUMBER specifies the number of stack trace log files of the asadmin utility command.

### Specifiable values

Type: Integer

An integer from 1 to 64

### Default value

If the definition item is omitted:

8

If the value is omitted:

8

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_ASADMIN_STACKTRACE_FILE_NUMBER=16
```

## 5.3.20 HJES_ASADMIN_STACKTRACE_ROTATION_SIZE

HJES_ASADMIN_STACKTRACE_ROTATION_SIZE specifies the size (in bytes) of the stack trace log file of the asadmin utility command.

### Description

HJES_ASADMIN_STACKTRACE_ROTATION_SIZE specifies the switching size (in bytes) of the log output destination file of the stack trace log of the asadmin utility command.

### Specifiable values

Type: Integer

An integer from 4096 to 16777216

### Default value

If the definition item is omitted:

```
16777216
```

If the value is omitted:

```
16777216
```

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_ASADMIN_STACKTRACE_ROTATION_SIZE=8388608
```

## 5.3.21 HJES_ASADMIN_STACKTRACE_ROTATION_TIME

`HJES_ASADMIN_STACKTRACE_ROTATION_TIME` specifies the time when the stack trace log files of the `asadmin` utility command are to be rotated.

### Description

`HJES_ASADMIN_STACKTRACE_ROTATION_TIME` specifies the time (in the *HHMMSS* format) when the log output destination files of the stack trace log of the `asadmin` utility command are to be switched.

### Specifiable values

Type: `String`

Value from 000000 to 235959 in the *HHMMSS* format

### Default value

If the definition item is omitted:

```
000000
```

If the value is omitted:

```
000000
```

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_ASADMIN_STACKTRACE_ROTATION_TIME=121530
```

## 5.3.22 HJES_LOGSDIR

HJES_LOGSDIR specifies the output destination directory of the Java EE Server log file.

### Description

HJES_LOGSDIR specifies a value for HJES_LOGSDIR to change the output destination directory of the Java EE Server log file.

### Specifiable values

Type: String

### Default value

If the definition item is omitted:

*installation_directory_for_Java_EE_Server*/logs

If the value is omitted:

*installation_directory_for_Java_EE_Server*/logs

### Overwrite permission

This value can be overwritten.

### Number of times it occurs

0 or 1

### Example

```
HJES_LOGSDIR=/home/user/logs
```

## 5.3.23 TZ

TZ specifies the time zone.

### Description

TZ specifies the time zone (in the TZ environment variable format) that is to be used for the server processes.

### Specifiable value

Type: String

## Default value

If the definition item is omitted:

Nothing is set.

If the value is omitted:

Nothing is set.

## Overwrite permission

This value can be overwritten.

## Number of times it occurs

0 or 1

## Example

```
TZ=JST-9
```

## 5.4 config.properties

`config.properties` files contain property settings for configuring a broker.

### Description

`config.properties` files contain property settings for configuring a broker.

The broker reads its instance configuration file only during startup.

To apply any changes to the configuration of the broker, you must restart the broker.

For property definitions in the `config.properties` file (or any configuration file) use the following syntax:

```
propertyName=value [ [,value1] ...]
```

### Storage location

`<IMQ_VARHOME>/instances/<instanceName>/props/config.properties`

*IMQ_VARHOME* is environment variable.

### Examples

```
imq.system.max_count=50000
```

## 5.5 Details of the properties to be specified in config.properties

This section describes the properties to be specified in config.properties.

### 5.5.1 imq.admincreate.topic.sharedConsumerFlowLimit

`imq.admincreate.topic.sharedConsumerFlowLimit` defines the maximum number of messages prefetched to a topic-shared subscriber or topic consumer in a Java EE Server cluster.

#### Description

`imq.admincreate.topic.sharedConsumerFlowLimit` defines the maximum number of messages prefetched to a topic-shared subscriber or topic consumer in a Java EE Server cluster.

The value of `0` or `-1` denotes an unlimited number of messages.

#### Specifiable values

Type: `Integer`

<Allowed values> `-1` to `2147483647`

#### Default value

If the definition item is omitted
`5`

### 5.5.2 imq.authentication.client.response.timeout

`imq.authentication.client.response.timeout` sets the interval (in seconds) to wait for the client response to authentication requests.

#### Description

`imq.authentication.client.response.timeout` property sets a timeout interval for authentication requests.

#### Specifiable values

Type: `Integer`

`0` to `2147483647`

#### Default value

If the definition item is omitted
`180`

## 5.5.3 imq.autocreate.destination.limitBehavior

imq.autocreate.destination.limitBehavior sets the broker behaviour on reaching the memory-limit threshold.

### Description

imq.autocreate.destination.limitBehavior sets the broker behaviour on reaching the memory-limit threshold:

- FLOW_CONTROL: Slow down producers.
- REMOVE_OLDEST: Remove the oldest messages.
- REMOVE_LOW_PRIORITY: Remove the lowest-priority messages according to age. Notifications are not sent to the client that generates these messages.
- REJECT_NEWEST: Reject newest messages and notify the producing client with an exception only if the message is persistent.

When the FLOW_CONTROL is specified, it is still possible for the number of messages to exceed imq.system.max_count. In this situation, the broker generates a ResourceAllocationException indicating that the destination is full and rejects new messages.

If the value is REMOVE_OLDEST or REMOVE_LOW_PRIORITY and the imq.autocreate.destination.useDMQ property is set as true, then excess messages are moved to the dead message queue.

### Specifiable values

Type: String

{FLOW_CONTROL|REMOVE_OLDEST |REMOVE_LOW_PRIORITY |REJECT_NEWEST}

### Default value

If the definition item is omitted
REJECT_NEWEST

## 5.5.4 imq.autocreate.destination.maxBytesPerMsg

imq.autocreate.destination.maxBytesPerMsg sets the maximum size (in bytes) of any single message.

### Description

imq.autocreate.destination.maxBytesPerMsg sets the maximum size (in Bytes) of any single message.

The value may be expressed in Bytes, Kilobytes, or Megabytes using the following suffixes:

b
Bytes

k
Kilobytes (1024 Bytes)

m

Megabytes (1024 x 1024 = 1,048,576 Bytes)

An unsuffixed value is expressed in bytes. Value of `0` and `-1` denotes an unlimited message size.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted

`10k`

### Example

```
imq.autocreate.destination.maxBytesPerMsg=<Examples>
```

In the above example, you can replace *Examples* with one of the following values:

- 1600: 1600 Bytes
- 1600b: 1600 Bytes
- 16k: 16 Kilobytes (= 16,384 Bytes)
- 16m: 16 Megabytes (= 16,777,216 Bytes)
- `-1`: No limit

## 5.5.5 imq.autocreate.destination.maxNumMsgs

`imq.autocreate.destination.maxNumMsgs` sets the maximum number of unconsumed messages.

### Description

`imq.autocreate.destination.maxNumMsgs` sets the maximum number of unconsumed messages.

### Specifiable values

Type: `Integer`

<Allowed values>`1` to `2147483647`

### Default value

If the definition item is omitted

`100000`

### Notes

When the flow control is in effect (`imq.autocreate.destination.limitBehavior` = `FLOW_CONTROL`), it is possible for the specified message limit to be exceeded because the broker cannot react immediately to stop the

flow of incoming messages. In such cases, the value specified for `imq.autocreate.destination.maxNumMsgs` serves as a hint for the broker rather than a strictly enforced limit.

However, if the number of unconsumed messages exceeds `imq.system.max_count`, then the broker generates `ResourceAllocationException` indicating that the destination is full and rejects new messages.

## 5.5.6 imq.autocreate.destination.maxTotalMsgBytes

`imq.autocreate.destination.maxTotalMsgBytes` sets the maximum total memory (in bytes) for unconsumed messages.

### Description

`imq.autocreate.destination.maxTotalMsgBytes` sets the maximum total memory (in bytes) for unconsumed messages.

The syntax is the same for `imq.autocreate.destination.maxBytesPerMsg`.

The value may be expressed in Bytes, Kilobytes, or Megabytes using the following suffixes:

`b`
: Bytes

`k`
: Kilobytes (1024 Bytes)

`m`
: Megabytes (1024 x 1024 = 1,048,576 Bytes)

An unsuffixed value is expressed in bytes. A value of `0` and `-1` denotes an unlimited message size.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
: `10m`

### Example

```
imq.autocreate.destination.maxTotalMsgBytes=<Examples>
```

In the above example, you can replace *Examples* with one of the following values:

- 1600: 1600 Bytes
- 1600b: 1600 Bytes
- 16k: 16 Kilobytes (= 16,384 Bytes)
- 16m: 16 Megabytes (= 16,777,216 Bytes)
- `-1`: No limit

## 5.5.7 imq.autocreate.destination.useDMQ

`imq.autocreate.destination.useDMQ` enables or disables sending dead messages to the dead message queue.

### Description

`imq.autocreate.destination.useDMQ` enables or disables sending dead messages to the dead message queue. If `false`, then dead messages are simply discarded.

### Specifiable values

Type: `Boolean`

{`true` | `false`}

### Default value

If the definition item is omitted

`true`

## 5.5.8 imq.autocreate.queue

`imq.autocreate.queue` enables or disables the auto-creation of the queue destinations.

### Description

`imq.autocreate.queue` enables or disables the auto-creation of the queue destinations.

If `true`, then the broker automatically creates a physical destination whenever a message consumer or message producer attempts to access a non-existent destination.

### Specifiable values

Type: `Boolean`

{`true` | `false`}

### Default value

If the definition item is omitted

`true`

### Notes

It is used with the queue destinations only.

## 5.5.9 imq.autocreate.queue.maxNumActiveConsumers

`imq.autocreate.queue.maxNumActiveConsumers` sets the maximum number of active message consumers in the load-balanced delivery from the queue destination.

### Description

`imq.autocreate.queue.maxNumActiveConsumers` sets the maximum number of active message consumers in the load-balanced delivery from the queue destination.

A value of `0` and `-1` denotes an unlimited number of consumers.

### Specifiable values

Type: `Integer`

<Allowed values> `-1` to `2147483647`

### Default value

If the definition item is omitted

```
-1
```

### Notes

It is used with only the queue destinations.

## 5.5.10 imq.autocreate.queue.maxNumBackupConsumers

`imq.autocreate.queue.maxNumBackupConsumers` sets the maximum number of backup message consumers in the load-balanced delivery from the queue destination.

### Description

`imq.autocreate.queue.maxNumBackupConsumers` sets the maximum number of backup message consumers in the load-balanced delivery from the queue destination.

A value of `-1` denotes an unlimited number of consumers.

### Specifiable values

Type: `Integer`

`-1` to `2147483647`

### Default value

If the definition item is omitted

```
0
```

### Notes

It is used only with the queue destinations.

## 5.5.11 imq.autocreate.topic

`imq.autocreate.topic` enables or disables the auto-creation of topic destinations.

### Description

`imq.autocreate.topic` enables or disables the auto-creation of topic destinations.

### Specifiable values

Type: `Boolean`

`{true|false}`

### Default value

If the definition item is omitted

```
true
```

### Notes

It is used only with the topic destinations.

## 5.5.12 imq.autocreate.topic.consumerFlowLimit

`imq.autocreate.topic.consumerFlowLimit` sets the maximum number of messages delivered to the topic consumer in a single batch.

### Description

`imq.autocreate.topic.consumerFlowLimit` sets the maximum number of messages delivered to the topic consumer in a single batch.

A value of `0` or `-1` denotes an unlimited number of messages.

### Specifiable values

Type: `Integer`

`-1` to `2147483647`

### Default value

If the definition item is omitted

```
1000
```

### Notes

Not used when the JMS resource adapter (jmsra) is used to consume messages in a Java EE Server cluster.

It is used only for the topic destinations.

## 5.5.13 imq.autocreate.topic.sharedConsumerFlowLimit

`imq.autocreate.topic.sharedConsumerFlowLimit` sets the maximum number of messages pre-fetched to a topic-shared subscriber or a topic consumer in the Java EE Server cluster.

### Description

`imq.autocreate.topic.sharedConsumerFlowLimit` sets the maximum number of messages pre-fetched to a topic-shared subscriber or a topic consumer in the Java EE Server cluster.

A value of `0` or `-1` denotes an unlimited number of messages.

### Specifiable values

Type: `Integer`

`-1` to `2147483647`

### Default value

If the definition item is omitted
`5`

### Notes

It is used only with the topic destinations.

## 5.5.14 imq.destination.DMQ.truncateBody

`imq.destination.DMQ.truncateBody` enables or disables removal of the message body before storing it in the dead message queue.

### Description

`imq.destination.DMQ.truncateBody` enables or disables removal of the message body before storing it in the dead message queue.

If set to `true`, then only the message header and property data is saved.

### Specifiable values

Type: `Boolean`

`{true|false}`

### Default value

If the definition item is omitted
    `false`

## 5.5.15 imq.hostname

`imq.hostname` sets the default host name or IP address for all the connection services.

### Description

`imq.hostname` sets the default host name or IP address for all the connection services.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
    *<All available IP addresses>*

## 5.5.16 imq.persist.file.destination.message.filepool.limit

`imq.persist.file.destination.message.filepool.limit` sets the maximum number of free files available for reuse in the destination file pool.

### Description

`imq.persist.file.destination.message.filepool.limit` sets the maximum number of free files available for reuse in the destination file pool.

Free files in excess of this limit are deleted. The broker creates and deletes additional files in excess of the limit as required.

The higher the limit, the faster the broker processes the persistent data.

### Specifiable values

Type: `Integer`

`0` to `2147483647`

### Default value

If the definition item is omitted
    `100`

## 5.5.17 imq.persist.file.message.cleanup

`imq.persist.file.message.cleanup` enables or disables the cleaning up of files in the free file pools on shutdown.

### Description

`imq.persist.file.message.cleanup` enables or disables the cleaning up of files in the free file pools on shutdown.

Setting this property to `true` saves disk space for the file store, but slows the broker shutdown.

### Specifiable values

Type: `Boolean`

{`true` | `false`}

### Default value

If the definition item is omitted

`false`

## 5.5.18 imq.persist.file.message.filepool.cleanratio

`imq.persist.file.message.filepool.cleanratio` defines the percentage of files in the free file pools to be maintained in a clean (empty) state.

### Description

`imq.persist.file.message.filepool.cleanratio` defines the percentage of files in the free file pools to be maintained in a clean (empty) state.

The higher this value, the lesser disk space is required for the file pool. However, an increase in the processing load is required to clean files during operation.

### Specifiable values

Type: `Integer`

`0` to `100`

### Default value

If the definition item is omitted

`0`

## 5.5.19 imq.persist.file.message.max_record_size

`imq.persist.file.message.max_record_size` defines the maximum-size of the message to be added to the message storage file.

### Description

`imq.persist.file.message.max_record_size` defines the maximum-size of the message to be added to the message storage file.

Any message exceeding this size is stored in a separate file of its own.

The value may be expressed in Bytes, Kilobytes, or Megabytes using the following suffixes:

`b`
: Bytes

`k`
: Kilobytes (1024 Bytes)

`m`
: Megabytes (1024 x 1024 = 1,048,576 Bytes)

An unsuffixed value is expressed in Bytes.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
: `1m`

### Example

```
imq.persist.file.message.max_record_size=<Examples>
```

In the above example, you can replace *Examples* with one of the following values:

- 1600: 1600 Bytes
- 1600b: 1600 Bytes
- 16k: 16 Kilobytes (= 16,384 Bytes)
- 16m: 16 Megabytes (= 16,777,216 Bytes)

## 5.5.20 imq.persist.file.sync.enabled

`imq.persist.file.sync.enabled` enables or disables synchronize in-memory state with the physical storage device.

### Description

imq.persist.file.sync.enabled enables or disables synchronize in-memory state with the physical storage device.

Setting this property to true eliminates data loss due to system crashes, but at a cost in terms of performance.

### Specifiable values

Type: Boolean

{true|false}

### Default value

If the definition item is omitted
    false

## 5.5.21 imq.service.activelist

imq.service.activelist is the list of connection services to be activated at broker startup, separated by commas.

### Description

imq.service.activelist is the list of connection services to be activated at broker startup, separated by commas. The available connection services are:

- jms
- ssljms
- httpjms
- httpsjms
- admin
- ssladmin

By setting a broker imq.service.activelist property, it configures to run any or all of these connection services. The value of this property is a list of connection services to be activated when the broker is started. If the property is not specified explicitly, then the jms and admin services are activated by default.

### Specifiable values

Type: String

[[jms]|[ssljms]|[httpjms]|[httpsjms]|[admin]|[ssladmin]]

### Default value

If the definition item is omitted
    jms,admin

## 5.5.22 imq.system.max_count

`imq.system.max_count` sets the maximum number of messages held by the broker.

### Description

`imq.system.max_count` sets the maximum number of messages held by the broker.

A value of `0` and `-1` denotes an unlimited message count.

### Specifiable values

Type: `Integer`

`-1` to `2147483647`

### Default value

If the definition item is omitted
`-1`

## 5.5.23 imq.system.max_size

`imq.system.max_size` sets the maximum total size of the messages held by the broker.

### Description

`imq.system.max_size` sets the maximum total size of the messages held by the broker.

The value may be expressed in Bytes, Kilobytes, or Megabytes using the following suffixes:

`b`
Bytes

`k`
Kilobytes (1024 Bytes)

`m`
Megabytes (1024 x 1024 = 1,048,576 Bytes)

A value of `0` and `-1` denotes an unlimited message count.

### Specifiable values

Type: `String`

### Default value

If the definition item is omitted
`-1`

## 5.5.24 imq.txn.reapInterval

`imq.txn.reapInterval` sets the interval (in seconds) in which the reaper thread reaps or cleans periodically for committed transactions.

### Description

`imq.txn.reapInterval` sets the interval (in seconds) for the reaper thread to periodically reap or clean the committed transactions.

### Specifiable values

Type: `Integer`

`0` to `2147483647`

### Default value

If the definition item is omitted

```
900
```

## 5.5.25 imq.txt.reapLimit

`imq.txt.reapLimit` specifies the maximum number of transactions that were committed last, to be retained while reaping or cleaning the committed transactions.

### Description

`imq.txt.reapLimit` specifies the maximum number of transactions that were committed last, to be retained while reaping or cleaning the committed transactions.

### Specifiable values

Type: `Integer`

`0` to `2147483647`

### Default value

If the definition item is omitted

```
0
```

## 5.5.26 java.util.logging.FileHandler.count

`java.util.logging.FileHandler.count` specifies the number of output files to cycle through.

### Description

`java.util.logging.FileHandler.count` specifies the number of output files to cycle through.

For a rotating set of files, a file is closed, rotated out, and a new file is created when each file reaches the specified size limit. Older files are renamed by adding values such as 0, 1, and 2 to the base file name.

By default, buffering is enabled in the IO libraries, however, each log record is flushed out when it is complete.

### Specifiable values

Type: `Integer`

`1` to `2147483647`

### Default value

If the definition item is omitted
`8`

## 5.5.27 java.util.logging.FileHandler.level

`java.util.logging.FileHandler.level` specifies the default level for the file handler.

### Description

`java.util.logging.FileHandler.level` specifies the default level for the file handler.

The logging Level objects are ordered and are specified by ordered integers. Enabling logging at a given level also enables logging at all higher levels.

Level `OFF` turns off logging.

### Specifiable values

Type: `String`

{`SEVERE` (highest value) | `WARNING` | `INFO` | `CONFIG` | `FINE` | `FINER` | `FINEST` | `ALL` | `OFF`}

### Default value

If the definition item is omitted
`ALL`

## 5.5.28 java.util.logging.FileHandler.limit

`java.util.logging.FileHandler.limit` specifies an approximate maximum amount to write (in bytes) to any one file. If this is zero, then there is no limit.

### Description

`java.util.logging.FileHandler.limit` specifies an approximate maximum amount to write (in bytes) to any one file. If this is zero, then there is no limit.

## Specifiable values

Type: Integer

0 to 2147483647

## Default value

If the definition item is omitted
    16777216

## 5.6 das.properties

The `das.properties` file contains the connection information for the node agent, which is connected to the Domain Administration Server (DAS).

### Description

`das.properties` file contains the connection information for the node agent, which is connected to the DAS.

### Storage location

```
<install-dir>/nodes/<node-name>/agent/config/das.properties
```

## 5.7 Details of the properties to be specified in das.properties

This section describes the properties to be specified in das.properties.

### 5.7.1 agent.das.host

`agent.das.host` changes the host name or the IP address for the domain administration server (DAS).

#### Description

`agent.das.host` changes the host name or the IP address of the DAS, which administrates the server instance.

#### Specifiable values

Type: `String` (The Host name or the IP address of the DAS)

#### Initial value

`localhost`

#### Default value

If the definition item is omitted
`localhost`

# 6 Original properties that can be set for the standard API used in Java EE servers

This section describes the original properties that can be set for the standard API used in Java EE servers.

# 6.1 List of original properties that can be set for the standard API used in Java EE servers

This section provides an overview of the original properties that can be set through the standard API.

## Properties used to connect to the SMTP server in JavaMail

| Property | Overview | Details |
|---|---|---|
| 6.2.1 mail.smtp.allow8bitmime | Supporting 8BITMIME extension | If this value is set to `true` and the server supports the 8BITMIME extension, then the text parts of the messages that use the quoted-printable or base64 encodings are converted to use the 8-bit encoding. |
| 6.2.2 mail.smtp.auth | Attempting to authenticate user using `AUTH` command | When `mail.smtp.auth` is set to `true`, it attempts to authenticate the user using the `AUTH` command. |
| 6.2.3 mail.smtp.connectiontimeout | Specifying socket connection time-out value in milliseconds | `mail.smtp.connectiontimeout` specifies the socket connection time-out value in milliseconds. |
| 6.2.4 mail.smtp.ehlo | Attempting to logon with the `EHLO` command | When `mail.smtp.ehlo` is set to `false`, it does not attempt to logon with the `EHLO` command. |
| 6.2.5 mail.smtp.localhost | Apecifying name of localhost | `mail.smtp.localhost` specifies the name of the localhost that is used in the `SMTP HELO` or `EHLO` commands. |
| 6.2.6 mail.smtp.sendpartial | Sending mail only to valid address | If set to `true` and the message has both valid and invalid addresses, then the message is sent and a partial failure is reported with the SendFailedException exception. |
| 6.2.7 mail.smtp.ssl.protocols | Specifying SSL protocols that are enabled for SSL connections | `mail.smtp.ssl.protocols` specifies the SSL protocols that are enabled for SSL connections. |
| 6.2.8 mail.smtp.timeout | Specifying socket read time-out value in milliseconds | `mail.smtp.timeout` specifies the socket read time-out value in milliseconds. |
| 6.2.9 mail.smtp.writetimeout | Specifying socket write time-out value in milliseconds | `mail.smtp.writetimeout` specifies the socket write time-out value in milliseconds. |

## Properties used to connect to the IMAP server in JavaMail

| Property | Overview | Details |
|---|---|---|
| 6.3.1 mail.imap.connectiontimeout | Specifying socket connection time-out value in milliseconds | `mail.imap.connectiontimeout` specifies the socket connection time-out value in milliseconds. |
| 6.3.2 mail.imap.fetchsize | Specifying partial fetch size in bytes | `mail.imap.fetchsize` specifies the partial fetch size in bytes. |
| 6.3.3 mail.imap.peek | Avoiding setting SEEN flag on messages | When `mail.imap.peek` is set to `true`, it uses the `IMAP PEEK` option while fetching body parts, to avoid setting the SEEN flag on messages. |
| 6.3.4 mail.imap.ssl.protocols | Specifying SSL protocols that are enabled for SSL connections | `mail.imap.ssl.protocols` specifies the SSL protocols that are enabled for SSL connections. |
| 6.3.5 mail.imap.statuscachetimeout | Specifying time-out value in milliseconds for cache of `STATUS` command response | `mail.imap.statuscachetimeout` specifies the time-out value in milliseconds for the cache of the `STATUS` command response. |
| 6.3.6 mail.imap.timeout | Specifying socket read time-out value in milliseconds | `mail.imap.timeout` specifies the socket read time-out value in milliseconds. |

| Property | Overview | Details |
|---|---|---|
| 6.3.7 mail.imap.writetimeout | Specifying socket write time-out value in milliseconds | `mail.imap.writetimeout` specifies the socket write time-out value in milliseconds. |

## 6.2 Details of the properties used for connecting to the SMTP server in JavaMail

This section describes the properties used for connecting to the SMTP server in JavaMail.

### 6.2.1 mail.smtp.allow8bitmime

When `mail.smtp.allow8bitmime` is set to `true`, the server supports the 8BITMIME extension.

#### Description

If this value is set to `true` and the server supports the 8BITMIME extension, then the text parts of the messages that use the quoted-printable or base64 encodings are converted to use the 8-bit encoding, provided that they follow the RFC2045 rules for the 8-bit text. The default value is `false`.

#### Specifiable values

Type: `Boolean`

`{true|false}`

#### Default value

If the definition item is omitted

`false`

#### Example

```
Properties properties = new Properties();
properties.setProperty("mail.smtp.allow8bitmime", "true");
Session session = Session.getDefaultInstance(properties);
Message message = new MimeMessage(session);
message.setSubject(sentDate);
Transport.send(message);
```

### 6.2.2 mail.smtp.auth

When `mail.smtp.auth` is set to `true`, it attempts to authenticate the user using the `AUTH` command. The default value is `false`.

#### Description

When `mail.smtp.auth` is set to `true`, it attempts to authenticate the user using the `AUTH` command. The default value is `false`.

#### Specifiable values

Type: `Boolean`

{true|false}

### Default value

If the definition item is omitted
   false

### Examples

```
Properties properties = new Properties();
properties.setProperty("mail.smtp.auth", "true");
Session session = Session.getDefaultInstance(properties);
Message message = new MimeMessage(session);
message.setSubject(sentDate);
Transport.send(message);
```

## 6.2.3 mail.smtp.connectiontimeout

mail.smtp.connectiontimeout specifies the socket connection time-out value in milliseconds.

### Description

mail.smtp.connectiontimeout specifies the socket connection time-out value in milliseconds. This time-out is implemented using java.net.Socket. The default value is -1. If the time-out value is 0 or the default value, then it is interpreted as an infinite time-out.

### Specifiable values

Type: Integer

-1 to 2147483647

### Default value

If the definition item is omitted
   -1

### Example

```
Properties properties = new Properties();
properties.setProperty("mail.smtp.connectiontimeout", "30");
Session session = Session.getDefaultInstance(properties);
Message message = new MimeMessage(session);
message.setSubject(sentDate);
Transport.send(message);
```

## 6.2.4 mail.smtp.ehlo

When mail.smtp.ehlo is set to false, it does not attempt to logon with the EHLO command.

### Description

When mail.smtp.ehlo is set to false, it does not attempt to logon with the EHLO command. The default value is true. Normally failure of the EHLO command will fallback to the HELO command. This property exists only for the servers where the EHLO command does not fail completely or the EHLO command is not implemented correctly.

### Specifiable values

Type: Boolean

{true|false}

### Default value

If the definition item is omitted

true

### Examples

```
Properties properties = new Properties();
properties.setProperty("mail.smtp.ehlo", "false");
Session session = Session.getDefaultInstance(properties);
Message message = new MimeMessage(session);
message.setSubject(sentDate);
Transport.send(message);
```

## 6.2.5 mail.smtp.localhost

mail.smtp.localhost specifies the name of the localhost that is used in the SMTP HELO or EHLO commands.

### Description

mail.smtp.localhost specifies the name of the localhost that is used in the SMTP HELO or EHLO commands. The default value is InetAddress.getLocalHost().getCanonicalHostName(). If the JDK and naming service are configured correctly, then you are not required set the name of the localhost.

### Specifiable values

Type: String

### Default value

If the definition item is omitted

*Return value of java.net.InetAddress.getLocalHost().getCanonicalHostName()*

### Example

```
Properties properties = new Properties();
properties.setProperty("mail.smtp.localhost", "localhost");
Session session = Session.getDefaultInstance(properties);
Message message = new MimeMessage(session);
```

```
message.setSubject(sentDate);
Transport.send(message);
```

## 6.2.6 mail.smtp.sendpartial

When `mail.smtp.sendpartial` is set to `true`, and the message has an invalid address, then the mail is sent only to the valid address. In this case, SendFailedException is reported as partial failure for all the invalid addresses. If set to `false`, then the message is not sent to any of the addresses.

### Description

If set to `true` and the message has both valid and invalid addresses, then the message is sent and a partial failure is reported with the SendFailedException exception. If set to `false` (the default value) and an invalid recipient address exists, then the message is not sent to any of the recipients.

### Specifiable values

Type: `Boolean`

{`true` | `false`}

### Default value

If the definition item is omitted

`false`

### Example

```
Properties properties = new Properties();
properties.setProperty("mail.smtp.sendpartial", "true");
Session session = Session.getDefaultInstance(properties);
Message message = new MimeMessage(session);
message.setSubject(sentDate);
Transport.send(message);
```

## 6.2.7 mail.smtp.ssl.protocols

`mail.smtp.ssl.protocols` specifies the SSL protocols that are enabled for SSL connections.

### Description

`mail.smtp.ssl.protocols` specifies the SSL protocols that are enabled for SSL connections. The property value is a blank space-separated list of tokens valid for the javax.net.ssl.SSLSocket.setEnabledProtocols method.

### Specifiable values

Type: `String`

For details, refer to JDK documentation.

### Default value

If the definition item is omitted

`TLSv1.1`, `TLSv1.2`

### Example

```
Properties properties = new Properties();
properties.setProperty("mail.smtp.ssl.protocols", "TLSv1 TLSv1.1");
Session session = Session.getDefaultInstance(properties);
Message message = new MimeMessage(session);
message.setSubject(sentDate);
Transport.send(message);
```

## 6.2.8 mail.smtp.timeout

`mail.smtp.timeout` specifies the socket read time-out value in milliseconds.

### Description

`mail.smtp.timeout` specifies the socket read time-out value in milliseconds. This time-out is implemented using java.net.Socket. The default value is `-1`. If the time-out value is `0` or the default value, then it is interpreted as an infinite time-out.

### Specifiable values

Type: `Integer`

`-1` to `2147483647`

### Default value

If the definition item is omitted

`-1`

### Example

```
Properties properties = new Properties();
properties.setProperty("mail.smtp.timeout", "30");
Session session = Session.getDefaultInstance(properties);
Message message = new MimeMessage(session);
message.setSubject(sentDate);
Transport.send(message);
```

## 6.2.9 mail.smtp.writetimeout

`mail.smtp.writetimeout` specifies the socket write time-out value in milliseconds.

## Description

`mail.smtp.writetimeout` specifies the socket write time-out value in milliseconds. This time-out is implemented using java.util.concurrent.ScheduledExecutorService per connection, which schedules a thread to close the socket if the time-out expires. Thus, the overhead of using `mail.smtp.writetimeout` is one thread per connection. The default value is `-1`. If the time-out value is `0` or the default value, then it is interpreted as an infinite time-out.

## Specifiable values

Type: `Integer`

`-1` to `2147483647`

## Default value

If the definition item is omitted

`-1`

## Example

```
Properties properties = new Properties();
properties.setProperty("mail.smtp.writetimeout", "30");
Session session = Session.getDefaultInstance(properties);
Message message = new MimeMessage(session);
message.setSubject(sentDate);
Transport.send(message);
```

# 6.3 Details of the properties used for connecting to the IMAP server in JavaMail

This section describes the properties used for connecting to the IMAP server in JavaMail.

## 6.3.1 mail.imap.connectiontimeout

`mail.imap.connectiontimeout` specifies the socket connection time-out value in milliseconds.

### Description

`mail.imap.connectiontimeout` specifies the socket connection time-out value in milliseconds. This time-out is implemented using java.net.Socket. The default value is `-1`. If the time-out value is `0` or the default value, then it is interpreted as an infinite time-out.

### Specifiable values

Type: `Integer`

`-1` to `2147483647`

### Default value

If the definition item is omitted

`-1`

### Example

```
Properties properties = new Properties();
properties.setProperty("mail.imap.connectiontimeout", "30");
Session session = Session.getDefaultInstance(properties);
Store store = session.getStore("imap");
store.connect("user", "password");
messages = folder.getMessages();
```

## 6.3.2 mail.imap.fetchsize

`mail.imap.fetchsize` specifies the partial fetch size in bytes. The default value is 16 kilobyte.

### Description

`mail.imap.fetchsize` specifies the partial fetch size in bytes. The default value is 16 kilobyte.

### Specifiable values

Type: `Integer`

`0` to `2147483647`

### Default value

If the definition item is omitted

16384

### Example

```
Properties properties = new Properties();
properties.setProperty("mail.imap.fetchsize", "1000");
Session session = Session.getDefaultInstance(properties);
Store store = session.getStore("imap");
store.connect("user", "password");
messages = folder.getMessages();
```

## 6.3.3 mail.imap.peek

When `mail.imap.peek` is set to `true`, it uses the `IMAP PEEK` option while fetching body parts, to avoid setting the SEEN flag on messages.

### Description

When `mail.imap.peek` is set to `true`, it uses the `IMAP PEEK` option while fetching body parts, to avoid setting the SEEN flag on messages. The default value is `false`. This option can be overridden for individual messages by using the setPeek method on IMAPMessage.

### Specifiable values

Type: `Boolean`

{`true` | `false`}

### Default value

If the definition item is omitted

`false`

### Example

```
Properties properties = new Properties();
properties.setProperty("mail.imap.peek", "true");
Session session = Session.getDefaultInstance(properties);
Store store = session.getStore("imap");
store.connect("user", "password");
messages = folder.getMessages();
```

## 6.3.4 mail.imap.ssl.protocols

`mail.imap.ssl.protocols` specifies the SSL protocols that are enabled for SSL connections.

### Description

`mail.imap.ssl.protocols` specifies the SSL protocols that are enabled for SSL connections. The property value is a blank space-separated list of tokens valid for the javax.net.ssl.SSLSocket.setEnabledProtocols method.

### Specifiable values

Type: `String`

For details, refer to JDK documentation.

### Default value

If the definition item is omitted

`TLSv1.1`, `TLSv1.2`

### Example

```
Properties properties = new Properties();
properties.setProperty("mail.imap.ssl.protocols", "TLSv1  TLSv1.1");
Session session = Session.getDefaultInstance(properties);
Message message = new MimeMessage(session);
message.setSubject(sentDate);
Transport.send(message);
```

## 6.3.5 mail.imap.statuscachetimeout

`mail.imap.statuscachetimeout` specifies the time-out value in milliseconds for the cache of the `STATUS` command response.

### Description

`mail.imap.statuscachetimeout` specifies the time-out value in milliseconds for the cache of the `STATUS` command response. The default value is `1000` (1 second). If the value is `0`, then the cache is disabled.

### Specifiable values

Type: `Integer`

`0` to `2147483647`

### Default value

If the definition item is omitted

`1000`

### Examples

```
Properties properties = new Properties();
properties.setProperty("mail.imap.statuscachetimeout", "30");
Session session = Session.getDefaultInstance(properties);
Store store = session.getStore("imap");
```

```
store.connect("user", "password");
messages = folder.getMessages();
```

## 6.3.6 mail.imap.timeout

`mail.imap.timeout` specifies the socket read time-out value in milliseconds.

### Description

`mail.imap.timeout` specifies the socket read time-out value in milliseconds. This time-out is implemented using java.net.Socket. The default value is `-1`. If the time-out value is `0` or the default value, then it is interpreted as an infinite time-out.

### Specifiable values

Type: `Integer`

`-1` to `2147483647`

### Default value

If the definition item is omitted
`-1`

### Example

```
Properties properties = new Properties();
properties.setProperty("mail.imap.timeout", "30");
Session session = Session.getDefaultInstance(properties);
Store store = session.getStore("imap");
store.connect("user", "password");
messages = folder.getMessages();
```

## 6.3.7 mail.imap.writetimeout

`mail.imap.writetimeout` specifies the socket write time-out value in milliseconds.

### Description

`mail.imap.writetimeout` specifies the socket write time-out value in milliseconds. This time-out is implemented using java.util.concurrent.ScheduledExecutorService per connection, which schedules a thread to close the socket if the time-out expires. Thus, the overhead of using `mail.imap.writetimeout` is one thread per connection. The default value is `-1`. If the time-out value is `0` or the default value, then it is interpreted as an infinite time-out.

### Specifiable values

Type: `Integer`

`-1` to `2147483647`

## Default value

If the definition item is omitted

-1

## Example

```
Properties properties = new Properties();
properties.setProperty("mail.imap.writetimeout", "30");
Session session = Session.getDefaultInstance(properties);
Store store = session.getStore("imap");
store.connect("user", "password");
messages = folder.getMessages();
```

# 7 Options and properties used in Java VM

This chapter describes the options and properties used for tuning Java VM.

# 7.1 Options and properties used in Java VM

This section describes an overview of all options and properties used in Java VM. This section also describes an overview of the environment variables used in Java VM.

## Notes

- The default values of the Java VM options and properties described here might differ from the default values of the servers.
- For details on the default values of the servers, see the description *Changing Java VM options by using the create-jvm-options subcommand* in the *User's Guide*.

## Java VM options used for list displays

| Option | Overview | Details |
|---|---|---|
| 7.2.1 -XX:+Hitachi | Displaying a list of extended Java VM options | Displays a list of extended Java VM options. |

## Java VM options used for the extended thread dump functionality

| Option | Overview | Details |
|---|---|---|
| 7.3.1 -XX:[+\|-]HitachiThreadDump | Outputting extended thread dump information | Specifies whether to output extended thread dump information. |
| 7.3.2 -XX:[+\|-]HitachiThreadDumpToStdout | Outputting extended thread dumps to the standard output | Specifies whether to output extended thread dumps to the standard output. |
| 7.3.3 -XX:[+\|-]HitachiThreadDumpWithBlockCount | Outputting the following information as the thread information of extended thread dumps: the number of times that thread processing was blocked and the number of times the thread was in the wait status | Specifies whether to output the following information as the thread information of extended thread dumps: the number of times that thread processing was blocked and the number of times the thread was in the wait status. |
| 7.3.4 -XX:[+\|-]HitachiThreadDumpWithCpuTime | Outputting the following information as the thread information of extended thread dumps: user CPU time and kernel CPU time | Specifies whether to output the following information as the thread information of extended thread dumps: user CPU time and kernel CPU time. |
| 7.3.5 -XX:[+\|-]HitachiThreadDumpWithHashCode | Outputting hash codes as the thread information of extended thread dumps | Specifies whether to output hash codes as the thread information of extended thread dumps. |

## Java VM options used for Java VM log files

| Option | Overview | Details |
|---|---|---|
| 7.4.1 -XX:HitachiJavaLog | Specifying the prefix and the output-destination directory of Java VM log files | Specifies the prefix and the output-destination directory of Java VM log files. |
| 7.4.2 -XX:HitachiJavaLogFileSize | Specifying the maximum size for each Java VM log file | Specifies the maximum size for a single log file. This specification prevents the size of log files from increasing. If the size of a file reaches the maximum size, no logs are output to the file. |

| Option | Overview | Details |
|---|---|---|
| 7.4.3 -XX:[+\|-]HitachiJavaLogNoMoreOutput | Specifying how to output log information if an input or output error occurs during log file creation | Specifies how to output log information if an input or output error occurs during log file creation. Note that Java VM continues processing regardless of the specified value. This option applies to Java VM log files and the log files for the explicit memory management functionality. |
| 7.4.4 -XX:HitachiJavaLogNumberOfFile | Specifying the maximum number of Java VM log files that are to be created | Specifies the maximum number of Java VM log files that are to be created. This specification prevents the number of created files from increasing. |
| 7.4.5 -XX:[+\|-]JavaLogAsynchronous | Enabling or disabling the asynchronous output functionality for log files | Specifies whether to enable or disable the asynchronous output functionality for log files. |
| 7.4.6 -XX:[+\|-]JavaLogHeaderOutput | Outputting the header information when a Java VM log file is opened | Specifies whether to output the header information when a Java VM log file is opened. The header information contains the following information: the Java VM version in the 1st line, and the startup command line information in the 2nd line. You must take into account the size of the output header information when specifying the maximum file size for the `-XX:HitachiJavaLogFileSize` option. This option applies to Java VM log files and the log files for the explicit memory management functionality. |
| 7.4.7 -XX:JavaLogRotationTime | Specifying the rotation time of the Java VM log file | If the rotation type of the Java VM log file is the shift type, specify the time when the storage destination file is to be switched for this option. This option applies to Java VM log files and the log files for the explicit memory management functionality. The Java VM log file will be switched at the time specified in this option. |
| 7.4.8 -XX:JavaLogRotationType | Specifying the rotation type of the Java VM log file | Specifies the rotation type of the Java VM log file. This option applies to Java VM log files and the log files for the explicit memory management functionality. |

## Java VM option used for the detailed time output

| Option | Overview | Details |
|---|---|---|
| 7.5.1 -XX:[+\|-]HitachiOutputMilliTime | Outputting the time (accurate to the millisecond) to the Java VM log file | Specifies whether to output the time accurate to the millisecond. This option applies to Java VM log files and the log files for the explicit memory management functionality. |

## Java VM options used for the extended verbosegc functionality

| Option | Overview | Details |
|---|---|---|
| 7.6.1 -XX:[+\|-]HitachiCommaVerboseGC | Outputting the extended verbosegc information in CSV format | Specifies whether to output the extended verbosegc information in CSV format. |
| 7.6.2 -XX:[+\|-]HitachiVerboseGC | Outputting the extended verbosegc information to the Java VM log file when a GC occurs | Specifies whether to output the extended verbosegc information when a GC occurs. |
| 7.6.3 -XX:[+\|-]HitachiVerboseGCCpuTime | Outputting the user CPU time and the kernel CPU time as the extended verbosegc information | Specifies whether to output the CPU usage time as the extended verbosegc information. |
| 7.6.4 -XX:HitachiVerboseGCIntervalTime | Specifying the interval (in seconds) for outputting the extended verbosegc information | Specifies the interval (in seconds) for outputting the extended verbosegc information. |

| Option | Overview | Details |
|---|---|---|
| 7.6.5 -XX:[+\|-]HitachiVerboseGCPrintCause | Outputting details on the causes of GCs | Specifies whether to output details on the causes of GCs. |
| 7.6.6 -XX:[+\|-]HitachiVerboseGCPrintDate | Outputting the date and time when a GC started to the extended verbosegc information | Specifies whether to output the date and time when a GC started to the extended verbosegc information. |
| 7.6.7 -XX:[+\|-]HitachiVerboseGCPrintDeleteOnExit | Outputting the following information to the Java VM log file: the cumulative heap size allocated by Java VM when java.io.File.deleteOnExit() was called, and the number of times the method was called | Specifies whether to output the following information to the Java VM log file: the cumulative heap size allocated by Java VM when java.io.File.deleteOnExit() was called, and the number of times the method was called. |
| 7.6.8 -XX:[+\|-]HitachiVerboseGCPrintJVMInternalMemory | Outputting the heap information that is internally managed by Java VM, to the Java VM log file | Specifies whether to output the heap information that is internally managed by Java VM, to the Java VM log file. |
| 7.6.9 -XX:[+\|-]HitachiVerboseGCPrintTenuringDistribution | Outputting the age distribution for the Survivor area to the Java VM log file | Specifies whether to output the age distribution for the Survivor area to the Java VM log file when `-XX:+PrintTenuringDistribution` is specified. |
| 7.6.10 -XX:[+\|-]HitachiVerboseGCPrintThreadCount | Outputting the number of Java threads to the Java VM log file | Specifies whether to output the number of Java threads to the Java VM log file. This information can be used to monitor the number of Java threads. |

## Java VM options used for the functionality that outputs the code cache area information

| Option | Overview | Details |
|---|---|---|
| 7.7.1 -XX:CodeCacheInfoPrintRatio | Specifying the usage threshold rate of the code cache area | Specifies the usage rate of the code cache area. This is the rate at which a message is output to indicate that usage has reached the threshold value. |
| 7.7.2 -XX:[+\|-]PrintCodeCacheFullMessage | Outputting a message to the Java VM log file when the code cache area becomes insufficient during JIT compilation of a Java method | Specifies whether to output a message to the Java VM log file when the code cache area becomes insufficient during JIT compilation of a Java method. |
| 7.7.3 -XX:[+\|-]PrintCodeCacheInfo | Specifying whether to output the following information to the Java VM log file: the usage rate of the code cache area and the message informing the user that usage has reached the threshold value | Specifies whether to output the usage rate of the code cache area. In addition, this option specifies whether to output the message informing the user that usage has reached the threshold value, to the Java VM log file. |

## Java VM options used for the extended functionality when an OutOfMemoryError occurs

| Option | Overview | Details |
|---|---|---|
| 7.8.1 -XX:[+\|-]HitachiOutOfMemoryAbort | Enabling or disabling the functionality that forcibly terminates processing when an OutOfMemoryError occurs | If an OutOfMemoryError occurs, a message is output to the standard output and processing is forcibly terminated. |
| 7.8.2 -XX:[+\|-]HitachiOutOfMemoryAbortThreadDump | Outputting thread dumps when an OutOfMemoryError occurs | Thread dumps are output when an OutOfMemoryError occurs. When the C heap in the J2SE class library is insufficient, thread dumps are not output, to prevent the recurrence of C heap insufficiency due to the output of thread dumps. |

| Option | Overview | Details |
|---|---|---|
| 7.8.3 -XX:[+\|-]HitachiOutOfMemoryAbortThreadDumpWithJHeapProf | Outputting class-wise statistics to the thread dump log file that is output when an OutOfMemoryError occurs | Specify whether to output class-wise statistics to the output thread dump log file that is output when `-XX:+HitachiOutOfMemoryAbortThreadDump` is specified.<br>If G1GC is used, this functionality is disabled. If the option that enables this functionality is specified when G1GC is being used, the specification is not applied, and this functionality is disabled. |
| 7.8.4 -XX:[+\|-]HitachiOutOfMemoryCause | Outputting the cause type when an OutOfMemoryError occurs | Specifies whether to output the cause type when an OutOfMemoryError occurs. |
| 7.8.5 -XX:[+\|-]HitachiOutOfMemorySize | Outputting the memory size requested when an OutOfMemoryError occurs | Outputs the memory size requested when an OutOfMemoryError occurs. |
| 7.8.6 -XX:[+\|-]HitachiOutOfMemoryStackTrace | Outputting the exception information and the stack trace to the Java VM log file when an OutOfMemoryError occurs | Specifies whether to output the exception information and the stack trace to the Java VM log file when an OutOfMemoryError occurs. |
| 7.8.7 -XX:HitachiOutOfMemoryStackTraceLineSize | Specifying the number of characters (in bytes) per line of the stack trace that is output when an OutOfMemoryError occurs | Specifies the number of characters (in bytes) per line of the stack trace that is output when an OutOfMemoryError occurs. |

## Java VM options used for the class library trace functionality

| Option | Overview | Details |
|---|---|---|
| 7.9.1 -XX:[+\|-]HitachiJavaClassLibTrace | Outputting the stack trace for the class library | Outputs the stack trace for the API to the Java VM log file when a method that affects the entire system is used. |
| 7.9.2 -XX:HitachiJavaClassLibTraceLineSize | Specifying the number of characters (in bytes) per line of the stack trace for the class library | Specifies the number of characters (in bytes) per line of the stack trace for the class library that is output when the `-XX:+HitachiJavaClassLibTrace` option is specified. |

## Java VM options used for the functionality that outputs the local variable information

| Option | Overview | Details |
|---|---|---|
| 7.10.1 -XX:HitachiCallToString | Outputting the character strings of the String objects that were obtained via a local variable object | Outputs the character strings of the String objects that were obtained via a local variable object in a class corresponding to *applicable_range*, as strings that represent variable values. |
| 7.10.2 -XX:[+\|-]HitachiLocalsInStackTrace | Adding the local variable information of each method to the stack traces generated when thread dumps are output, and outputting the stack traces | Adds the local variable information of each method to the stack traces that are generated when thread dumps are output, and then outputs the stack traces. |
| 7.10.3 -XX:[+\|-]HitachiLocalsInThrowable | Outputting the local variable information of the methods in the stack traces | Collects the local variable information of the methods in the stack traces when the java.lang.Throwable.fillInStackTrace method is executed. |
| 7.10.4 -XX:[+\|-]HitachiLocalsSimpleFormat | Changing the output format of local variable information to the simple output format, where one variable is output per line | Changes the output format of the local variable information to the simple output format, where one variable is output per line. |
| 7.10.5 -XX:[+\|-]HitachiTrueTypeInLocals | Outputting actual object type names to the local variable information | Outputs the name of the object type that is set for a class or an array-type local variable when collecting local variable information. |

## Java VM options used for releasing system resources

| Option | Overview | Details |
|---|---|---|
| 7.11.1 -XX:[+\|-]HitachiFullCore | Creating the `core` file without considering the user limit when a failure occurs | Specifies whether to change the setting of the system resource `RLIMIT_CORE`. |

## Java VM options used for the explicit memory management functionality

| Option | Overview | Details |
|---|---|---|
| 7.12.1 -XX:ExplicitMemoryAutoReclaimTargetBlockRatio | Specifying the upper limit on the release ratio that is set during the automatic release processing of the explicit memory management functionality | Specify the maximum release rate that can be set in the automatic release processing of the explicit memory management functionality. The release rate is the ratio of the amount of the heap area that is actually released by automatic release processing, to the amount selected during the automatic release processing. |
| 7.12.2 -XX:ExplicitMemoryExcludeClassListFile | Specifying the file path for the explicit memory management functionality exclusion configuration file | Specifies the file path for the explicit memory management functionality exclusion configuration file that is used by the functionality that excludes classes from the explicit memory management functionality. The explicit memory management functionality is not applied to the classes specified in this file. |
| 7.12.3 -XX:ExplicitMemoryFullGCPolicy | Controlling (based on reference relationships) the movement of objects from the JavaHeap to Explicit memory blocks when full GC occurs | Specifies whether to control (based on reference relationships) the movement of objects from the JavaHeap to Explicit memory blocks when full GC occurs. This option enables the objects that were moved to the Explicit heap when full GC occurred, to be moved to the Tenured area. |
| 7.12.4 -XX:ExplicitMemoryNotExcludeClassListFile | Specifying the file path for the configuration file that disables exclusions from the explicit memory management functionality | Specifies the file path for the configuration file that disables exclusions from the explicit memory management functionality. This file is used by the functionality that excludes classes from the explicit memory management functionality. The functionality that excludes classes from the explicit memory management functionality is not applied to the classes specified in this file, even if those classes are also specified in the explicit memory management functionality exclusion configuration file. |
| 7.12.5 -XX:[+\|-]ExplicitMemoryUseExcludeClass | Enabling or disabling the functionality that excludes classes from the explicit memory management functionality | Specifies whether to enable or disable the functionality that excludes classes from the explicit memory management functionality. |
| 7.12.6 -XX:[+\|-]HitachiAutoExplicitMemory | Enabling or disabling the functionality for automatically placing Explicit memory blocks | Specifies whether to enable or disable the functionality for automatically placing Explicit memory blocks. |
| 7.12.7 -XX:HitachiAutoExplicitMemoryFile | Specifying the file path for the automatic placement configuration file used by the functionality for automatically placing Explicit memory blocks | Specifies the file path for the automatic placement configuration file used by the functionality for automatically placing Explicit memory blocks. |
| 7.12.8 -XX:HitachiExplicitHeapMaxSize | Specifying the maximum size of the entire Explicit heap | Specifies the maximum size of the entire Explicit heap. |
| 7.12.9 -XX:[+\|-]HitachiExplicitMemoryAutoReclaim | Enabling or disabling the automatic release of the explicit memory management functionality | Specifies whether to use the automatic release functionality of the explicit memory management functionality. |
| 7.12.10 -XX:[+\|-]HitachiExplicitMemoryAutoRefReclaim | Enabling or disabling the functionality that saves the amount of memory in the Explicit heap that is used for HTTP sessions | Specifies whether to enable or disable the functionality that saves the amount of memory in the Explicit heap that is used for HTTP sessions. |

| Option | Overview | Details |
|---|---|---|
| 7.12.11 -XX:[+\|-]HitachiExplicitMemoryCompatibleToV8 | Specifying whether to allocate Explicit memory blocks by using the same method as 08-00 | Specifies whether to allocate Explicit memory blocks by using the same method as 08-00. Enable this option if the applications that were used in 08-00 are to be used in 08-50, instead of the new functionality implemented in 08-50 and later. |
| 7.12.12 -XX:HitachiExplicitMemoryJavaLog | Specifying the prefix and output-destination directory of the log file for the explicit memory management functionality | Specifies the prefix and output-destination directory for the log files of the explicit memory management functionality. |
| 7.12.13 -XX:HitachiExplicitMemoryJavaLogFileSize | Specifying the maximum size (in bytes) per log file of the explicit memory management functionality | Specifies the maximum size (in bytes) per file. |
| 7.12.14 -XX:HitachiExplicitMemoryJavaLogNumberOfFile | Specifying the maximum number of log files that are to be created by the explicit memory management functionality | Specifies the maximum number of Java VM log files that are to be created. This specification prevents the number of created files from increasing. |
| 7.12.15 -XX:HitachiExplicitMemoryLogLevel | Specifying the event log level for the explicit memory management functionality | Specifies the event log level for the explicit memory management functionality. |
| 7.12.16 -XX:[+\|-]HitachiExplicitMemoryMoveToTenuredFirst | Changing the location where objects are moved during the release of Explicit memory blocks, to the Tenured area | Specifies the location where objects are moved during the release of Explicit memory blocks. |
| 7.12.17 -XX:[+\|-]HitachiUseExplicitMemory | Enabling or disabling the explicit memory management functionality | Specifies whether to enable or disable the explicit memory management functionality. |

## Java VM options used for specifying the maximum values for resources

| Option | Overview | Details |
|---|---|---|
| 7.13.1 -XX:HitachiJITCompileMaxMemorySize | Specifying the maximum memory size of the C heap to be allocated during JIT compilation | Specifies the maximum memory size of the C heap to be allocated during JIT compilation. |
| 7.13.2 -XX:HitachiThreadLimit | Specifying the maximum number of threads | Specifies the maximum number of threads. |

## Java VM options used for the JIT compiler continuation functionality

| Option | Overview | Details |
|---|---|---|
| 7.14.1 -XX:[+\|-]JITCompilerContinuation | Enabling or disabling the JIT compiler continuation functionality | Specifies whether to enable or disable the JIT compiler continuation functionality. |

## Java VM options used to execute Java application programs

| Option | Overview | Details |
|---|---|---|
| 7.15.1 -Xhras | Executing Java application programs | If you execute the `java` command or the `javaw` command with this option specified, you will be able to execute Java application programs. |

## Java VM options used for the functionality for the compressed object pointer

| Option | Overview | Details |
|---|---|---|
| 7.16.1 -XX:[+\|-]UseCompressedOops | Enabling or disabling the compressed object pointer functionality | Specifies whether to enable or disable the compressed object pointer functionality. |

## Java VM properties used for the finalize-retention-cancellation functionality

| Property | Overview | Details |
|---|---|---|
| 7.17.1 JP.co.Hitachi.soft.jvm.autofinalizer | Enabling or disabling the finalize-retention-cancellation functionality | Specifies whether to enable or disable the finalize-retention-cancellation functionality. |

## Java VM properties used for performance-based trace analysis

| Property | Overview | Details |
|---|---|---|
| 7.18.1 jvm.userprf.Enable | Enabling or disabling performance-based trace analysis | Specifies whether to enable or disable performance-based trace analysis. |
| 7.18.2 jvm.userprf.ExtendedSetting | Specifying the specification format for the performance-based trace analysis configuration file | Specifies whether to enable each of the following specification formats for the performance-based trace analysis configuration file. |
| 7.18.3 jvm.userprf.File | Specifying the file path for the performance-based trace analysis configuration file | Specifies the file path for the performance-based trace analysis configuration file. |
| 7.18.4 jvm.userprf.Limit | Specifying the maximum number of target methods of the performance-based trace analysis | Specifies the maximum number of target methods of the performance-based trace analysis. |
| 7.18.5 jvm.userprf.LineNumber | Outputting to the trace information, the line number of the last executed statement of the method | Specifies whether to output to the trace information, the line number of the last executed statement of the method when the method ends normally. |
| 7.18.6 jvm.userprf.LogLevel | Specifying the trace output level for performance-based trace analysis | Specifies the output level for the names of traced methods. The names are output in the specified level to the optional information (`OPT`) of the performance-based trace analysis information. |
| 7.18.7 jvm.userprf.ThrowableName | Outputting the names of exception or error classes to the trace information | Specifies whether to output the names of exception or error classes to the operation information (`OPR`) of the trace information when a method ends abnormally. |
| 7.18.8 jvm.userprf.ThrowableNameEditMethod | Specifying how the name of an exception or error class is edited if the name exceeds 32 characters | Specifies how the name of an exception or error class is to be modified if the name exceeds 32 characters. If the name of an exception or error class is 32 characters or less, all characters are output to the trace information regardless of the specification in this property. |
| 7.18.9 jvm.userprf.Trace | Outputting logs when the class file specified in the performance-based trace analysis configuration file is successfully overwritten | Specifies whether to output logs when the class file specified in the performance-based trace analysis configuration file is successfully overwritten. |

## Java HotSpot VM options used for Application Server

| Option | Overview | Details |
|---|---|---|
| 7.19.1 -agentlib:hndlwrap2 | Continuing Java VM execution when a user logs off from Windows | Specifies whether to continue Java VM execution when a user logs off from Windows in an environment that includes JDK version 6 or later. |
| 7.19.2 -agentlib:libname | Loading the native agent library | Loads the native agent library *libname*. |
| 7.19.3 -XX:CompressedClassSpaceSize | Specifying the maximum size of the Compressed Class Space | Specifies the maximum size of the Compressed Class Space. |
| 7.19.4 -XX:ConcGCThreads | Specifying the number of threads that can execute concurrent marking in parallel | Specifies the number of threads that can execute processing for Concurrent Marking in parallel when G1GC is enabled. |
| 7.19.5 -XX:MaxGCPauseMillis | Specifying the target amount of time for which applications are stopped by GC for G1GC | Specifies the target amount of time (in milliseconds) for which applications are stopped by GC for G1GC. |
| 7.19.6 -XX:MaxMetaspaceSize | Specifying the maximum value of the Metaspace area | Specifies the maximum value of the Metaspace area. |
| 7.19.7 -XX:MaxTenuringThreshold | Specifying the threshold value for the number of times Java objects are replaced in the From space and in the To space when CopyGC is executed | Specifies the threshold for the number of times Java objects are replaced in the From space and in the To space when CopyGC is executed. After the specified threshold is exceeded, the Java objects to be replaced are moved to the Tenured area. |
| 7.19.8 -XX:MetaspaceSize | Specifying the standard value for the full GC that originated in the Metaspace area | Specifies the standard value for the full GC that originated in the Metaspace area. |
| 7.19.9 -XX:NewRatio | Specifying the ratio of the Tenured area to the New area | Specifies the ratio of the Tenured area to the New area. |
| 7.19.10 -XX:ParallelGCThreads | Specifying the number of threads that can execute G1GC in parallel | Specifies the number of threads that can execute G1GC in parallel. |
| 7.19.11 -XX:ReservedCodeCacheSize | Specifying the maximum size of the code cache area | Specifies the maximum size of the code cache area. |
| 7.19.12 -XX:SurvivorRatio | Specifying the ratio of the Eden area to each of the following spaces in the Survivor area: the From space and the To space | Specifies the ratio of the New::Eden area to each of the following spaces in the New::Survivor area: the From space and the To space. |
| 7.19.13 -XX:TargetSurvivorRatio | Specifying the target proportion of the Java objects in the Survivor area after GC is executed | Specifies the target proportion (0% to 100%) of the New::Survivor area that is to be made up of Java objects after GC is executed. |
| 7.19.14 -XX:[+\|-]UseG1GC | Executing G1GC | Specifies whether to execute G1GC.<br>This option cannot be specified at the same time as the options (`UseSerialGC` and `HitachiUseExplicitMemory`). |
| 7.19.15 -XX:[+\|-]UseSerialGC | Executing SerialGC | Specifies whether to execute SerialGC. |
| 7.19.16 -verbose:information-type | Outputting the information specified in *information_type* | Outputs the information specified in *information_type*. |
| 7.19.17 -Xloggc:file | Outputting logs to *file* whenever a GC event occurs | Similar to `-verbose:gc`, a report is sent whenever a GC event occurs. In addition, data about the event is recorded in *file*. In addition to the information reported when `-verbose:gc` is specified, the amount of time (in seconds) that has elapsed from the first GC event is included at the beginning of each event report. |

| Option | Overview | Details |
|---|---|---|
| 7.19.18 -Xms | Specifying the initial size of the JavaHeap | Specifies the initial size of the JavaHeap. |
| 7.19.19 -Xmx | Specifying the maximum size of the JavaHeap | Specifies the maximum size of the JavaHeap. |
| 7.19.20 -Xprof | Generating the profile for a running program, and outputting the profiling data to the standard output | If you specify this option, the profile for a running program is generated, and the profiling data is output to the standard output. This option is provided as a program development utility. This option is not intended for use in a system that is running in the production environment. |
| 7.19.21 -Xss | Specifying the maximum area size per stack | Specifies the maximum area size per stack. |

## Environment variables used in Java VM

| Environment variables | Overview | Details |
|---|---|---|
| 7.20.1 JAVA_HRAS | An environment variable that enables the `java` command to be executed | If you execute the `java` command with this option specified, you will be able to execute Java application programs that do not link with Application Server. |
| 7.20.2 JAVACOREDIR | Specifying the directory where thread dump files are output | Specifies the directory where thread dump files are output in the C shell. |
| 7.20.3 JAVAW_HRAS | An environment variable that enables the `javaw` command to be executed | If you execute the `javaw` command with this option specified, you will be able to execute Java application programs that do not link with Application Server. |

## 7.2 Java VM option used for displaying lists

This section describes the option used for displaying a list of Java VM options.

### 7.2.1 -XX:+Hitachi

`-XX:+Hitachi` displays a list of extended Java VM options.

#### Description

`-XX:+Hitachi` displays a list of extended Java VM options.

This option does not execute Java programs. If you specify this option for the Java EE server startup option, the Java EE server will not start.

#### Syntax

```
-XX:+Hitachi
```

#### Specifiable values

Type: `String`

`-XX:+Hitachi`

#### Default value

If the definition item is omitted:

Nothing is set.

#### Example

```
-XX:[+|-]HitachiVerboseGC
    print GC log in detail
-XX:[+|-]HitachiCommaVerboseGC
    output GC log separated by ","
-XX:HitachiVerboseGCIntervalTime=<time>
    set interval for printing GC log
-XX:[+|-]HitachiVerboseGCPrintCause
    add GC cause to GC log
-XX:[+|-]HitachiVerboseGCPrintDate
    add date to GC log
-XX:[+|-]HitachiVerboseGCCpuTime
    add CPU time spent by GC to GC log
-XX:[+|-]HitachiVerboseGCPrintTenuringDistribution
    add tenuring age info. to GC log
-XX:[+|-]HitachiVerboseGCPrintJVMInternalMemory
    add JVM Internal Memory to GC log
-XX:[+|-]HitachiVerboseGCPrintThreadCount
    add thread count to GC log
-XX:[+|-]HitachiVerboseGCPrintDeleteOnExit
    add memory size and called count by java.io.File#deleteOnExit to GC log
-XX:[+|-]JavaLogAsynchronous
    enable output asynchronous javalog
```

```
-XX:HitachiJITCompileMaxMemorySize=<size>
    set max memory size of JIT compiler
-XX:[+|-]JITCompilerContinuation
    continue JIT compilation when failure occurs
-XX:HitachiThreadLimit=<num>
    set maximum number of threads
-XX:[+|-]HitachiOutOfMemoryStackTrace
    print stack trace when OutOfMemoryError occurs
-XX:[+|-]HitachiOutOfMemoryCause
    print cause of OutOfMemoryError
-XX:[+|-]HitachiOutOfMemorySize
    print requested allocation size when OutOfMemoryError occurs
-XX:HitachiOutOfMemoryStackTraceLineSize=<size>
    set stack trace line size
-XX:[+|-]HitachiOutOfMemoryAbort
    abort when OutOfMemoryError occurs
-XX:[+|-]HitachiOutOfMemoryAbortThreadDump
    print thread dump before abort at OOM
-XX:[+|-]HitachiOutOfMemoryAbortThreadDumpWithJHeapProf
    print Java heap profiling data before abort at OOM
-XX:[+|-]HitachiJavaClassLibTrace
    print java class library trace when specific API called
-XX:HitachiJavaClassLibTraceLineSize=<size>
    set java class library trace line size
-XX:[+|-]HitachiOutputMilliTime
    use milliseconds precision timer for javalog
-XX:[+|-]HitachiLocalsInThrowable
    output locals info. in Throwable#printStackTrace
-XX:[+|-]HitachiLocalsInStackTrace
    output locals info. in thread dump
-XX:[+|-]HitachiLocalsSimpleFormat
    change output format of locals info. to simpler one
-XX:[+|-]HitachiTrueTypeInLocals
    add true type name to locals info
-XX:HitachiCallToString=<range>
    specify range of locals targets to which apply toString method call
-XX:[+|-]HitachiThreadDump
    print expand thread dump
-XX:[+|-]HitachiThreadDumpToStdout
    print expand thread dump to stdout
-XX:[+|-]HitachiThreadDumpWithHashCode
    add hashCode value for thread object to expand thread dump
-XX:[+|-]HitachiThreadDumpWithCpuTime
    add CPU time spent by thread to expand thread dump
-XX:[+|-]HitachiThreadDumpWithBlockCount
    add blocked count and waited count of thread to expand thread dump
-XX:HitachiJavaLog:[<file>]
    set log filename
-XX:JavaLogRotationType:[WRAP|SHIFT]
    specify type of javalog rotation
-XX:JavaLogRotationTime:<time>
    specify time of javalog rotation
-XX:[+|-]JavaLogHeaderOutput
    output header information in javalog
-XX:HitachiJavaLogFileSize=<size>
    set maximum size of log file
-XX:HitachiJavaLogNumberOfFile=<value>
    set maximum number of log file
-XX:[+|-]HitachiJavaLogNoMoreOutput
    cease to output log when file output error occurs
-XX:[+|-]HitachiUseExplicitMemory
    use explicit memory
-XX:HitachiExplicitHeapMaxSize=<size>
    set maximum size of explicit heap
```

```
-XX:[+|-]HitachiExplicitMemoryAutoReclaim
    use explicit memory auto reclaim
-XX:[+|-]HitachiAutoExplicitMemory
    use explicit memory auto creation
-XX:HitachiAutoExplicitMemoryFile:[<file>]
    set explicit memory auto creation file
-XX:[+|-]HitachiExplicitMemoryCompatibleToV8
    maintain compatibility with version 08-00 specification of explicit
memory instead of new features
-XX:[+|-]HitachiExplicitMemoryMoveToTenuredFirst
    move Java objects to tenured area before new area in reclaim
-XX:[+|-]HitachiExplicitMemoryAutoRefReclaim
    enable auto reclaiming of reference explicit memory
-XX:HitachiExplicitMemoryLogLevel:[none|normal|verbose|debug]
    set explicit memory log level
-XX:HitachiExplicitMemoryJavaLog:[<file>]
    set explicit memory log filename
-XX:HitachiExplicitMemoryJavaLogFileSize=<size>
    set maximum size of explicit memory log file
-XX:HitachiExplicitMemoryJavaLogNumberOfFile=<value>
    set maximum number of explicit memory log file
-XX:ExplicitMemoryFullGCPolicy=<value>
    set full GC policy when using explicit memory
-XX:[+|-]ExplicitMemoryUseExcludeClass
    use explicit memory exclude class
-XX:ExplicitMemoryExcludeClassListFile:[<file>]
    set explicit memory exclude class list file
-XX:ExplicitMemoryNotExcludeClassListFile:[<file>]
    set explicit memory not exclude class list file
-XX:ExplicitMemoryAutoReclaimTargetBlockRatio=<value>
    set ratio of auto reclaim target block
-XX:[+|-]PrintCodeCacheInfo
    print code cache information
-XX:CodeCacheInfoPrintRatio=<value>
    set tuning parameter of code cache monitoring threshold
-XX:[+|-]PrintCodeCacheFullMessage
    print message when code cache is full
-XX:[+|-]HitachiFullCore
    always generate full core
-Xhras
    use utility for stand-alone programming in executing java command
```

## 7.3 Java VM options used for the extended thread dump functionality

This section describes the options for specifying the settings for outputting extended thread dumps.

### 7.3.1 -XX:[+|-]HitachiThreadDump

`-XX:[+|-]HitachiThreadDump` outputs extended thread dump information.

#### Description

`-XX:[+|-]HitachiThreadDump` specifies whether to output extended thread dump information.

Thread dumps are output to the standard output and to the file below.

Thread dump output destination

By default, the output destination is the current directory during Java VM execution. However, you can change the output destination by specifying the environment variable `JAVACOREDIR`.

Thread dump output file name

`javacore`*`process_number`*`.`*`YYMMDDhhmmss`*#`.txt`

#:

*YY*: year (last 2 digits), *MM*: month (2 digits), *DD*: date (2 digits)
*hh*: hour (24-hour notation), *mm*: minute (2 digits), *ss*: second (2 digits)

The table below shows the structure of the thread dump information.

Table 7-1: Structure of the thread dump information

| Output information | Description |
|---|---|
| Header | Outputs the start date and time of the thread dump, the Java VM version information, and the startup command line. |
| System settings | Outputs the following information:<br>• Installation directory for the JDK execution environment<br>• Installation directory for the libraries that make up JDK<br>• System class path<br>• Java command option |
| Operating environment | Outputs the following information:<br>• Host name<br>• OS version<br>• CPU information<br>• Resource information |
| JavaHeap information | Outputs the memory usage status for each generation of the JavaHeap. |
| Java VM internal memory map information | Outputs area information for the memory allocated to Java VM itself. |
| Java VM internal memory size information | Outputs size information for the memory allocated to Java VM itself. |
| Application information | Outputs the following information:<br>• Signal handler |

| Output information | Description |
|---|---|
| | • Environment variables<br>• Current directory information |
| Library information | Outputs the loaded library information. |
| Thread information<br><Thread 1><br>:<br><Thread *n*> | Outputs thread information for each thread. Outputs the stack trace for all existing threads. |
| Java monitor dump# | Displays the list of Java monitor objects. You can check the status of exclusion waiting between threads. |
| Information on the number of JNI global references | Outputs the number of global references of the JNI allocated to Java VM.<br>JNI global references are created in the following cases:<br>• When a JNI global reference is necessary for self-startup or execution of Java VM<br>• When the NewGlobalRef function supported by JNI is issued |
| Explicit heap information | Outputs usage status for the entire Explicit heap in the Explicit heap information. Regardless of whether the Explicit heap is used, the usage status is always output when `-XX:+HitachiUseExplicitMemory` is enabled. |
| Explicit memory block information | Outputs the information below in the Explicit memory block information. Note, however, if no Explicit memory block exists, nothing will be output.<br>• Usage status for each Explicit memory block<br>• Object statistics (output when the `eheapprof` command is executed)<br>• Object release rate information (output when the `eheapprof` command is executed with the `-freeratio` option specified) |
| Footer | Outputs the end date and time of the thread dump |

#:

The notify wait list of might not be displayed.

The output format of each type of thread dump information is shown below.

Header

```
EEE MMM dd hh:mm:ss yyyy#

Full thread dump Java HotSpot(TM) Client VM (1.5.0_05-b05-CDK0850-build_date \
mixed mode)
startup_command_line
...
```

#:

*EEE* represents the day of the week, *MMM* represents the month, and *dd* represents the date. Similarly, *hh* represents the hour, *mm* represents the minute, *ss* represents the second, and *yyyy* represents the year.

System settings

```
System Properties
-----------------
Java Home Dir   : installation_directory_for_JDK_execution_environment
Java DLL Dir    : installation_directory_for_libraries_that_make_up_JDK
Sys Classpath   : system_class_path
User Args       :
Java_command_option_1
Java_command_option_2
...
```

Operating environment

```
Operating Environment
---------------------
Host    : host_name:IP_address
OS      : OS_version
CPU     : CPU_type, number_of_available_CPUs/number_of_CPUs_in_the_entire_system

Resource Limits -
         RLIMIT_CPU     :number_of_seconds_the_resource_can_be_used_by_a_process
         RLIMIT_FSIZE   :size_of_the_largest_file (unit: bytes)
         RLIMIT_DATA    :size_available_for_malloc (unit: bytes)
         RLIMIT_STACK   :size_of_the_largest_stack (unit: bytes)
         RLIMIT_CORE    :size_of_the_largest_core (unit: bytes)
         RLIMIT_RSS     :size_of_the_resident_of_the_process (unit: bytes)
         RLIMIT_AS      :total_memory_that_can_be_used_by_the_process (unit:
bytes)
         RLIMIT_NOFILE  :largest_file_descriptor_value
```

JavaHeap information (for serial GC)

```
Heap Status
-----------
def new generation   max maximum_capacity, total current_capacity, \
used size_of_used_memory \
(usage_rate_corresponding_to_the_maximum_capacity% used/max,
usage_rate_corresponding_to_the_current_capacity% used/total)
                     [first_address_of_the_area,
last_address_of_the_committed_area, \
last_address_of_the_reserved_area)
  eden space current_capacity,  usage_rate% used [first_address_of_the_area, \
first_address_of_the_area_in_use, last_address_of_the_reserved_area)
  from space current_capacity,   usage_rate% used [first_address_of_the_area, \
first_address_of_the_area_in_use, last_address_of_the_reserved_area)
  to   space current_capacity,   usage_rate% used [first_address_of_the_area, \
first_address_of_the_area_in_use, last_address_of_the_reserved_area)
tenured generation   max maximum_capacity, total current_capacity, \
used size_of_used_memory \
(usage_rate_corresponding_to_the_maximum_capacity% used/max,
usage_rate_corresponding_to_the_current_capacity% used/total)
                     [first_address_of_the_area,
last_address_of_the_committed_area, \
last_address_of_the_reserved_area)
   the space current_capacity,  usage_rate% used [first_address_of_the_area, \
first_address_of_the_area_in_use, first_address_of_the_next_free_block, \
last_address_of_the_reserved_area)
Metaspace       max maximum_capacity, capacity \
total_memory_size_excluding_the_free_area_in_the_committed_Metaspace, \
committed total_memory_size_of_the_committed_Metaspace, \
reserved size_of_the_reserved_memory, used size_of_used_memory \
(usage_rate_corresponding_to_the_maximum_capacity% used/max,
usage_rate_corresponding_to_the_current_capacity% used/committed)
  class space    max maximum_capacity, capacity \
total_memory_size_excluding_the_free_area_in_the_committed_Metaspace, \
committed total_memory_size_of_the_committed_Metaspace, \
reserved size_of_the_reserved_memory, used size_of_used_memory \
(usage_rate_corresponding_to_the_maximum_capacity% used/max,
usage_rate_corresponding_to_the_current_capacity% used/committed)
                 [first_address_of_the_area, first_address_of_the_area_in_use, \
last_address_of_the_committed_area, last_address_of_the_reserved_area)
```

Notes

- Values related to capacity and memory size are given in units of kilobytes.

- If the -XX:MaxMetaspaceSize option is not specified, the maximum value for the Metaspace area is unlimited. For the Metaspace area, unlimited is output as the maximum capacity and -% is output as the rate of usage for the maximum capacity.
- class space is output only if you are using both the compressed object pointer functionality on a 64-bit Java VM and Compressed Class Space.
- The value for the Metaspace area is the total value of the entire Metaspace area, including Compressed Class Space.

JavaHeap information (for G1GC)

```
Heap Status
-----------
 garbage-first heap   total JavaHeap_area_capacity, \
used usage_of_JavaHeap_area [first_address_of_the_JavaHeap_area, \
last_address_of_the_committed_JavaHeap_area, \
last_address_of_the_reserved_JavaHeap_area)
  region size size_of_1_region, number_of_used_regions_in_the_New_area young \
(usage_of_the_New_area), number_of_used_regions_in_the_Survivor_area survivors \
(usage_of_the_Survivor_area)
 Metaspace       max maximum_capacity, capacity \
total_memory_size_excluding_the_free_area_from_the_committed_Metaspace, \
committed total_memory_size_of_the_committed_Metaspace, \
reserved size_of_the_reserved_memory, used size_of_the_used_memory \
(usage_rate_corresponding_to_the_maximum_capacity% used/max,
usage_rate_corresponding_to_the_current_capacity% used/committed)
  class space    max maximum_capacity, capacity \
total_memory_size_excluding_the_free_area_from_the_committed_Metaspace, \
committed total_memory_size_of_the_committed_Metaspace, \
reserved size_of_the_reserved_memory, used size_of_the_used_memory \
(usage_rate_corresponding_to_the_maximum_capacity% used/max,
usage_rate_corresponding_to_the_current_capacity% used/committed)
                [first_address_of_the_area, first_address_of_the_area_in_use, \
last_address_of_the_committed_area, last_address_of_the_reserved_area)
```

Note

Values related to capacity are given in units of kilobytes.

Java VM internal memory map information

```
JVM Internal Memory Map
-----------------------
memory_allocation_function:address = starting_address - ending_address (size:size)
```

Notes

*memory_allocation_function*: Either mmap() or malloc() is output.

*starting_address*: The starting address of the memory area is output in hexadecimal notation.

*ending_address*: The ending address of the memory area is output in hexadecimal notation.

*size*: The size (in bytes) of the allocated memory area is output.

Java VM internal memory size information

```
JVM Internal Memory Status
--------------------------
  Heap Size      :allocated_memory_size#
  Alloc Size     :size_of_the_used_memory#
  Free Size      :size_of_the_unused_memory#
```

#:

Values are given in units of bytes.

Application information

```
Application Environment
-----------------------
Signal Handlers -#1
  SIGHUP          :signal_handler_information
  SIGINT          :signal_handler_information
...
  SIGSOUND        :signal_handler_information
  SIGSAK          :signal_handler_information

Signal Handlers -
signal_type:  [signal_handler_address], sa_mask[0]=signal_mask,
sa_flags=special_flag
...

Environment Variables -#2
environment_variable=value
...
Current Directory -
  /opt/hitachi/APServer/CC/server/...
```

#1:

The following information is displayed:

- If the handler is installed, the address of the signal handler is displayed.
- For `SIG_DFL`, `default` is displayed.
- For `SIG_IGN`, `ignored` is displayed.

#2:

The following information is displayed:

- For the signal type, the signal name defined in `/usr/include/sys/signal.h` is displayed.
- For the signal handler address, the address of the signal handler is output in hexadecimal notation. The address might also be displayed in the following format: library name + offset.
- For the signal mask, the value of the sa_mask field in the structure that can be extracted by sigaction() is output in hexadecimal notation.
- For the special flag, the value of the sa_flags field in the structure that can be extracted by sigaction() is output in hexadecimal notation.

Library information

```
Loaded Libraries
----------------
Dynamic libraries :
starting_address-ending_address   command
starting_address-ending_address   library
...
```

Thread information

```
Stack Trace
-----------

"thread_name" #thread_identifier daemon prio=priority os_prio=OS_priority \
jid=hash_value tid=thread_ID nid=native_ID status \
[starting_address..ending_address]
    java.lang.Thread.State:  current_status_of_the_thread
    stack=[stack_starting_address..YellowPage_address..RedPage_address..\
stack_ending_address]
```

```
    [user cpu time=user_timems, kernel cpu time=kernel_timems] \
[blocked count=blocked_count, waited count=standby_count]
         at class_name.method_name(method_information)
...
```

The following provides details about the output:

| Output item | Output content |
|---|---|
| *thread_name* | The thread name that is specified in the thread class constructor is output. |
| *thread_identifier* | The unique number that is generated during the creation of the Java thread is output.<br>This value is the same as the value that can be acquired by using java.lang.Thread.getId(). |
| *daemon* | If the thread is a daemon thread, `daemon` is output. |
| *priority* | The priority set for Thread#setPriority is output. |
| *OS_priority* | The OS-level priority is output. For an OS for which priority cannot be specified, `0` is output. |
| *hash_value* | The same value as the value that can be obtained by calling System.identityHashCode() is output as an 8-digit hexadecimal number. |
| *thread_ID* | The address in the thread object memory is output. |
| *nativeID* | The OS-level thread ID is output. |
| *status* | The thread status is output The following information is output:<br>• `runnable`: Threads that are being executed or can be executed<br>• `in Object.wait()`, `waiting for monitor entry`, or `waiting on condition`: Threads that are waiting for monitor lock<br>• `sleeping`: Interrupted threads |
| *starting_address* | The highest-level stack address of the Java frame is output in hexadecimal notation. |
| *ending_address* | The highest-level stack address of JavaLock is output in hexadecimal notation. |
| *current_status_of_the_thread* | A message indicating the current status of the thread is output. The message contents correspond to the enumeration type java.lang.Thread.State. |
| *stack_starting_address* | The stack starting address is output in hexadecimal notation. |
| *YellowPage_address* | The first address of the stack Yellow guard page is output in hexadecimal notation. |
| *RedPage_address* | The first address of the stack Red guard page is output in hexadecimal notation. |
| *stack_ending_address* | The stack ending address is output in hexadecimal notation. |
| *user_time* | The user time from the start of the thread is output in milliseconds. |
| *kernel_time* | The kernel time from the start of the thread is output in milliseconds. |
| *blocked_count* | The number of times the process has been blocked since the start of the thread is output. |
| *standby_count* | The number of times the process has changed to the wait status since the start of the thread is output. |
| *class_name* | The class name is output. |
| *method_name* | The method name is output. |
| *method information* | The following method information is output:<br>• `Native Method`<br>Output when the native method is used<br>• *`file_name`*`:`*`line_number`*<br>Output when a Java program whose lines are numbered is compiled<br>• `Unknown Source`<br>Output when a Java program whose lines are not numbered is compiled |

Java monitor dump

```
Java monitor
------------
lock_object@hash_code owner_information
   standby_status:number_of_standby_threads
      standby_thread_information
```

The following provides details about the output:

| Output item | Output content |
|---|---|
| *lock_object* | The class name of the lock target object is output. |
| *hash_code* | The hash code that can be obtained by Object.hashCode is output. |
| *owner_information* | • `owner "`*thread_name*`"`*thread_ID*<br>This information is output when an owner exists.<br>• `no owner`<br>This information is output when no owner exists. |
| *standby_status* | • `... waiting to enter`<br>This information is output when a method is waiting to be executed.<br>• `... waiting to be notified`<br>This information is output when a method is waiting for notification that the exclusive lock is released. |
| *number_of_standby_threads* | The number of threads is output. |
| *standby_thread_information* | This information is output in the following format: "*thread name>*" *thread_ID*. |

Information on the number of JNI global references

```
JNI Information
---------------
JNI global references:  number_of_JNI_global_references
```

The following provides details about the output:

| Output item | Output content |
|---|---|
| *number_of_JNI_global_references* | The number of global references that are allocated to Java VM is output. |

Note

Because JNI global references are also reused in Java VM, the number of references does not decrease even when a JNI global reference is deleted by issuing the DeleteGlobalRef function that is supported by JNI. Similarly, when JNI global references that are reused by Java VM are assigned, the number of references does not increase even if a new JNI global reference is created by issuing the NewGlobalRef function.

Explicit heap information and Explicit memory block information

```
Explicit Heap Status
--------------------
 max EH_MAX, total EH_TOTAL, used EH_USED, garbage EH_GARB (EH_PER1 used/max, \
EH_PER2 used/total, EH_PER3 garbage/used), EM_NUMS spaces exist

 Explicit Memories(EM_MGR_PTR)

  ""EM_NAME"" eid=EID(EM_PTR)/EM_TYPE, total EM_TOTAL, \
used EM_USED, garbage EM_GARB (EM_PER1 used/total, EM_PER2 garbage/used, \
FL_BLOCKS blocks) EM_STAT
    deployed objects
    _________________Size__Instances__FreeRatio__Class_________________
```

```
                    ISIZE        INUM      FRATIO CNAME
                    ...
                  AISIZE       AINUM total

...
```

Note the following:

- There is a blank row between the Explicit heap information and the Explicit memory block information.
- The order in which the Explicit memory block information is to be output (the Explicit memory block from which output is to start) is not defined.
- There are two single-byte spaces before *EM_NAME*.
- There are four single-byte spaces before `deployed objects`.
- *ISIZE* is output so that the last character of this character string is aligned with the "e" of `____________________Size_`.
- *INUM* is output so that the last character of this character string is aligned with the last "s" of `__Instances`.
- *FRATIO* is output so that the last character of this character string is aligned with the "o" of `__FreeRatio__`.
- *CNAME* is output so that the first character of this character string is aligned with the second ""_"" from the beginning of `__Class____________________` (the underscore directly before the "C").
- The last row is blank. As a result, there is a blank row between each pair of Explicit memory blocks that are output.

Footer

```
Full thread dump completed.   EEE MMM dd hh:mm:ss yyyy#
```

#:

*EEE* represents the day of the week, *MMM* represents the month, and *dd* represents the date. Similarly, *hh* represents the hour, *mm* represents the minute, *ss* represents the second, and *yyyy* represents the year.

The table below shows a comparison between the standard thread dump information and the extended thread dump information.

Table 7-2: Comparison of the output information between standard thread dumps and extension thread dumps

| Output information | Standard thread dump | Extended thread dump |
|---|---|---|
| Header | N | Y |
| System settings | N | Y |
| Operating environment | N | Y |
| JavaHeap information | Y | Y |
| Java VM internal memory map information | N | Y |
| Java VM internal memory size information | N | Y |
| Application information | N | Y |
| Library information | N | Y |
| Thread information | Y | Y#1 |
| Java monitor dump | N | Y |

| Output information | Standard thread dump | Extended thread dump |
|---|---|---|
| Information on the number of JNI global references | Y | Y |
| Explicit heap information | N | Y |
| Explicit memory block information | N | Y |
| Footer | N | Y |
| Thread dump output destination | Standard output | Standard output[#2]<br>Java VM log file |

Legend

Y: Information is output.

N: Information is not output.

#1:

The starting address information and ending address information of the stack is output.

#2:

Information is output to the standard output if the `-XX:+HitachiThreadDumpToStdout` option is specified.

## Syntax

```
-XX:[+|-]HitachiThreadDump
```

## Specifiable values

Type: `String`

`-XX:+HitachiThreadDump`

If the `-Xrs` option is not specified, outputs the extended thread dump information when the thread dump is output.

`-XX:-HitachiThreadDump`

Outputs the standard thread dump information when the thread dump is output.

## Default value

If the definition item is omitted:

`-XX:+HitachiThreadDump`

## Example

```
Tue Jan 20 13:13:46 2015

Full thread dump Java HotSpot(TM) 64-Bit Server VM
(25.20-b23-HJDK1010-20150116 mixed mode)
/opt/hitachi/APServer/jdk/bin/java -Xhras -Xms256m -Xmx512m
-XX:+UseCompressedOops -XX:MaxMetaspaceSize=128m Test

System Properties
-----------------
Java Home Dir   : /opt/hitachi/APServer/jdk/jre
Java DLL Dir    : /opt/hitachi/APServer/jdk/jre/lib/amd64
Sys Classpath   : /opt/hitachi/APServer/jdk/jre/lib/amd64/server/../../../../
../javaee/glassfish/modules/endorsed/javax.annotation-api.jar:/opt/hitachi/
APServer/jdk/jre/lib/amd64/server/../../../../../javaee/glassfish/modules/
```

```
endorsed/jaxb-api.jar:/opt/hitachi/APServer/jdk/jre/lib/amd64/server/../../../
../../javaee/glassfish/modules/endorsed/webservices-api-osgi.jar:/opt/hitachi/
APServer/jdk/jre/lib/resources.jar:/opt/hitachi/APServer/jdk/jre/lib/rt.jar:/
opt/hitachi/APServer/jdk/jre/lib/sunrsasign.jar:/opt/hitachi/APServer/jdk/jre/
lib/jsse.jar:/opt/hitachi/APServer/jdk/jre/lib/jce.jar:/opt/hitachi/APServer/
jdk/jre/lib/charsets.jar:/opt/hitachi/APServer/jdk/jre/lib/jfr.jar:/opt/
hitachi/APServer/jdk/jre/classes
User Args       :
-Djava.class.path=.
-XX:+HitachiVerboseGC
-XX:+HitachiOutputMilliTime
-XX:+HitachiOutOfMemoryStackTrace
-XX:+HitachiJavaClassLibTrace
-XX:+HitachiLocalsInStackTrace
-XX:+HitachiLocalsSimpleFormat
-XX:+HitachiOutOfMemoryAbort
-XX:-HitachiThreadDumpToStdout
-XX:+HitachiFullCore
-Xms256m
-Xmx512m
-XX:+UseCompressedOops
-XX:MaxMetaspaceSize=128m
-Dsun.java.command=Test
-Dsun.java.launcher=SUN_STANDARD
-Dsun.java.launcher.pid=1518


Operating Environment
---------------------
Host    : LINUXAMD64PC:10.255.255.255
OS      : Linux #1 SMP Wed Oct 10 16:34:19 EDT 2007 2.6.18-53.el5
CPU     : x86_64, 8/8 active

Resource Limits -
        RLIMIT_CPU              : unlimited
        RLIMIT_FSIZE            : unlimited
        RLIMIT_DATA             : unlimited
        RLIMIT_STACK            : 10485760
        RLIMIT_CORE             : unlimited
        RLIMIT_RSS              : unlimited
        RLIMIT_NOFILE           : 1024
        RLIMIT_AS               : unlimited
        RLIMIT_NPROC            : 73728
        RLIMIT_MEMLOCK          : 32768

Heap Status
-----------
 def new generation   max 169600K, total 84800K, used 4934K (2.9% used/max,
5.8% used/total)
                      [0x00000000e0000000, 0x00000000e5550000,
0x00000000eaaa0000)
  eden space 82240K,   6% used [0x00000000e0000000, 0x00000000e04d1a60,
0x00000000e5050000)
  from space 2560K,   0% used [0x00000000e5050000, 0x00000000e5050000,
0x00000000e52d0000)
  to   space 2560K,   0% used [0x00000000e52d0000, 0x00000000e52d0000,
0x00000000e5550000)
 tenured generation   max 349568K, total 174784K, used 0K (0.0% used/max,
0.0% used/total)
                      [0x00000000eaaa0000, 0x00000000f5550000,
0x0000000100000000)
   the space 174784K,   0% used [0x00000000eaaa0000, 0x00000000eaaa0000,
0x00000000eaaa0200, 0x00000000f5550000)
 Metaspace        max 131072K, capacity 4492K, committed 4864K,
```

```
reserved 1056768K, used 3646K, (2.8% used/max, 75.0% used/committed)
  class space     max 1048576K, capacity 388K, committed 512K,
reserved 1048576K, used 369K, (0.0% used/max, 72.2% used/committed)
                   [0x0000000100000000, 0x0000000100061000, 0x0000000100080000,
0x0000000140000000)

JVM Internal Memory Map
-----------------------
        mmap()   : address = 0x00002aaaabd84000 - 0x00002aaaabd94000
(size:65536)
        mmap()   : address = 0x00002aaaac409000 - 0x00002aaaac419000
(size:65536)
        mmap()   : address = 0x00002aaab009e000 - 0x00002aaab01ae000
(size:1114112)
        mmap()   : address = 0x00002aaab03d5000 - 0x00002aaab0425000
(size:327680)
        mmap()   : address = 0x00002aaab39f3000 - 0x00002aaab3a63000
(size:458752)
        mmap()   : address = 0x00002aaab3a83000 - 0x00002aaab3a93000
(size:65536)
        mmap()   : address = 0x00002aaab3ab3000 - 0x00002aaab3af3000
(size:262144)
        mmap()   : address = 0x00002aaab3b03000 - 0x00002aaab3b23000
(size:131072)
        mmap()   : address = 0x00002aaab3b53000 - 0x00002aaab3b63000
(size:65536)
        mmap()   : address = 0x00002aaab3b93000 - 0x00002aaab3bc3000
(size:196608)

JVM Internal Memory Status
--------------------------
        Heap Size  : 2916352
        Alloc Size : 2460032
        Free Size  : 456320

Application Environment
-----------------------
Signal Handlers -
SIGHUP: [libjvm.so+0x9b6c60], sa_mask[0]=11111111011111111101111111111110,
sa_flags=SA_RESTART|SA_SIGINFO
SIGINT: [libjvm.so+0x9b6c60], sa_mask[0]=11111111011111111101111111111110,
sa_flags=SA_RESTART|SA_SIGINFO
SIGQUIT: [libjvm.so+0x9b6c60], sa_mask[0]=11111111011111111101111111111110,
sa_flags=SA_RESTART|SA_SIGINFO
SIGILL: [libjvm.so+0x9b35d0], sa_mask[0]=11111111011111111101111111111110,
sa_flags=SA_RESTART|SA_SIGINFO
SIGTRAP: SIG_DFL, sa_mask[0]=00000000000000000000000000000000, sa_flags=none
SIGABRT: SIG_DFL, sa_mask[0]=00000000000000000000000000000000, sa_flags=none
SIGBUS: [libjvm.so+0x9b35d0], sa_mask[0]=11111111011111111101111111111110,
sa_flags=SA_RESTART|SA_SIGINFO
SIGFPE: [libjvm.so+0x9b35d0], sa_mask[0]=11111111011111111101111111111110,
sa_flags=SA_RESTART|SA_SIGINFO
SIGKILL: SIG_DFL, sa_mask[0]=00000000000000000000000000000000, sa_flags=none
SIGUSR1: SIG_DFL, sa_mask[0]=00000000000000000000000000000000, sa_flags=none
SIGSEGV: [libjvm.so+0x9b35d0], sa_mask[0]=11111111011111111101111111111110,
sa_flags=SA_RESTART|SA_SIGINFO
SIGUSR2: [libjvm.so+0x9b7200], sa_mask[0]=00000000000000000000000000000000,
sa_flags=SA_RESTART|SA_SIGINFO
SIGPIPE: [libjvm.so+0x9b35d0], sa_mask[0]=11111111011111111101111111111110,
sa_flags=SA_RESTART|SA_SIGINFO
SIGALRM: SIG_DFL, sa_mask[0]=00000000000000000000000000000000, sa_flags=none
SIGTERM: [libjvm.so+0x9b6c60], sa_mask[0]=11111111011111111101111111111110,
sa_flags=SA_RESTART|SA_SIGINFO
SIGSTKFLT: SIG_DFL, sa_mask[0]=00000000000000000000000000000000, sa_flags=none
```

```
SIGCLD: SIG_DFL, sa_mask[0]=00000000000000000000000000000000, sa_flags=none
SIGCONT: SIG_DFL, sa_mask[0]=00000000000000000000000000000000, sa_flags=none
SIGSTOP: SIG_DFL, sa_mask[0]=00000000000000000000000000000000, sa_flags=none
SIGTSTP: SIG_DFL, sa_mask[0]=00000000000000000000000000000000, sa_flags=none
SIGTTIN: SIG_DFL, sa_mask[0]=00000000000000000000000000000000, sa_flags=none
SIGTTOU: SIG_DFL, sa_mask[0]=00000000000000000000000000000000, sa_flags=none
SIGURG: SIG_DFL, sa_mask[0]=00000000000000000000000000000000, sa_flags=none
SIGXCPU: [libjvm.so+0x9b35d0], sa_mask[0]=11111111011111111101111111111110,
sa_flags=SA_RESTART|SA_SIGINFO
SIGXFSZ: [libjvm.so+0x9b35d0], sa_mask[0]=11111111011111111101111111111110,
sa_flags=SA_RESTART|SA_SIGINFO
SIGVTALRM: SIG_DFL, sa_mask[0]=00000000000000000000000000000000, sa_flags=none
SIGPROF: SIG_DFL, sa_mask[0]=00000000000000000000000000000000, sa_flags=none
SIGWINCH: SIG_DFL, sa_mask[0]=00000000000000000000000000000000, sa_flags=none
SIGPOLL: SIG_DFL, sa_mask[0]=00000000000000000000000000000000, sa_flags=none
SIGPWR: SIG_DFL, sa_mask[0]=00000000000000000000000000000000, sa_flags=none
SIGSYS: SIG_DFL, sa_mask[0]=00000000000000000000000000000000, sa_flags=none

Environment Variables -
TERM=xterm
REMOTEHOST=10.255.255.255
HOME=/home/guest
PATH=/usr/kerberos/bin:/usr/local/bin:/bin:/usr/bin:/usr/X11R6/bin
SHELL=/bin/tcsh
MAIL=/var/spool/mail/guest
LOGNAME=guest
HOSTTYPE=x86_64-linux
VENDOR=unknown
OSTYPE=linux
MACHTYPE=x86_64
SHLVL=1
PWD=/home/guest
USER=guest
GROUP=guest
HOST=LINUXAMD64PC
G_BROKEN_FILENAMES=1
SSH_ASKPASS=/usr/libexec/openssh/gnome-ssh-askpass
LANG=ja_JP.UTF-8
LESSOPEN=|/usr/bin/lesspipe.sh %s
HOSTNAME=LINUXAMD64PC
INPUTRC=/etc/inputrc
JDK_PATH=/opt/hitachi/APServer/jdk
NLSPATH=/usr/dt/lib/nls/msg/%L/%N.cat
XFILESEARCHPATH=/usr/dt/app-defaults/%L/Dt

Current Directory -
        /home/guest

Loaded Libraries
----------------
Dynamic libraries:
00400000-00401000 r-xp 00000000 08:11 2689084
                            /opt/hitachi/APServer/jdk/bin/java
00600000-00601000 rw-p 00000000 08:11 2689084
                            /opt/hitachi/APServer/jdk/bin/java
08dad000-08def000 rw-p 08dad000 00:00 0
40000000-40003000 ---p 40000000 00:00 0
40003000-40101000 rw-p 40003000 00:00 0
40101000-40102000 ---p 40101000 00:00 0
40102000-40202000 rw-p 40102000 00:00 0
40202000-40205000 ---p 40202000 00:00 0
40205000-40303000 rw-p 40205000 00:00 0
40303000-40306000 ---p 40303000 00:00 0
40306000-40404000 rw-p 40306000 00:00 0
```

```
40404000-40407000 ---p 40404000 00:00 0
40407000-40505000 rw-p 40407000 00:00 0
40505000-40508000 ---p 40505000 00:00 0
40508000-40606000 rw-p 40508000 00:00 0
40606000-40609000 ---p 40606000 00:00 0
40609000-40707000 rw-p 40609000 00:00 0
40707000-4070a000 ---p 40707000 00:00 0
4070a000-40808000 rw-p 4070a000 00:00 0
40808000-4080b000 ---p 40808000 00:00 0
4080b000-40909000 rw-p 4080b000 00:00 0
40909000-4090a000 ---p 40909000 00:00 0
4090a000-40a0a000 rw-p 4090a000 00:00 0
40a0a000-40a0d000 ---p 40a0a000 00:00 0
40a0d000-40b0b000 rw-p 40a0d000 00:00 0
e0000000-e5550000 rw-p e0000000 00:00 0
e5550000-eaaa0000 ---p e5550000 00:00 0
eaaa0000-f5550000 rw-p eaaa0000 00:00 0
f5550000-100000000 ---p f5550000 00:00 0
100000000-100080000 rw-p 100000000 00:00 0
100080000-140000000 ---p 100080000 00:00 0
3de8600000-3de861a000 r-xp 00000000 08:01 65813
                          /lib64/ld-2.5.so
3de8819000-3de881a000 r--p 00019000 08:01 65813
                          /lib64/ld-2.5.so
3de881a000-3de881b000 rw-p 0001a000 08:01 65813
                          /lib64/ld-2.5.so
3de8a00000-3de8b46000 r-xp 00000000 08:01 65814
                          /lib64/libc-2.5.so
3de8b46000-3de8d46000 ---p 00146000 08:01 65814
                          /lib64/libc-2.5.so
3de8d46000-3de8d4a000 r--p 00146000 08:01 65814
                          /lib64/libc-2.5.so
3de8d4a000-3de8d4b000 rw-p 0014a000 08:01 65814
                          /lib64/libc-2.5.so
3de8d4b000-3de8d50000 rw-p 3de8d4b000 00:00 0
3de8e00000-3de8e82000 r-xp 00000000 08:01 65817
                          /lib64/libm-2.5.so
3de8e82000-3de9081000 ---p 00082000 08:01 65817
                          /lib64/libm-2.5.so
3de9081000-3de9082000 r--p 00081000 08:01 65817
                          /lib64/libm-2.5.so
3de9082000-3de9083000 rw-p 00082000 08:01 65817
                          /lib64/libm-2.5.so
3de9200000-3de9202000 r-xp 00000000 08:01 65816
                          /lib64/libdl-2.5.so
3de9202000-3de9402000 ---p 00002000 08:01 65816
                          /lib64/libdl-2.5.so
3de9402000-3de9403000 r--p 00002000 08:01 65816
                          /lib64/libdl-2.5.so
3de9403000-3de9404000 rw-p 00003000 08:01 65816
                          /lib64/libdl-2.5.so
3de9600000-3de9615000 r-xp 00000000 08:01 65815
                          /lib64/libpthread-2.5.so
3de9615000-3de9814000 ---p 00015000 08:01 65815
                          /lib64/libpthread-2.5.so
3de9814000-3de9815000 r--p 00014000 08:01 65815
                          /lib64/libpthread-2.5.so
3de9815000-3de9816000 rw-p 00015000 08:01 65815
                          /lib64/libpthread-2.5.so
3de9816000-3de981a000 rw-p 3de9816000 00:00 0
3de9e00000-3de9e07000 r-xp 00000000 08:01 65819
                          /lib64/librt-2.5.so
3de9e07000-3dea007000 ---p 00007000 08:01 65819
                          /lib64/librt-2.5.so
```

```
3dea007000-3dea008000 r--p 00007000 08:01 65819
                          /lib64/librt-2.5.so
3dea008000-3dea009000 rw-p 00008000 08:01 65819
                          /lib64/librt-2.5.so
2aaaaaaab000-2aaaaaaac000 rw-p 2aaaaaaab000 00:00 0
2aaaaaabb000-2aaaaaabc000 rw-p 2aaaaaabb000 00:00 0
2aaaaaabc000-2aaaaaad4000 r-xp 00000000 08:11 4001108
                     /opt/hitachi/APServer/jdk/lib/amd64/jli/libjli.so
2aaaaaad4000-2aaaaacd3000 ---p 00018000 08:11 4001108
                     /opt/hitachi/APServer/jdk/lib/amd64/jli/libjli.so
2aaaaacd3000-2aaaaacd5000 rw-p 00017000 08:11 4001108
                     /opt/hitachi/APServer/jdk/lib/amd64/jli/libjli.so
2aaaaacd5000-2aaaaacd7000 rw-p 2aaaaacd5000 00:00 0
2aaaaacd7000-2aaaaba2a000 r-xp 00000000 08:11 3196297
                     /opt/hitachi/APServer/jdk/jre/lib/amd64/server/libjvm.so
2aaaaba2a000-2aaaabc2a000 ---p 00d53000 08:11 3196297
                     /opt/hitachi/APServer/jdk/jre/lib/amd64/server/libjvm.so
2aaaabc2a000-2aaaabd02000 rw-p 00d53000 08:11 3196297
                     /opt/hitachi/APServer/jdk/jre/lib/amd64/server/libjvm.so
2aaaabd02000-2aaaabd4d000 rw-p 2aaaabd02000 00:00 0
2aaaabd5c000-2aaaabd94000 rwxp 2aaaabd5c000 00:00 0
2aaaabda3000-2aaaabdad000 r-xp 00000000 08:01 65564
                       /lib64/libnss_files-2.5.so
2aaaabdad000-2aaaabfac000 ---p 0000a000 08:01 65564
                       /lib64/libnss_files-2.5.so
2aaaabfac000-2aaaabfad000 r--p 00009000 08:01 65564
                       /lib64/libnss_files-2.5.so
2aaaabfad000-2aaaabfae000 rw-p 0000a000 08:01 65564
                       /lib64/libnss_files-2.5.so
2aaaabfae000-2aaaabfbc000 r-xp 00000000 08:11 3179667
                     /opt/hitachi/APServer/jdk/jre/lib/amd64/libverify.so
2aaaabfbc000-2aaaac1bb000 ---p 0000e000 08:11 3179667
                     /opt/hitachi/APServer/jdk/jre/lib/amd64/libverify.so
2aaaac1bb000-2aaaac1bd000 rw-p 0000d000 08:11 3179667
                     /opt/hitachi/APServer/jdk/jre/lib/amd64/libverify.so
2aaaac1bd000-2aaaac1c4000 r--s 00000000 08:01 4036900
                     /usr/lib64/gconv/gconv-modules.cache
2aaaac1c4000-2aaaac1c5000 rw-p 2aaaac1c4000 00:00 0
2aaaac1ce000-2aaaac1fc000 r-xp 00000000 08:11 3179647
                     /opt/hitachi/APServer/jdk/jre/lib/amd64/libjava.so
2aaaac1fc000-2aaaac3fc000 ---p 0002e000 08:11 3179647
                     /opt/hitachi/APServer/jdk/jre/lib/amd64/libjava.so
2aaaac3fc000-2aaaac3fe000 rw-p 0002e000 08:11 3179647
                     /opt/hitachi/APServer/jdk/jre/lib/amd64/libjava.so
2aaaac3fe000-2aaaac3ff000 rw-p 2aaaac3fe000 00:00 0
2aaaac3ff000-2aaaac400000 ---p 2aaaac3ff000 00:00 0
2aaaac400000-2aaaac401000 rw-p 2aaaac400000 00:00 0
2aaaac401000-2aaaac409000 rw-s 00000000 08:01 1015818
                     /tmp/hsperfdata_guest/1518
2aaaac409000-2aaaac419000 rwxp 2aaaac409000 00:00 0
2aaaac419000-2aaaac432000 r-xp 00000000 08:11 3179672
                     /opt/hitachi/APServer/jdk/jre/lib/amd64/libzip.so
2aaaac432000-2aaaac631000 ---p 00019000 08:11 3179672
                     /opt/hitachi/APServer/jdk/jre/lib/amd64/libzip.so
2aaaac631000-2aaaac632000 rw-p 00018000 08:11 3179672
                     /opt/hitachi/APServer/jdk/jre/lib/amd64/libzip.so
2aaaac632000-2aaaac8a2000 rwxp 2aaaac632000 00:00 0
2aaaac8a2000-2aaaaf632000 ---p 2aaaac8a2000 00:00 0
2aaaaf632000-2aaaaf63c000 rw-p 2aaaaf632000 00:00 0
2aaaaf63c000-2aaaaf6f2000 ---p 2aaaaf63c000 00:00 0
2aaaaf6f2000-2aaaaf71d000 rw-p 2aaaaf6f2000 00:00 0
2aaaaf71d000-2aaaaf747000 ---p 2aaaaf71d000 00:00 0
2aaaaf747000-2aaaaf79d000 rw-p 2aaaaf747000 00:00 0
2aaaaf79d000-2aaaaf7f2000 ---p 2aaaaf79d000 00:00 0
```

```
2aaaaf7f2000-2aaaaf849000 rw-p 2aaaaf7f2000 00:00 0
2aaaaf849000-2aaaaf89e000 ---p 2aaaaf849000 00:00 0
2aaaaf89e000-2aaaafcde000 rw-p 2aaaaf89e000 00:00 0
2aaaafcde000-2aaab009e000 ---p 2aaaafcde000 00:00 0
2aaab009e000-2aaab01ae000 rwxp 2aaab009e000 00:00 0
2aaab01ae000-2aaab0386000 r--s 044e2000 08:11 3065453
                    /opt/hitachi/APServer/jdk/jre/lib/rt.jar
2aaab0386000-2aaab03d5000 rw-p 2aaab0386000 00:00 0
2aaab03d5000-2aaab0425000 rwxp 2aaab03d5000 00:00 0
2aaab0425000-2aaab39f3000 r--p 00000000 08:01 4036395
                    /usr/lib/locale/locale-archive
2aaab39f3000-2aaab3a63000 rwxp 2aaab39f3000 00:00 0
2aaab3a83000-2aaab3a93000 rwxp 2aaab3a83000 00:00 0
2aaab3ab3000-2aaab3af3000 rwxp 2aaab3ab3000 00:00 0
2aaab3b03000-2aaab3b23000 rwxp 2aaab3b03000 00:00 0
2aaab3b53000-2aaab3b63000 rwxp 2aaab3b53000 00:00 0
2aaab3b93000-2aaab3bc3000 rwxp 2aaab3b93000 00:00 0
2aaab3bc3000-2aaab3bce000 r--s 0011c000 08:11 3229434
                    /opt/hitachi/APServer/jdk/jre/lib/ext/localedata.jar
2aaab3bce000-2aaab3bea000 r--s 003b6000 08:11 3229438
                    /opt/hitachi/APServer/jdk/jre/lib/ext/cldrdata.jar
7fff54ba3000-7fff54bb9000 rw-p 7fff54ba3000 00:00 0
                      [stack]
ffffffffff600000-ffffffffffe00000 ---p 00000000 00:00 0
                  [vdso]

Stack Trace
-----------
"JavaLogRotationTimer" #9 daemon prio=5 os_prio=0 jid=<N/A>
tid=0x00002aaab3aeb800 nid=0x5f9 in Object.wait()
[0x0000000040b09000..0x0000000040b099b0]
   java.lang.Thread.State: TIMED_WAITING (on object monitor)
  stack=
[0x0000000040b0b000..0x0000000040a0d000..0x0000000040a0b000..0x0000000040a0a000]
  [user cpu time=0ms, kernel cpu time=0ms] [blocked count=1, waited count=2]
        at java.lang.Object.wait(Native Method)
        - waiting on <0x00000000e004f6f8> (a java.util.TaskQueue)
          locals:
            (java.lang.Object) this = <0x00000000e004f6f8>
            (long) [arg1] = 38779955
        at java.util.TimerThread.mainLoop(Timer.java:552)
        - locked <0x00000000e004f6f8> (a java.util.TaskQueue)
          locals:
            (java.util.TimerThread) this = <0x00000000e004fa70>
            (java.util.TimerTask) task = <0x00000000e00b99c0>
            (boolean) taskFired = false
            (long) currentTime = 1421727220892
            (long) executionTime = 1421766000847
        at java.util.TimerThread.run(Timer.java:505)
          locals:
            (java.util.TimerThread) this = <0x00000000e004fa70>

"Service Thread" #8 daemon prio=9 os_prio=0 jid=<N/A>
tid=0x00002aaab3acd800 nid=0x5f7 runnable
[0x0000000000000000..0x0000000000000000]
   java.lang.Thread.State: RUNNABLE
  stack=
[0x0000000040909000..0x000000004080b000..0x0000000040809000..0x0000000040808000]
  [user cpu time=0ms, kernel cpu time=0ms] [blocked count=0, waited count=0]

"C2 CompilerThread1" #7 daemon prio=9 os_prio=0 jid=<N/A>
tid=0x00002aaab3a3f000 nid=0x5f6 waiting on condition
[0x0000000000000000..0x0000000000000000]
   java.lang.Thread.State: RUNNABLE
```

```
  stack=
[0x0000000040808000..0x000000004070a000..0x0000000040708000..0x0000000040707000]
  [user cpu time=0ms, kernel cpu time=0ms] [blocked count=0, waited count=0]

"C2 CompilerThread0" #6 daemon prio=9 os_prio=0 jid=<N/A>
tid=0x00002aaab3a2e800 nid=0x5f5 waiting on condition
[0x0000000000000000..0x0000000000000000]
   java.lang.Thread.State: RUNNABLE
  stack=
[0x0000000040707000..0x0000000040609000..0x0000000040607000..0x0000000040606000]
  [user cpu time=0ms, kernel cpu time=0ms] [blocked count=0, waited count=0]

"Signal Dispatcher" #5 daemon prio=9 os_prio=0 jid=<N/A>
tid=0x00002aaab3a22000 nid=0x5f4 runnable
[0x0000000000000000..0x0000000000000000]
   java.lang.Thread.State: RUNNABLE
  stack=
[0x0000000040606000..0x0000000040508000..0x0000000040506000..0x0000000040505000]
  [user cpu time=0ms, kernel cpu time=0ms] [blocked count=0, waited count=0]

"FinalizerWatcherThread" #4 daemon prio=5 os_prio=0 jid=<N/A>
tid=0x00002aaab3a07800 nid=0x5f3 waiting on condition
[0x0000000040503000..0x0000000040503ab0]
   java.lang.Thread.State: TIMED_WAITING (sleeping)
  stack=
[0x0000000040505000..0x0000000040407000..0x0000000040405000..0x0000000040404000]
  [user cpu time=0ms, kernel cpu time=0ms] [blocked count=0, waited count=0]
        at java.lang.Thread.sleep(Native Method)
          locals:
            (long) [arg1] = 60000
        at java.lang.ref.Finalizer$FinalizerWatcherThread.run
(Finalizer.java:300)
          locals:
            (java.lang.ref.Finalizer$FinalizerWatcherThread)
this = <0x00000000e002e7b8>
            (int) interval = 60000
            (java.lang.String) prop = (null)
            (java.lang.Object) oldObj = (null)
            (java.lang.Object) newObj = (null)
            (long) length = 0

"Finalizer" #3 daemon prio=8 os_prio=0 jid=<N/A>
tid=0x00002aaab041c000 nid=0x5f2 in Object.wait()
[0x0000000040402000..0x0000000040402b30]
   java.lang.Thread.State: WAITING (on object monitor)
  stack=
[0x0000000040404000..0x0000000040306000..0x0000000040304000..0x0000000040303000]
  [user cpu time=0ms, kernel cpu time=0ms] [blocked count=1, waited count=2]
        at java.lang.Object.wait(Native Method)
        - waiting on <0x00000000e00064d0> (a java.lang.ref.ReferenceQueue$Lock)
          locals:
            (java.lang.Object) this = <0x00000000e00064d0>
            (long) [arg1] = 0
        at java.lang.ref.ReferenceQueue.remove(ReferenceQueue.java:143)
        - locked <0x00000000e00064d0> (a java.lang.ref.ReferenceQueue$Lock)
          locals:
            (java.lang.ref.ReferenceQueue) this = <0x00000000e00064b0>
            (long) timeout [arg1] = 0
            (java.lang.ref.Reference) r = (null)
        at java.lang.ref.ReferenceQueue.remove(ReferenceQueue.java:159)
          locals:
            (java.lang.ref.ReferenceQueue) this = <0x00000000e00064b0>
        at java.lang.ref.Finalizer$FinalizerThread.run(Finalizer.java:222)
          locals:
```

```
            (java.lang.ref.Finalizer$FinalizerThread)
this = <0x00000000e0006580>
            (sun.misc.JavaLangAccess) jla = <0x00000000e002e2d0>

"Reference Handler" #2 daemon prio=10 os_prio=0 jid=<N/A>
tid=0x00002aaab0414000 nid=0x5f1 in Object.wait()
[0x0000000040301000..0x00000000403019b0]
   java.lang.Thread.State: WAITING (on object monitor)
  stack=
[0x0000000040303000..0x0000000040205000..0x0000000040203000..0x0000000040202000]
  [user cpu time=0ms, kernel cpu time=0ms] [blocked count=0, waited count=1]
        at java.lang.Object.wait(Native Method)
        - waiting on <0x00000000e0005f40> (a java.lang.ref.Reference$Lock)
          locals:
            (java.lang.Object) this = <0x00000000e0005f40>
            (long) [arg1] = 0
        at java.lang.Object.wait(Object.java:502)
          locals:
            (java.lang.Object) this = <0x00000000e0005f40>
        at java.lang.ref.Reference$ReferenceHandler.run(Reference.java:157)
        - locked <0x00000000e0005f40> (a java.lang.ref.Reference$Lock)
          locals:
            (java.lang.ref.Reference$ReferenceHandler)
this = <0x00000000e0005fc0>

"main" #1 prio=5 os_prio=0 jid=<N/A> tid=0x00002aaaabd8c000 nid=0x5ef
waiting on condition [0x00000000400ff000..0x00000000400ffe60]
   java.lang.Thread.State: TIMED_WAITING (sleeping)
  stack=
[0x0000000040101000..0x0000000040003000..0x0000000040001000..0x0000000040000000]
  [user cpu time=110ms, kernel cpu time=60ms] [blocked count=0, waited count=0]
        at java.lang.Thread.sleep(Native Method)
          locals:
            (long) [arg1] = 5000
        at Test.main(Test.java:5)
          locals:
            (java.lang.String[]) [arg1] = <0x00000000e00bd418>
        at sun.reflect.NativeMethodAccessorImpl.invoke0(Native Method)
          locals:
            (java.lang.reflect.Method) [arg1] = <0x00000000e00bd498>
            (java.lang.Object) [arg2] = (null)
            (java.lang.Object[]) [arg3] = <0x00000000e00bd4f0>
        at sun.reflect.NativeMethodAccessorImpl.invoke
(NativeMethodAccessorImpl.java:62)
          locals:
            (sun.reflect.NativeMethodAccessorImpl) this = <0x00000000e00bd578>
            (java.lang.Object) obj [arg1] = (null)
            (java.lang.Object[]) args [arg2] = <0x00000000e00bd4f0>
        at sun.reflect.DelegatingMethodAccessorImpl.invoke
(DelegatingMethodAccessorImpl.java:43)
          locals:
            (sun.reflect.DelegatingMethodAccessorImpl)
this = <0x00000000e00bd600>
            (java.lang.Object) obj [arg1] = (null)
            (java.lang.Object[]) args [arg2] = <0x00000000e00bd4f0>
        at java.lang.reflect.Method.invoke(Method.java:483)
          locals:
            (java.lang.reflect.Method) this = <0x00000000e00bd498>
            (java.lang.Object) obj [arg1] = (null)
            (java.lang.Object[]) args [arg2] = <0x00000000e00bd4f0>
            (sun.reflect.MethodAccessor) ma = <0x00000000e00bd600>
        at JP.co.Hitachi.soft.jvm.tools.Java_hras.execJava(Java_hras.java:53)
          locals:
            (JP.co.Hitachi.soft.jvm.tools.Java_hras) this = <0x00000000e00bd400>
```

```
            (java.lang.ClassLoader) loader = <0x00000000e0049990>
            (java.lang.Class) klazz = <0x00000000e00bc498>
            (java.lang.reflect.Method) m = <0x00000000e00bd498>
        at JP.co.Hitachi.soft.jvm.tools.Java_hras.main(Java_hras.java:40)
          locals:
            (java.lang.String[]) args [arg1] = <0x00000000e00bd090>
            (java.lang.String) className [arg2] = <0x00000000e00bd060>

"VM Thread" os_prio=0 tid=0x00002aaab040c000 nid=0x5f0 runnable

"VM Periodic Task Thread" os_prio=0 tid=0x00002aaab3ad1800 nid=0x5f8
waiting on condition


Java monitor
------------
java.util.TaskQueue@0x00000000e004f6f8 no owner
    waiting to be notified: 1
        "JavaLogRotationTimer" 0x00002aaab3aeb800
java.lang.ref.ReferenceQueue$Lock@0x00000000e00064d0 no owner
    waiting to be notified: 1
        "Finalizer" 0x00002aaab041c000
java.lang.ref.Reference$Lock@0x00000000e0005f40 no owner
    waiting to be notified: 1
        "Reference Handler" 0x00002aaab0414000

JNI Information
---------------
JNI global references: 7


Full thread dump completed.   Tue Jan 20 13:13:46 2015
```

### Notes

- If the output to the directory specified in the environment variable `JAVACOREDIR` fails, the information is output in the current directory.
- If the output to the current directory fails, the information is output as a standard error. In this case, the thread dump is not output as a standard.
- When [+|-] for the options below is specified as "-", some thread information is not output.

| Option name | Information that is not output |
|---|---|
| `-XX:[+\|-]HitachiThreadDumpWithHashCode` | *hash_value* |
| `-XX:[+\|-]HitachiThreadDumpWithCpuTime` | *user_time*, *kernel_time* |
| `-XX:[+\|-]HitachiThreadDumpWithBlockCount` | *block_count*, *standby_count* |

## 7.3.2 -XX:[+|-]HitachiThreadDumpToStdout

`-XX:[+|-]HitachiThreadDumpToStdout` outputs extended thread dumps to the standard output.

## Description

`-XX:[+|-]HitachiThreadDumpToStdout` specifies whether to output extended thread dumps to the standard output.

The message below is output regardless of the specification of this option. Extended thread dumps are output to Java VM log files.

`Writing Java core to` *file_name*[#] `... OK`

#:

The file name is displayed as an absolute path.

Prerequisite option

- `-XX:+HitachiThreadDump`

## Syntax

```
-XX:[+|-]HitachiThreadDumpToStdout
```

## Specifiable values

Type: `String`

`-XX:+HitachiThreadDumpToStdout`

Outputs extended thread dumps to the standard output and to the thread dump output files.

`-XX:-HitachiThreadDumpToStdout`

Does not output extended thread dumps to the standard output. Extended thread dumps are output to the thread dump output files only.

## Default value

If the definition item is omitted:

`-XX:+HitachiThreadDumpToStdout`

## Notes

- If the output to the directory specified in the environment variable `JAVACOREDIR` fails, the information is output in the current directory.
- If the output to the current directory fails, the information is output as a standard error. In this case, the thread dump is not output as a standard.
- When [+|-] for the options below is specified as "-", some thread information is not output.

| Option name | Information that is not output |
|---|---|
| `-XX:[+\|-]HitachiThreadDumpWithHashCode` | *hash_value* |
| `-XX:[+\|-]HitachiThreadDumpWithCpuTime` | *user_time*, *kernel_time* |
| `-XX:[+\|-]HitachiThreadDumpWithBlockCount` | *block_count*, *standby_count* |

## 7.3.3 -XX:[+|-]HitachiThreadDumpWithBlockCount

`-XX:[+|-]HitachiThreadDumpWithBlockCount` outputs the following information in the thread information of extended thread dumps: the number of times that thread processing was blocked and the number of times the thread was in the wait status.

### Description

`-XX:[+|-]HitachiThreadDumpWithBlockCount` specifies whether to output the following information in the thread information of extended thread dumps: the number of times that thread processing was blocked and the number of times the thread was in the wait status.

Note that hash codes are output for the thread that is running the Java program. Hash codes are not output for the thread that is used for Java VM internal operation.

Prerequisite option

- `-XX:+HitachiThreadDump`

### Syntax

```
-XX:[+|-]HitachiThreadDumpWithBlockCount
```

### Specifiable values

Type: `String`

`-XX:+HitachiThreadDumpWithBlockCount`

Outputs the following information in the thread information of extended thread dumps: the number of times that thread processing was blocked and the number of times the thread was in the wait status.

`-XX:-HitachiThreadDumpWithBlockCount`

Does not output the following information as the thread information of extended thread dumps: the number of times that thread processing was blocked and the number of times the thread was in the wait status.

### Default value

If the definition item is omitted:

`-XX:+HitachiThreadDumpWithBlockCount`

### Notes

- If the output to the directory specified in the environment variable `JAVACOREDIR` fails, the information is output in the current directory.
- If the output to the current directory fails, the information is output as a standard error. In this case, the thread dump is not output as a standard.
- When [+|-] for the options below is specified as "-", some thread information is not output.

| Option name | Information that is not output |
|---|---|
| `-XX:[+\|-]HitachiThreadDumpWithHashCode` | *hash_value* |
| `-XX:[+\|-]HitachiThreadDumpWithCpuTime` | *user_time*, *kernel_time* |
| `-XX:[+\|-]HitachiThreadDumpWithBlockCount` | *block_count*, *standby_count* |

## 7.3.4 -XX:[+|-]HitachiThreadDumpWithCpuTime

`-XX:[+|-]HitachiThreadDumpWithCpuTime` outputs the following information in the thread information of extended thread dumps: user CPU time and kernel CPU time.

### Description

`-XX:[+|-]HitachiThreadDumpWithCpuTime` specifies whether to output the following information in the thread information of extended thread dumps: user CPU time and kernel CPU time.

The user CPU time and the kernel CPU time are output for the thread that is running the Java program. Hash codes are not output for the thread that is used for Java VM internal operation.

Prerequisite option

- `-XX:+HitachiThreadDump`

### Syntax

```
-XX:[+|-]HitachiThreadDumpWithCpuTime
```

### Specifiable values

Type: `String`

`-XX:+HitachiThreadDumpWithCpuTime`

Outputs the following information in the thread information of extended thread dumps: user CPU time and kernel CPU time from the start of the thread.

`-XX:-HitachiThreadDumpWithCpuTime`

Does not output the following information in the thread information of extended thread dumps: user CPU time and kernel CPU time from the start of the thread.

### Default value

If the definition item is omitted:

`-XX:+HitachiThreadDumpWithCpuTime`

### Notes

- If the output to the directory specified in the environment variable `JAVACOREDIR` fails, the information is output in the current directory.
- If the output to the current directory fails, the information is output as a standard error. In this case, the thread dump is not output as a standard.
- When [+|-] for the options below is specified as "-", some thread information is not output.

| Option name | Information that is not output |
|---|---|
| `-XX:[+|-]HitachiThreadDumpWithHashCode` | *hash_value* |
| `-XX:[+|-]HitachiThreadDumpWithCpuTime` | *user_time*, *kernel_time* |
| `-XX:[+|-]HitachiThreadDumpWithBlockCount` | *block_count*, *standby_count* |

## 7.3.5 -XX:[+|-]HitachiThreadDumpWithHashCode

`-XX:[+|-]HitachiThreadDumpWithHashCode` outputs hash codes in the thread information of extended thread dumps.

### Description

`-XX:[+|-]HitachiThreadDumpWithHashCode` specifies whether to output hash codes in the thread information of extended thread dumps.

Note that hash codes are output for the thread that is running the Java program. Hash codes are not output for the thread that is used for Java VM internal operation.

Prerequisite option

- `-XX:+HitachiThreadDump`

### Syntax

```
-XX:[+|-]HitachiThreadDumpWithHashCode
```

### Specifiable values

Type: `String`

`-XX:+HitachiThreadDumpWithHashCode`

Outputs hash codes in the thread information of extended thread dumps.

`-XX:-HitachiThreadDumpWithHashCode`

Does not output hash codes as the thread information of extended thread dumps.

### Default value

If the definition item is omitted:

`-XX:+HitachiThreadDumpWithHashCode`

### Notes

- If the output to the directory specified in the environment variable `JAVACOREDIR` fails, the information is output in the current directory.
- If the output to the current directory fails, the information is output as a standard error. In this case, the thread dump is not output as a standard.
- When [+|-] for the options below is specified as "-", some thread information is not output.

| Option name | Information that is not output |
|---|---|
| `-XX:[+\|-]HitachiThreadDumpWithHashCode` | *hash_value* |
| `-XX:[+\|-]HitachiThreadDumpWithCpuTime` | *user_time*, *kernel_time* |
| `-XX:[+\|-]HitachiThreadDumpWithBlockCount` | *block_count*, *standby_count* |

## 7.4 Java VM options used for Java VM log files

This section describes the options for outputting more troubleshooting information than the standard Java VM.

### 7.4.1 -XX:HitachiJavaLog

`-XX:HitachiJavaLog` specifies the prefix and the output-destination directory of Java VM log files.

#### Description

`-XX:HitachiJavaLog` specifies the prefix and the output-destination directory of Java VM log files.

If multiple Java VM processes are executed in the same current directory at the same time, or if multiple Java VM processes for which the same log output destination is specified for the `-XX:HitachiJavaLog` option are executed at the same time, information will not be output to the Java VM log files correctly. To execute multiple Java VM processes, specify the `-XX:HitachiJavaLog` option so that a different path is used as the log output destination for each process.

Prerequisite options

Specify one of the following options:

- `-XX:+HitachiVerboseGC`
- `-XX:+HitachiOutOfMemoryStackTrace`
- `-XX:+HitachiOutOfMemoryCause`
- `-XX:+HitachiOutOfMemorySize`
- `-XX:+HitachiJavaClassLibTrace`
- `-XX:+JITCompilerContinuation`

#### Syntax

```
-XX:HitachiJavaLog:character_string
```

#### Specifiable values

*character_string*

Type: `String`

Specify a prefix and a path. If this option is not specified, `javalog` is set for *character_string*. The file name after the prefix varies depending on the rotation method for Java VM log files.

If the rotation method for Java VM log files is the wraparound method, log files are created as *character_string??*`.log` (where *??* is a serial number from 01 to 99). For example, if `Samp` is specified for *character_string*, the first log file name will be `Samp01.log`.

If the rotation method for Java VM log files is the shift method, the current log file and backup log files to be output are created. The current log file is created as *character_string*`.log`, and the backup log files are created as *character_string??*`.log` (where *??* is a serial number from 01 to 98). For example, if `Samp` is specified for *character_string*, the current log file name will be `Samp.log`. When the current log file is backed up, the first backup log file name will be `Samp01.log`.

The three following patterns can be used to specify the prefix and the path.

To specify the prefix only:

Files for which the file name starts with *character_string* are output to the current directory.

To specify the path only:

If a directory is specified for *character_string*, files for which the file name starts with the default prefix `javalog` are created in the specified directory.

To specify the prefix and the path:

If both a directory and a prefix are specified for *character_string*, files are created in the specified directory. For example, if `d:\temp\Samp` is specified for *character_string*, one of the following files will be created in the `d:\temp` directory: `Samp01.log` for the wraparound method, or `Samp.log` for the shift method.

### Default value

If the definition item is omitted:

`-XX:HitachiJavaLog:javalog`

## 7.4.2 -XX:HitachiJavaLogFileSize

`-XX:HitachiJavaLogFileSize` specifies the maximum size for a single Java VM log file.

### Description

`-XX:HitachiJavaLogFileSize` specifies the maximum size for a single log file. This specification prevents the size of log files from increasing. If the size of a file reaches the maximum size, no logs are output to the file.

Prerequisite options

Specify one of the following options:

- `-XX:+HitachiVerboseGC`
- `-XX:+HitachiOutOfMemoryStackTrace`
- `-XX:+HitachiOutOfMemoryCause`
- `-XX:+HitachiOutOfMemorySize`
- `-XX:+HitachiJavaClassLibTrace`
- `-XX:+JITCompilerContinuation`

### Syntax

```
-XX:HitachiJavaLogFileSize=integer_value
```

### Specifiable values

*integer_value*

Type: `Integer`

Specify an integer value (in bytes) from 8192 through 2147483647. If you specify a value outside of this range, `8192` is set. If you specify a negative value, an error occurs.

### Default value

If the definition item is omitted:

For the wraparound method:

```
-XX:HitachiJavaLogFileSize=256k
```

For the shift method:

```
-XX:HitachiJavaLogFileSize=128M
```

## 7.4.3 -XX:[+|-]HitachiJavaLogNoMoreOutput

`-XX:[+|-]HitachiJavaLogNoMoreOutput` specifies how to output log information if an input or output error occurs during log file creation.

### Description

`-XX:[+|-]HitachiJavaLogNoMoreOutput` specifies how to output log information if an input or output error occurs during log file creation. Note that Java VM continues processing regardless of the specified value. This option applies to Java VM log files and the log files for the explicit memory management functionality.

Prerequisite options

Specify one of the following options:

- `-XX:+HitachiVerboseGC`
- `-XX:+HitachiOutOfMemoryStackTrace`
- `-XX:+HitachiOutOfMemoryCause`
- `-XX:+HitachiOutOfMemorySize`
- `-XX:+HitachiJavaClassLibTrace`
- An option other than `-XX:HitachiExplicitMemoryLogLevel:none`
- `-XX:+JITCompilerContinuation`

### Syntax

```
-XX:[+|-]HitachiJavaLogNoMoreOutput
```

### Specifiable values

Type: `String`

`-XX:+HitachiJavaLogNoMoreOutput`

If a file input or output error occurs during log file output, the following message is output to the standard error output, and then the output of log information stops.

```
Java logfile output failed.
(errno=name_of_function_that_caused_input_or_output_error:error_number)
```

`-XX:-HitachiJavaLogNoMoreOutput`

If a file input or output error occurs during log file output, the following message is output to the standard error output, the output destination of log information is changed to the standard error output, and then the output of log information continues.

```
Java logfile output failed.
(errno=name_of_function_that_caused_input_or_output_error:error_number)
Changing output to stderr
```

### Default value

If the definition item is omitted:

`-XX:+HitachiJavaLogNoMoreOutput`

## 7.4.4 -XX:HitachiJavaLogNumberOfFile

`-XX:HitachiJavaLogNumberOfFile` specifies the maximum number of Java VM log files that are to be created.

### Description

`-XX:HitachiJavaLogNumberOfFile` specifies the maximum number of Java VM log files that are to be created. This specification prevents the number of created files from increasing.

If the wraparound method is used as the rotation method, when the maximum number of files is exceeded, information is output to the file that was created first.

If the shift method is used as the rotation method, when the maximum number of files is exceeded, the oldest backup file is deleted.

Prerequisite options

Specify one of the following options:

- `-XX:+HitachiVerboseGC`
- `-XX:+HitachiOutOfMemoryStackTrace`
- `-XX:+HitachiOutOfMemoryCause`
- `-XX:+HitachiOutOfMemorySize`
- `-XX:+HitachiJavaClassLibTrace`
- `-XX:+JITCompilerContinuation`

### Syntax

```
-XX:HitachiJavaLogNumberOfFile=integer_value
```

### Specifiable values

*integer_value*

Type: `Integer`

Specify a value from 1 to 99. If you specify a value of `100` or more, `99` is set. If you specify `0`, `1` is set. If you specify a negative value, an error occurs.

### Default value

If the definition item is omitted:

For the wraparound method:

```
-XX:HitachiJavaLogNumberOfFile=4
```

For the shift method:

```
-XX:HitachiJavaLogNumberOfFile=8
```

## 7.4.5 -XX:[+|-]JavaLogAsynchronous

`-XX:[+|-]JavaLogAsynchronous` specifies whether to enable the asynchronous output functionality for log files.

### Description

`-XX:[+|-]JavaLogAsynchronous` specifies whether to enable the asynchronous output functionality for log files.

When using the asynchronous output functionality for log files, if you specify a value greater than `4096` in the `-XX:HitachiOutOfMemoryStackTraceLineSize` option or `-XX:HitachiJavaClassLibTraceLineSize` option, the functionality operates as if you specified 4,096 bytes for the number of characters per row of the stack trace that is output. When the specified number of bytes cannot be allocated, a warning message is output and no stack trace is output. In addition, if the number of characters in a row exceeds the specified number of characters, characters after "at" are deleted in order until the number of characters in that row is equal to the specified number. Then the character string of length equal the specified number of bytes is output.

### Syntax

```
-XX:[+|-]JavaLogAsynchronous
```

### Specifiable values

Type: `String`

`-XX:+JavaLogAsynchronous`

Enables the asynchronous output functionality for log files.

`-XX:-JavaLogAsynchronous`

Disables the asynchronous output functionality for log files.

### Default value

If the definition item is omitted:

```
-XX:-JavaLogAsynchronous
```

## 7.4.6 -XX:[+|-]JavaLogHeaderOutput

`-XX:[+|-]JavaLogHeaderOutput` outputs the header information when a Java VM log file is opened.

### Description

`-XX:[+|-]JavaLogHeaderOutput` specifies whether to output the header information when a Java VM log file is opened. The header information consists of the following: the Java VM version in the 1st line, and the startup command line information in the 2nd line. When specifying the maximum file size for the `-XX:HitachiJavaLogFileSize` option, you must take into account the size of the header information to be output. This option applies to Java VM log files and the log files for the explicit memory management functionality.

If the rotation type is the shift method, the Java VM log file is opened in edit mode when Java VM starts. Therefore, if Java VM starts and stops repeatedly, the log information output for each Java VM execution is written in a single Java VM log file. If this option is enabled, the time when the Java VM started can be checked in the header information, and the log information that is output for each Java VM execution can be distinguished. However, if this option is disabled, it will be difficult to distinguish the log information that is output for each Java VM execution. For this reason, we recommend that you enable this option.

### Syntax

```
-XX:[+|-]JavaLogHeaderOutput
```

### Specifiable values

Type: `String`

`-XX:+JavaLogHeaderOutput`

Outputs the header information when a Java VM log file is opened.

`-XX:-JavaLogHeaderOutput`

Does not output the header information when a Java VM log file is opened.

### Default value

If the definition item is omitted:

`-XX:+JavaLogHeaderOutput`

### Example

```
[JVM]<Fri May 30 19:27:24 2014>Java HotSpot(TM) 64-Bit Server VM
(24.51-b03-HJDK1000-20140529) for windows-amd64 JRE
(1.7.0_51-b13-HJDK1000-20140529), built on May 29 2014 16:04:41 by "Java"
with unknown MS VC++:1600
[JVM]Command : C:\Hitachi\APServer\jdk\bin\java.exe
-Djava.class.path=. -XX:+HitachiVerboseGC HelloWorld
```

## 7.4.7 -XX:JavaLogRotationTime

`-XX:JavaLogRotationTime` specifies the rotation time of the Java VM log file.

## Description

If the rotation type of the Java VM log file is the shift method, `-XX:JavaLogRotationTime` specifies the time when the output destination file is to be switched. This option applies to Java VM log files and the log files for the explicit memory management functionality. The Java VM log files will be switched at the time specified in this option. If this option is omitted or a value that is outside of the specifiable range is specified, the log files will be switched at the default time of 00:00:00 (midnight). If the rotation type is the wraparound method (`-XX:JavaLogRotationType:WRAP`), the functionality for switching output destination files at a specific time cannot be used.

Depending on certain conditions (for example, when there is a heavy load on OS resources or a thread is in the stopped status during GC execution), the switching of the output destination files might be delayed by a few milliseconds or a few seconds from the specified time. Even if the switching time is delayed, the delay will not carry over to the next switching time, because the next switch will occur at the specified time.

Note that, depending on the delay in the switch timing, there might be a margin of error in the time when log information is output to the backup log and the current log file. For example, if you specify `000000` (00:00:00) in this option, the log information before and after 00:00:00 might be output to two files. If the asynchronous output functionality for the log file is used, there might be a margin of error between the switching time and the time when log information is output, because the log is output to the log file asynchronously via a thread that is used exclusively for log output.

The output destination file is switched everyday at the specified time. However, if you specify a time that is earlier than the current time, the Java VM log file will switched at the specified time on the next day. For example, if you specify `144500` (14:45:00) in this option and then start Java at 15:00:00 on February 12, 2014, the Java VM log file will be switched at 14:45:00 on February 13, 2014.

## Syntax

```
-XX:JavaLogRotationTime:applicable_range
```

## Specifiable values

*applicable_range*

Type: `Integer`

Specifies the time. Specify the time in the HHMMSS format as a value from 000000 to 235959. Specify with 6 numbers without using any delimiter characters (such as colons). If you specify an incorrect time value that is outside of the specifiable range, the default value is set.

## Default value

If the definition item is omitted:

`-XX:JavaLogRotationTime:000000`

If the value is omitted:

`-XX:JavaLogRotationTime:000000`

# 7.4.8 -XX:JavaLogRotationType

`-XX:JavaLogRotationType` specifies the rotation type of the Java VM log files.

## Description

`-XX:JavaLogRotationType` specifies the rotation type of the Java VM log files. This option applies to Java VM log files and the log files for the explicit memory management functionality.

## Syntax

```
-XX:JavaLogRotationType:character_string
```

## Specifiable values

*character_string*

Type: `String`

`WRAP`

Sets the wraparound method as the rotation type of the Java VM log file.

`SHIFT`

Sets the shift method as the rotation type of the Java VM log file.

If you omit this option, or specify a value other than `WRAP` or `SHIFT`, the shift method is set by default.

## Default value

If the definition item is omitted:

```
-XX:JavaLogRotationType:SHIFT
```

If the value is omitted:

```
-XX:JavaLogRotationType:SHIFT
```

## 7.5 Java VM options used for the detailed time output

This section describes the options used to specify the format of the time information that is output to Java VM log.

### 7.5.1 -XX:[+|-]HitachiOutputMilliTime

`-XX:[+|-]HitachiOutputMilliTime` outputs the time (accurate to the millisecond) to the Java VM log files.

#### Description

`-XX:[+|-]HitachiOutputMilliTime` specifies whether to output the time accurate to the millisecond. This option applies to Java VM log files and the log files for the explicit memory management functionality.

Prerequisite option

Specify one of the following:

- `-XX:+HitachiVerboseGC`
- `-XX:+HitachiOutOfMemoryStackTrace`
- `-XX:+HitachiOutOfMemoryCause`
- `-XX:+HitachiOutOfMemorySize`
- `-XX:+HitachiJavaClassLibTrace`
- Option other than `-XX:HitachiExplicitMemoryLogLevel:none`
- `-XX:+JITCompilerContinuation`

#### Syntax

```
-XX:[+|-]HitachiOutputMilliTime
```

#### Specifiable values

Type: `String`

`-XX:+HitachiOutputMilliTime`

Outputs the time (accurate to the millisecond) to the Java VM log files.

`-XX:-HitachiOutputMilliTime`

Outputs the time (accurate to the second) to the Java VM log files.

#### Default value

If the definition item is omitted:

`-XX:-HitachiOutputMilliTime`

#### Examples

- Output of the extended verbosegc information

```
[VGC]<Fri Feb 06 14:09:04.661 2015>[GC 5339K->3061K(8256K), 0.0019990 secs]
[DefNew::Eden:  2688K->0K(2688K)][DefNew::Survivor:  0K->64K(64K)]
```

```
[Tenured:  2651K->2997K(5504K)]
[Metaspace:  9753K(10808K, 10880K)->9753K(10808K, 10880K)]
[class space:  3612K(3708K, 3712K)->3612K(3708K, 3712K)]
[cause:ObjAllocFail][User:  0.0000000 secs][Sys:  0.0000000 secs]
[IM:  8685K, 14240K, 0K][TC:  10][DOE:  0K, 0][CCI:  791K, 49152K, 2496K]
```

- Output when an OutOfMemoryError occurs

```
[OOM][Thread:  0x00957820]<Wed Mar 17 00:47:00.662 2004>
[java.lang.OutOfMemory Error :(C Heap) :340]
```

- Output of the class library trace

```
[CLT][Thread:  0x00286348]<Wed Mar 17 00:47:00.662 2004>
[CLT][Thread:  0x00286348] at java.lang.Shutdown.halt0(Native Method)
[CLT][Thread:  0x00286348] at java.lang.Shutdown.halt(Shutdown.java:145)
```

- JIT compiler continuation function (JIT compiler failure information)

```
[JCC][Thread:  0x05432c00]<Thu Nov 15 17:10:40.347 2012>
[Method:  chosa_cmp.func(Ljava/lang/String;)V][Fail:  3][JITCT:  1]
```

## 7.6 Java VM options used for the extended verbosegc functionality

This section describes the options for specifying the settings for outputting the extended verbosegc information when GC occurs.

### 7.6.1 -XX:[+|-]HitachiCommaVerboseGC

`-XX:[+|-]HitachiCommaVerboseGC` outputs the extended verbosegc information in CSV format.

#### Description

`-XX:[+|-]HitachiCommaVerboseGC` specifies whether to output the extended verbosegc information in CSV format.

Prerequisite option

- `-XX:+HitachiVerboseGC`

Output format (for SerialGC)

Output format when the `-XX:-HitachiVerboseGCIntervalTime` option is specified:

```
id,date,full_count,copy_count,gc_kind,gc_info,gc_time,eden_info,
survivor_info,tenured_info,metaspace_info,classspace_info,cause_info,
user_cpu,system_cpu,jvm_alloc_size,mmap_total_size,malloc_total_size,
thread_count,doe_alloc_size,called_count,cc_used_size,cc_max_size,cc_info
```

The following provides details about the output.

| Output item | Output content |
|---|---|
| *id* | Java VM log file identifier. |
| *date* | Start date and time of GC. This information is not output if the `-XX:-HitachiVerboseGCPrintDate` option is specified. |
| *full_count* | Number of times output of the Full GC information is skipped.<br>This information is output if the `-XX:HitachiVerboseGCIntervalTime` option is specified. |
| *copy_count* | The number of times output of the CopyGC information is skipped.<br>This information is output if the `-XX:HitachiVerboseGCIntervalTime` option is specified. |
| *gc_kind* | GC type. `FullGC` or `GC` is output. |
| *gc_info* | GC information. This information is output in the following format, where values are given in units of kilobytes:<br>*area_length_before_GC*,*area_length_after_GC*,*area_size* |
| *gc_time* | Elapsed GC time. This information is output in units of seconds. |
| *eden_info* | Eden information. This information is output in the following format, where values are given in units of kilobytes:<br>*area_length_before_GC*,*area_length_after_GC*,*area_size* |
| *survivor_info* | Survivor information. This information is output in the following format, where values are given in units of kilobytes:<br>*area_length_before_GC*,*area_length_after_GC*,*area_size* |

| Output item | Output content |
|---|---|
| *tenured_info* | Tenured information. This information is output in the following format, where values are given in units of kilobytes:<br>*area_length_before_GC*,*area_length_after_GC*,*area_size* |
| *metaspace_info* | Metaspace information. This information is output in the following format, where values are given in units of kilobytes:<br>*size_of_used_Metaspace_area_before_GC*,*capacity_of_Metaspace_area_before_GC*,*size_of_committed_Metaspace_area_before_GC*,*size_of_used_Metaspace_area_after_GC*,*capacity_of_Metaspace_area_after_GC*,*size_of_committed_Metaspace_area_after_GC* |
| *classspace_info* | Compressed Class Space information. This information is output in the following format, where values are given in units of kilobytes:<br>*size_of_used_Compressed_Class_Space_before_GC*,*capacity_of_Compressed_Class_Space_before_GC*,*size_of_committed_Compressed_Class_Space_before_GC*,*size_of_used_Compressed_Class_Space_after_GC*,*capacity_of_Compressed_Class_Space_after_GC*,*size_of_committed_Compressed_Class_Space_after_GC*<br>If the functionality for the compressed object pointer is not used, `0` is output for each size. |
| *cause_info* | GC factor number.<br>This information is not output if the `-XX:-HitachiVerboseGCPrintCause` option is specified. |
| *user_cpu* | Amount of CPU time that the GC thread spent in user mode. This information is output in units of seconds.<br>If acquisition of the CPU time fails, `unknown` is displayed.<br>This information is not output if the `-XX:-HitachiVerboseGCCpuTime` option is specified. |
| *system_cpu* | Amount of CPU time that the GC thread spent in kernel mode. This information is output in units of seconds.<br>If acquisition of the CPU time fails, `unknown` is displayed.<br>This information is not output if the `-XX:-HitachiVerboseGCCpuTime` option is specified. |
| *jvm_alloc_size* | Of the areas managed in Java VM, the size of the area that is currently in use (of the total size of `mmap_total_size` and `malloc_total_size`, the size of the area that is currently in use). This information is output in units of kilobytes.<br>This information is not output if the `-XX:-HitachiVerboseGCPrintJVMInternalMemory` option is specified. |
| *mmap_total_size* | Of the areas managed in Java VM, the total size of the C heap assigned by mmap. This information is output in units of kilobytes.<br>This information is not output if the `-XX:-HitachiVerboseGCPrintJVMInternalMemory` option is specified. |
| *malloc_total_size* | Of the areas managed in Java VM, the total size of the C heap assigned by `malloc`. This information is output in units of kilobytes.<br>This information is not output if the `-XX:-HitachiVerboseGCPrintJVMInternalMemory` option is specified. |
| *thread_count* | Number of Java threads.<br>This information is not output if the `-XX:-HitachiVerboseGCPrintThreadCount` option is specified. |
| *doe_alloc_size* | Accumulated size of the heap that was secured by calling `java.io.File.deleteOnExit()`. This information is output in units of kilobytes.<br>This information is not output if the `-XX:-HitachiVerboseGCPrintDeleteOnExit` option is specified. |
| *called_count* | Number of times `java.io.File.deleteOnExit()` was called. |

| Output item | Output content |
|---|---|
| | This information is not output if the `-XX:-HitachiVerboseGCPrintDeleteOnExit` option is specified. |
| *cc_used_size* | Size of the used code cache area when GC occurred. This information is output in units of kilobytes.<br>This information is not output if the `-XX:-PrintCodeCacheInfo` option is specified. |
| *cc_max_size* | Maximum size of the code cache area. This information is output in units of kilobytes.<br>This information is not output if the `-XX:-PrintCodeCacheInfo` option is specified. |
| *cc_info* | Maintenance information.<br>This information is not output if the `-XX:-PrintCodeCacheInfo` option is specified. |

Output format when the `-XX:+HitachiVerboseGCPrintTenuringDistribution` option is specified:

```
id, date, size, value, max_value, total_age1, total_age2, total_age_n
```

The following provides details about the output.

| Output item | Output content |
|---|---|
| *id* | `PTD` (JavaVM log file identifier). |
| *date* | Date and time the GC started. |
| *size* | Target size of the objects in the Survivor area after GC. |
| *value* | Tenure threshold value for the Java objects that will be promoted to the Tenured area in the next CopyGC.<br>This value is dynamically set for each CopyGC, based on the values specified in the `-XX:MaxTenuringThreshold=`*value* option, the memory size of the Survivor area, and the `-XX:TargetSurvivorRatio=`*value* option.<br>The Java objects for which the tenure value is *value* or more will be promoted to the Tenured area in the next CopyGC. |
| *max_value* | Maximum value (the value specified in the `MaxTenuringThreshold` option) of the tenure threshold value (*value*) for the Java objects that will be promoted to the Tenured area in the CopyGC.<br>*value* is dynamically set for each CopyGC, but does not exceed *max_value*.<br>The Java objects for which the tenure value is *max_value* or more always will be promoted to the Tenured area in the next CopyGC. |
| *total_age1* | Total number of bytes of 1-year-old objects. |
| *total_age2* | Total number of bytes of 1-to-2-year-old objects. |
| *total_agen* | Total number of bytes of 1-to-n-year-old objects.<br>If n is close to *max_value*, it means that an object with a long life exists. |

Output format (for G1GC)

Log entries related to GC and log entries related to concurrent marking are output to the Java VM log file. The log entry for one concurrent marking is divided into two or more lines for output, because concurrent marking executes processing in parallel with other applications.

Output format of the log entries related to GC

```
id,date,gc_kind,gc_info,gc_time,gc_status,eden_info,survivor_info,tenured_info,
humongous_info,free_info,metaspace_info,classspace_info,cause_info,
region_size,target_time,predicted_time,target_size,reclaimable_info,user_cpu,
system_cpu,jvm_alloc_size,mmap_total_size,malloc_total_size,thread_count,
doe_alloc_size,called_count,cc_used_size,cc_max_size,cc_info
```

Output format of the log entries related to concurrent marking

```
id,date,cm_event,user_cpu,sys_spu
```

The following provides details about the output.

| Classification | Output item | Output content |
|---|---|---|
| Log entry related to GC | *id* | `VG1` (Java VM log file identifier) |
| | *date* | Start date and time of GC.<br>This information is not output if the `-XX:-HitachiVerboseGCPrintDate` option is specified. |
| | *gc_kind* | Type of GC or Concurrent Marking. One of the following is output: `FullGC`, `Mixed GC`, `Young GC`, `Young GC(initial-mark)`, `CM Remark`, or `CM Cleanup`. |
| | *gc_info* | Memory information of the JavaHeap area. This information is output in the following format, where values are given in units of kilobytes:<br>*size_of_used_JavaHeap_area_before_GC*,*size_of_used_JavaHeap_area_before_GC*#,*size_of_used_JavaHeap_area_before_GC*#,*size_of_used_JavaHeap_area_after_GC*,*size_of_used_JavaHeap_area_after_GC*#,*size_of_used_JavaHeap_area_after_GC*# |
| | *gc_time* | Amount of time for which the application stopped due to GC. This information is output in units of seconds. |
| | *gc_status* | GC status.<br>• When a To space overflow occurs, `to exhausted` is output.<br>• In cases other than the above, `-` is output.<br>For each type of GC, the GC status is output as follows.<br>• When *gc_kind* is `Young GC`, `Young GC(initial-mark)`, or `Mixed GC`:<br>`-` or `to exhausted` is output.<br>• When *gc_kind* is a type other than the above:<br>`-` is output. |
| | *eden_info* | Memory information of the Eden area. This information is output in the following format, where values are given in units of kilobytes:<br>*size_of_used_Eden_area_before_GC*#,*maximum_size_that_can_be_acquired_by_Eden_area_before_GC*#,*size_of_used_Eden_area_after_GC*#,*maximum_size_that_can_be_acquired_by_Eden_area_after_GC*#<br>"maximum_size_that_can_be_acquired_by_Eden_area_before_GC" refers to "*size_of_New_area - size_of_Survivor_area*". |
| | *survivor_info* | Memory information of the Survivor area. This information is output in the following format, where values are given in units of kilobytes:<br>*size_of_used_Survivor_area_before_GC*#,*size_of_used_Survivor_area_after_GC*# |
| | *tenured_info* | Memory information of the Tenured area. This information is output in the following format, where values are given in units of kilobytes:<br>*size_of_used_Tenured_area_before_GC*#,*size_of_used_Tenured_area_after_GC*# |
| | *humongous_info* | Memory information of the Humongous area. This information is output in the following format, where values are given in units of kilobytes:<br>*size_of_used_Humongous_area_before_GC*#,*size_of_used_Humongous_area_after_GC*# |
| | *free_info* | Memory information of the Free area. This information is output in the following format, where values are given in units of kilobytes: |

| Classification | Output item | Output content |
|---|---|---|
| | | *size_of_used_Free_area_before_GC*#,*size_of_used_Free_area_after_GC*# |
| | *metaspace_info* | Metaspace information. This information is output in the following format, where values are given in units of kilobytes:<br>*size_of_used_Metaspace_area_before_GC*,*capacity_of_Metaspace_area_before_GC*,*size_of_committed_Metaspace_area_before_GC*,*size_of_used_Metaspace_area_after_GC*,*capacity_of_Metaspace_area_after_GC*,*size_of_committed_Metaspace_area_after_GC* |
| | *classspace_info* | Compressed Class Space information. This information is output in the following format, where values are given in units of kilobytes:<br>*size_of_used_Compressed_Class_Space_before_GC*,*capacity_of_Compressed_Class_Space_before_GC*,*size_of_committed_Compressed_Class_Space_before_GC*,*size_of_used_Compressed_Class_Space_after_GC*,*capacity_of_Compressed_Class_Space_after_GC*,*size_of_committed_Compressed_Class_Space_after_GC*<br>If the functionality for the compressed object pointer is not used, `0` is output for each size. |
| | *cause_info* | GC factor number.<br>This information is not output if the `-XX:-HitachiVerboseGCPrintCause` option is specified. |
| | *region_size* | Size of a single region. This information is output in units of kilobytes. |
| | *target_time* | Target amount of time for which applications are stopped due to GC. This information is output in units of seconds.<br>You can specify the target time by using the `-XX:+ MaxGCPauseMillis` option. |
| | *predicted_time* | Amount of time for which applications will be stopped due to GC, as predicted by Java VM. This information is output in units of seconds.<br>If the GC type is `Full GC`, `CM Remark`, or `CM Cleanup`, Java VM does not predict the stop time, and `0` is output. |
| | *target_size* | Size of the Tenured area that is subject to Mixed GC. This information is output in units of kilobytes.<br>If the GC type is not `Mixed GC`, `0` is output. |
| | *reclaimable_info* | Information about the predicted collection size. This information is output in the following format:<br>*predicted_collection_size*,*predicted_collection_rate*<br>The predicted collection size is output in units of kilobytes. The predicted collection rate is output as a value with two decimal places.<br>Note that the information about the predicted collection size is output only for Young GC or Mixed GC immediately after Concurrent Marking. In other cases, Java VM does not predict the collection size, and `0` is output. |
| | *user_cpu* | Total CPU time that all GC threads spent in user mode. This information is output in units of seconds.<br>If acquisition of the CPU time fails, `unknown` is displayed, as in "`[User: unknown]`".<br>This information is not output if the `-XX:-HitachiVerboseGCCpuTime` option is specified. |
| | *system_cpu* | Total CPU time that all GC threads spent in kernel mode. This information is output in units of seconds.<br>If acquisition of the CPU time fails, `unknown` is displayed, as in "`[Sys: unknown]`".<br>This information is not output if the `-XX:-HitachiVerboseGCCpuTime` option is specified. |

| Classification | Output item | Output content |
|---|---|---|
| | *jvm_alloc_size* | Of the areas managed in Java VM, the size of the area that is currently in use (of the total size of *mmap_total_size* and *malloc_total_size*, the size of the area that is currently in use).<br>This information is not output if the `-XX:-HitachiVerboseGCPrintJVMInternalMemory` option is specified. |
| | *mmap_total_size* | Of the areas managed in Java VM, the total size of the C heap assigned by mmap.<br>This information is not output if the `-XX:-HitachiVerboseGCPrintJVMInternalMemory` option is specified. |
| | *malloc_total_size* | Of the areas managed in Java VM, the total size of the C heap assigned by malloc.<br>This information is not output if the `-XX:-HitachiVerboseGCPrintJVMInternalMemory` option is specified. |
| | *thread_count* | Number of Java threads.<br>This information is not output if the `-XX:-HitachiVerboseGCPrintThreadCount` option is specified. |
| | *doe_alloc_size* | Accumulated size of the heap that was secured by calling java.io.File.deleteOnExit().<br>This information is not output if the `-XX:-HitachiVerboseGCPrintDeleteOnExit` option is specified. |
| | *called_count* | Number of times java.io.File.deleteOnExit() was called.<br>This information is not output if the `-XX:-HitachiVerboseGCPrintDeleteOnExit` option is specified. |
| | *cc_used_size* | Size of the used code cache area when GC occurred. This information is output in units of kilobytes.<br>This information is not output if the `-XX:-PrintCodeCacheInfo` option is specified. |
| | *cc_max_size* | Maximum size of the code cache area. This information is output in units of kilobytes.<br>This information is not output if the `-XX:-PrintCodeCacheInfo` option is specified. |
| | *cc_info* | Maintenance information.<br>This information is not output if the `-XX:-PrintCodeCacheInfo` option is specified. |
| Log entry related to concurrent marking | *id* | `VCM` (Java VM log file identifier) |
| | *date* | Start date and time of Concurrent Marking.<br>This information is not output if the `-XX:-HitachiVerboseGCPrintDate` option is specified. |
| | *cm_event* | Status of Concurrent Marking.<br>• `Concurrent Root Region Scan Start`<br>The Concurrent Root Region Scan started.<br>• `Concurrent Root Region Scan End`<br>The Concurrent Root Region Scan ended.<br>• `Concurrent Mark Start`<br>The Concurrent Mark started.<br>• `Concurrent Mark End`<br>The Concurrent Mark ended.<br>• `Concurrent Mark Stop`<br>The Concurrent Mark stopped.<br>• `Concurrent Cleanup Start`<br>The Concurrent Cleanup started.<br>• `Concurrent Cleanup End`<br>The Concurrent Cleanup ended. |

| Classification | Output item | Output content |
|---|---|---|
| | *user_cpu* | Total CPU time that all GC threads spent in user mode. This information is output in units of seconds.<br>If acquisition of the CPU time fails, `unknown` is displayed, as in "`[User: unknown]`".<br>This information is not output if the `-XX:-HitachiVerboseGCCpuTime` option is specified.<br>If the status of the Concurrent Marking is `Concurrent Mark Start`, `0` is output. |
| | *sys_cpu* | Total CPU time that all GC threads spent in kernel mode. This information is output in units of seconds.<br>If acquisition of the CPU time fails, `unknown` is displayed, as in "`[Sys: unknown]`".<br>This information is not output if the `-XX:-HitachiVerboseGCCpuTime` option is specified.<br>If the status of the Concurrent Marking is `Concurrent Mark Start`, `0` is output. |

#

The size is estimated by rounding up the area size to the size of one region, and represented as a multiple of the size of one region.

The GC factor numbers output to *cause_info* are as follows.

Table 7-3: List of GC causes

| Cause number | Cause content | Description | GC type | |
|---|---|---|---|---|
| | | | Other than G1GC | G1GC |
| 0 | `ObjAllocFail` | GC occurred because the object area could not be allocated. | Y | Y |
| 1 | `System.gc` | GC occurred because the java.lang.System.gc method was called. | Y | Y |
| 3 | `DelayedGC` | GC that was suspended by JNI or JVMTI was started. | Y | Y |
| 4 | `JavaGCCommand` | GC occurred due to the `javagc` command. | Y | Y |
| 6 | `JHeapProfCommand` | GC occurred due to the `jheapprof` command. | Y | N |
| 8 | `EMReclaimFail` | Because objects were moved to the Java heap due to explicit release of Explicit memory, the Java heap overflowed. | Y | N |
| 9 | `EMMigrateFail` | Because objects were moved to the Java heap due to automatic release of Explicit memory, the Java heap overflowed. | Y | N |
| 10 | `JVMTIForceGC` | GC occurred due to the JVMTI function ForceGarbageCollection(). | Y | Y |
| 11 | `PromotionFail` | GC occurred due to a CopyGC promotion failure. | Y | N |
| 12 | `EMJavaGCCommand` | GC occurred because an Explicit memory block was released by the `javagc` command. | Y | Y |
| 13 | `EHeapProfCommand` | GC occurred due to the `eheapprof` command. | Y | Y |
| 14 | `G1HumAllocFail` | When G1GC was used, GC occurred because a Humongous area was allocated. | N | Y |
| 15 | `G1EvacuationPause` | An evacuation occurred when G1GC was used. | N | Y |
| 16 | `Concurrent Marking` | No GC occurred but the Concurrent Marking processing, which stops and executes applications, was logged. | N | Y |

| Cause number | Cause content | Description | GC type | |
|---|---|---|---|---|
| | | | Other than G1GC | G1GC |
| 17 | EvacuationFail | When G1GC was used, GC occurred due to an evacuation failure. | N | Y |
| 18 | MetaspaceAllocFail | GC occurred because the Metaspace area could not be allocated. | Y | Y |
| 19 | LastMetaspaceGC | The last GC occurred before a Metaspace OutOfMemory error occurred. | Y | Y |

Legend:

Y: Output.

N: Not output.

## Syntax

```
-XX:[+|-]HitachiCommaVerboseGC
```

## Specifiable values

Type: String

`-XX:+HitachiCommaVerboseGC`

Outputs the extended verbosegc information delimited by commas, so that the information can be imported to a CSV format file.

All parentheses `()`, square brackets `[]`, angle brackets <>, and colons (`:`) in the extended verbosegc information are deleted, and the resulting information in which values and character strings are delimited by commas (`,`) is output.

`-XX:-HitachiCommaVerboseGC`

The extended verbosegc information is output in a normal format.

## Default value

If the definition item is omitted:

`-XX:-HitachiCommaVerboseGC`

## Examples

Example of output 1

When SerialGC is used and the `-XX:HitachiVerboseGCIntervalTime` option is specified

```
VGC,Thu Oct 02 10:38:52.442 2014,1,0,0,Full GC,770,682,8064,0.0040002,88,0,2304,
0,0,256,681,682,5504,3634,3634,4492,3634,3634,4492,356,356,388,356,356,388,1,0.
0000000,0.0000000,11913,12448,0,22,0,0,1173,245760,2496
```

Example of output 2

When SerialGC is used and the `-XX:+HitachiVerboseGCPrintTenuringDistribution` option is specified

```
PTD,Wed May 28 11:45:23 2008,5467547,30,31,1357527,1539661
```

Example of output 3

When G1GC is used

- GC-related log

```
VG1,Thu Oct 02 10:38:54.920 2014,Full GC,753,2048,8192,678,1024,8192,0.0064767,
-,1024,2048,0,2048,0,0,1024,1024,0,0,6144,7168,3634,3634,4492,3634,3634,4492,
356,356,388,356,356,388,1,1024,0.2000000,0.0000000,0,0,0.00,0.0000000,
0.0000000,20459,21920,0,35,0,0,1171,245760,2496
```

- Concurrent Marking related log

```
VCM,Fri Jul 26 21:35:50 2013,Concurrent Mark Start,0.0000000,0.0000000
VCM,Fri Jul 26 21:35:50 2013,Concurrent Mark End,0.0124532,0.0245698
```

## 7.6.2 -XX:[+|-]HitachiVerboseGC

`-XX:[+|-]HitachiVerboseGC` outputs the extended verbosegc information to the Java VM log file when GC occurs.

### Description

`-XX:[+|-]HitachiVerboseGC` specifies whether the extended verbosegc information is to be output when GC occurs.

Output format (for SerialGC)

```
[id] <date> (Skip Full:full_count, Copy:copy_count)
[gc_kind gc_info, gc_time secs][Eden: eden_info][Survivor: survivor_info]
[Tenured: tenured_info][Metaspace: Metaspace_info]
[class space: class_space_info] [cause:cause_info] [User: user_cpu secs]
[Sys:  system_cpu secs][IM: jvm_alloc_size, mmap_total_size, malloc_total_size]
[TC: thread_count][DOE: doe_alloc_size, called_count]
[CCI: cc_used_sizeK, cc_max_sizeK, cc_infoK]
```

The following provides details about the output.

| Output item | Output content |
|---|---|
| *id* | `VGC` (Java VM log file identifier) |
| *date* | Start date and time of GC<br>This information is not output if the `-XX:-HitachiVerboseGCPrintDate` option is specified. |
| *full_count* | Number of times output of the full GC information was skipped.<br>This information is output if the `-XX:HitachiVerboseGCIntervalTime` option is specified. |
| *copy_count* | Number of times output of the CopyGC information was skipped.<br>This information is output if the `-XX:HitachiVerboseGCIntervalTime` option is specified. |
| *gc_kind* | GC type. Either `FullGC` or `GC` is output. |
| *gc_info* | GC information. This information is output in the following format:<br>*area_length_before_GC* `->` *area_length_after_GC* `(`*area_size*`)` |
| *gc_time* | Elapsed GC time. |
| *Eden* | Eden type. `DefNew::Eden` is output. |
| *eden_info* | Eden information. This information is output in the following format: |

| Output item | Output content |
|---|---|
| | *area_length_before_GC -> area_length_after_GC (area_size)* |
| *Survivor* | Survivor type. `DefNew::Survivor` is output. |
| *survivor_info* | Survivor information. This information is output in the following format:<br>*area_length_before_GC -> area_length_after_GC (area_size)* |
| *Tenured* | Tenured type. `Tenured` is output. |
| *tenured_info* | Tenured information. This information is output in the following format:<br>*area_length_before_GC -> area_length_after_GC (area_size)* |
| *Metaspace_info* | Memory information of the Metaspace area. This information is output in the following format:<br>*size_of_used_Metaspace_area_before_GC*K(*capacity_size_of_Metaspace_area_before_GC*K, *commit_size_of_Metaspace_area_before_GC*K)->*size_of_used_Metaspace_area_after_GC*K(*capacity_size_of_Metaspace_area_after_GC*K, *commit_size_of_Metaspace_area_after_GC*K) |
| *classspace_info* | Memory information of the Compressed Class Space. This information is output in the following format:<br>*size_of_used_Compressed_Class_Space_before_GC*K(*capacity_size_of_Compressed_Class_Space_before_GC*K, *commit_size_of_Compressed_Class_Space_before_GC*K)->*size_of_used_Compressed_Class_Space_after_GC*K(*capacity_size_of_Compressed_Class_Space_after_GC*K, *commit_size_of_Compressed_Class_Space_after_GC*K)<br>This information is not output if the functionality for the compressed object pointer is not used. |
| *cause_info* | Details on the cause of GC.<br>This information is not output if the `-XX:-HitachiVerboseGCPrintCause` option is specified. |
| *user_cpu* | Amount of CPU time that the GC thread spent in user mode. This information is output in units of seconds.<br>If acquisition of the CPU time fails, `unknown` is displayed, as in `[User:unknown]`.<br>This information is not output if the `-XX:-HitachiVerboseGCCpuTime` option is specified. |
| *system_cpu* | Amount of CPU time that the GC thread spent in kernel mode. This information is output in units of seconds.<br>If acquisition of the CPU time fails, `unknown` is displayed, as in `[Sys:unknown]`.<br>This information is not output if the `-XX:-HitachiVerboseGCCpuTime` option is specified. |
| *jvm_alloc_size* | Of the total size of the areas managed in Java VM (the sum of *mmap_total_size* and *malloc_total_size*), the size of the area that is currently in use<br>This information is not output if the `-XX:-HitachiVerboseGCPrintJVMInternalMemory` option is specified. |
| *mmap_total_size* | Of the areas managed in Java VM, the total C heap size allocated by mmap<br>This information is not output if the `-XX:-HitachiVerboseGCPrintJVMInternalMemory` option is specified. |
| *malloc_total_size* | Of the areas managed in Java VM, the total C heap size allocated by malloc<br>This information is not output if the `-XX:-HitachiVerboseGCPrintJVMInternalMemory` option is specified. |
| *thread_count* | Number of Java threads<br>This information is not output if the `-XX:-HitachiVerboseGCPrintThreadCount` option is specified. |
| *doe_alloc_size* | Cumulative size of the heap that was allocated when java.io.File.deleteOnExit() was called<br>This information is not output if the `-XX:-HitachiVerboseGCPrintDeleteOnExit` option is specified. |

| Output item | Output content |
|---|---|
| *called_count* | Number of times java.io.File.deleteOnExit() was called.<br>This information is not output if the `-XX:-HitachiVerboseGCPrintDeleteOnExit` option is specified. |
| *cc_used_size* | Size of the used code cache area when GC occurred. This information is output in units of kilobytes.<br>This information is not output if the `-XX:-PrintCodeCacheInfo` option is specified. |
| *cc_max_size* | Maximum size of the code cache area. This information is output in units of kilobytes.<br>This information is not output if the `-XX:-PrintCodeCacheInfo` option is specified. |
| *cc_info* | Maintenance information<br>This information is not output if the `-XX:-PrintCodeCacheInfo` option is specified. |

Format of output (for G1GC)

Log entries related to GC and log entries related to Concurrent Marking are output to the Java VM log file. The log entry for one instance of Concurrent Marking is output into two or more lines, because Concurrent Marking is executed in parallel with other applications.

Format of output for the log entries related to GC

```
[id]<date>[gc_kind gc_info, gc_time secs][Status:gc_status]
[G1GC::Eden: eden_info][G1GC::Survivor: survivor_info]
[G1GC::Tenured: tenured_info][G1GC::Humongous: humongous_info]
[G1GC::Free: free_info][Metaspace: Metaspace_info]
[class space: class_space_info][cause:cause_info][RegionSize: region_sizeK]
[Target: target_time secs][Predicted: predicted_time secs]
[TargetTenured: target_sizeK][Reclaimable: reclaimable_info]
[User: user_cpu secs][Sys: system_cpu secs]
[IM: jvm_alloc_sizeK, mmap_total_sizeK, malloc_total_sizeK][TC: thread_count]
[DOE: doe_alloc_sizeK, called_count][CCI: cc_used_sizeK, cc_max_sizeK, cc_infoK]
```

Output format of the log entries related to Concurrent Marking

```
[id]<date>[cm_event][User:  user_cpu secs][Sys:  sys_cpu secs]
```

The following provides details about the output.

| Classification | Output item | Output content |
|---|---|---|
| Log entry related to GC | *id* | `VG1` (Java VM log file identifier). |
| | *date* | Start data and time of GC or Concurrent Marking.<br>This information is not output if the `-XX:-HitachiVerboseGCPrintDate` option is specified. |
| | *gc_kind* | Type of GC or Concurrent Marking. One of the following is output: `FullGC`, `Mixed GC`, `Young GC`, `Young GC(initial-mark)`, `CM Remark`, or `CM Cleanup`. |
| | *gc_info* | Memory information of the JavaHeap area. This information is output in the following format, where values are given in units of kilobytes:<br>*size_of_used_JavaHeap_area_before_GC*`K/`*size_of_used_JavaHeap_area_before_GC*[#]`K(`*size_of_JavaHeap_area_before_GC*[#]`K)->`*size_of_used_JavaHeap_area_after_GC*`K/`*size_of_used_JavaHeap_area_after_GC*[#]`K(`*size_of_JavaHeap_area_after_GC*[#]`K)` |
| | *gc_time* | Amount of time for which the application stopped due to GC. This information is output in units of seconds. |
| | *gc_status* | GC status.<br>• When a To space overflow occurs, `to exhausted` is output. |

| Classification | Output item | Output content |
|---|---|---|
| | | • In cases other than the above, - is output.<br>For each type of GC, the GC status is output as follows.<br>• When *gc_kind* is `Young GC`, `Young GC(initial-mark)`, or `Mixed GC`:<br>- or `to exhausted` is output.<br>• When *gc_kind* is a type other than the above:<br>- is output. |
| | *eden_info* | Memory information of the Eden area. This information is output in the following format, where values are given in units of kilobytes:<br>*size_of_used_Eden_area_before_GC*#`K(`*maximum_size_that_can_be_acquired_by_Eden_area_before_GC*#`K)->`*size_of_used_Eden_area_after_GC*#`K(`*maximum_size_that_can_be_acquired_by_Eden_area_after_GC*#`K)`<br>The maximum size that can be acquired by the Eden area refers to *size_of_New_area - size_of_used_Survivor_area*. |
| | *survivor_info* | Memory information of the Survivor area. This information is output in the following format, where values are given in units of kilobytes:<br>*size_of_used_Survivor_area_before_GC*#`K->`*size_of_used_Survivor_area_after_GC*#`K` |
| | *tenured_info* | Memory information of the Tenured area. This information is output in the following format, where values are given in units of kilobytes:<br>*size_of_used_Tenured_area_before_GC*#`K->`*size_of_used_Tenured_area_after_GC*#`K` |
| | *humongous_info* | Memory information of the Humongous area. This information is output in the following format, where values are given in units of kilobytes:<br>*size_of_used_Humongous_area_before_GC*#`K->`*size_of_used_Humongous_area_after_GC*#`K` |
| | *free_info* | Memory information of the Free area. This information is output in the following format, where values are given in units of kilobytes:<br>*size_of_used_Free_area_before_GC*#`K->`*size_of_used_Free_area_after_GC*#`K` |
| | *Metaspace_info* | Memory information of the Metaspace area. This information is output in the following format, where values are given in units of kilobytes:<br>*size_of_used_Metaspace_area_before_GC*`K(`*capacity_size_of_Metaspace_area_before_GC*`K,`<br>*commit_size_of_Metaspace_area_before_GC*`K)->`*size_of_used_Metaspace_area_after_GC*`K(`*capacity_size_of_Metaspace_area_after_GC*`K,`<br>*commit_size_of_Metaspace_area_after_GC*`K)` |
| | *classspace_info* | Memory information of the Compressed Class Space. This information is output in the following format, where values are given in units of kilobytes:<br>*size_of_used_Compressed_Class_Space_before_GC*`K(`*capacity_size_of_Compressed_Class_Space_before_GC*`K,`<br>*commit_size_of_Compressed_Class_Space_before_GC*`K)->`*size_of_used_Compressed_Class_Space_after_GC*`K(`*capacity_size_of_Compressed_Class_Space_after_GC*`K,`<br>*commit_size_of_Compressed_Class_Space_after_GC*`K)`<br>This information is not output if the functionality for the compressed object pointer is not used. |
| | *cause_info* | Details on the cause of GC<br>This information is not output if the `-XX:-HitachiVerboseGCPrintCause` option is specified. |

| Classification | Output item | Output content |
|---|---|---|
| | *region_size* | Size of a single region. This information is output in units of kilobytes. |
| | *target_time* | Target amount of time for which applications are stopped due to GC. This information is output in units of seconds.<br>You can specify the target time by using the `-XX:+MaxGCPauseMillis` option. |
| | *predicted_time* | Amount of time for which applications will be stopped due to GC, as predicted by Java VM. This information is output in units of seconds.<br>If the type of GC or Concurrent Marking is `Full GC`, `CM Remark`, or `CM Cleanup`, Java VM does not predict the stop time, and `0` is output. |
| | *target_size* | Size of the Tenured area that is subject to Mixed GC. This information is output in units of kilobytes.<br>If the type of GC or Concurrent Marking is not `Mixed GC`, `0` is output. |
| | *reclaimable_info* | Information about the predicted collection size. This information is output in the following format:<br>*predicted_collection_size* `K(`*predicted_collection_rate* `%)`<br>The predicted collection size is output in units of kilobytes. The predicted collection rate is output as a value with two decimal places.<br>Note that the information about the predicted collection size is output only for Young GC or Mixed GC immediately after Concurrent Marking. In other cases, Java VM does not predict the collection size, and `0` is output. |
| | *user_cpu* | Total CPU time that all GC threads spent in user mode. This information is output in units of seconds.<br>If acquisition of the CPU time fails, `unknown` is displayed, as in `[User:unknown]`.<br>This information is not output if the `-XX:-HitachiVerboseGCCpuTime` option is specified. |
| | *system_cpu* | Total CPU time that all GC threads spent in kernel mode. This information is output in units of seconds.<br>If acquisition of the CPU time fails, `unknown` is displayed, as in `[Sys:unknown]`.<br>This information is not output if the `-XX:-HitachiVerboseGCCpuTime` option is specified. |
| | *jvm_alloc_size* | Of the total size of the areas managed in Java VM (the sum of *mmap_total_size* and *malloc_total_size*), the size of the area that is currently in use<br>This information is not output if the `-XX:-HitachiVerboseGCPrintJVMInternalMemory` option is specified. |
| | *mmap_total_size* | Of the areas managed in Java VM, the total C heap size allocated by mmap<br>This information is not output if the `-XX:-HitachiVerboseGCPrintJVMInternalMemory` option is specified. |
| | *malloc_total_size* | Of the areas managed in Java VM, the total C heap size allocated by malloc<br>This information is not output if the `-XX:-HitachiVerboseGCPrintJVMInternalMemory` option is specified. |
| | *thread_count* | Number of Java threads<br>This information is not output if the `-XX:-HitachiVerboseGCPrintThreadCount` option is specified. |
| | *doe_alloc_size* | Cumulative size of the heap that was allocated when java.io.File.deleteOnExit() was called<br>This information is not output if the `-XX:-HitachiVerboseGCPrintDeleteOnExit` option is specified. |
| | *called_count* | Number of times java.io.File.deleteOnExit() was called |

| Classification | Output item | Output content |
|---|---|---|
| | | This information is not output if the `-XX:-HitachiVerboseGCPrintDeleteOnExit` option is specified. |
| | *cc_used_size* | Size of the used code cache area when GC occurred. This information is output in units of kilobytes.<br>This information is not output if the `-XX:-PrintCodeCacheInfo` option is specified. |
| | *cc_max_size* | Maximum size of the code cache area. This information is output in units of kilobytes.<br>This information is not output if the `-XX:-PrintCodeCacheInfo` option is specified. |
| | *cc_info* | Maintenance information<br>This information is not output if the `-XX:-PrintCodeCacheInfo` option is specified. |
| Log entry related to Concurrent Marking | *id* | `VCM` (Java VM log file identifier). |
| | *date* | Start data and time of Concurrent Marking.<br>This information is not output if the `-XX:-HitachiVerboseGCPrintDate` option is specified. |
| | *cm_event* | Status of Concurrent Marking.<br>• `Concurrent Root Region Scan Start`<br>The Concurrent Root Region Scan has started.<br>• `Concurrent Root Region Scan End`<br>The Concurrent Root Region Scan has ended.<br>• `Concurrent Mark Start`<br>The Concurrent Mark has started.<br>• `Concurrent Mark End`<br>The Concurrent Mark has ended.<br>• `Concurrent Mark Stop`<br>The Concurrent Mark has stopped.<br>• `Concurrent Cleanup Start`<br>The Concurrent Cleanup has started.<br>• `Concurrent Cleanup End`<br>The Concurrent Cleanup has ended. |
| | *user_cpu* | Total CPU time that all GC threads spent in user mode. This information is output in units of seconds.<br>If acquisition of the CPU time fails, `unknown` is displayed, as in `[User:unknown]`.<br>This information is not output if the `-XX:-HitachiVerboseGCCpuTime` option is specified.<br>If the status of Concurrent Marking is `Concurrent Mark Start`, `0` is output. |
| | *sys_cpu* | Total CPU time that all GC threads spent in kernel mode. This information is output in units of seconds.<br>If acquisition of the CPU time fails, `unknown` is displayed, as in `[Sys:unknown]`.<br>This information is not output if the `-XX:-HitachiVerboseGCCpuTime` option is specified.<br>If the status of Concurrent Marking is `Concurrent Mark Start`, `0` is output. |

#:

The size is estimated by rounding up the area size to the size of one region, and represented as a multiple of the size of one region.

The following provides details about the causes of GC that are output for *cause_info*.

Table 7-4: List of GC causes

| Cause number | Cause content | Description | GC type | |
|---|---|---|---|---|
| | | | Other than G1GC | G1GC |
| 0 | ObjAllocFail | GC occurred because the object area could not be allocated. | Y | Y |
| 1 | System.gc | GC occurred because the java.lang.System.gc method was called. | Y | Y |
| 3 | DelayedGC | GC that was suspended by JNI or JVMTI was started. | Y | Y |
| 4 | JavaGCCommand | GC occurred due to the javagc command. | Y | Y |
| 6 | JHeapProfCommand | GC occurred due to the jheapprof command. | Y | N |
| 8 | EMReclaimFail | Because objects were moved to the Java heap due to explicit release of Explicit memory, the Java heap overflowed. | Y | N |
| 9 | EMMigrateFail | Because objects were moved to the Java heap due to automatic release of Explicit memory, the Java heap overflowed. | Y | N |
| 10 | JVMTIForceGC | GC occurred due to the JVMTI function ForceGarbageCollection(). | Y | Y |
| 11 | PromotionFail | GC occurred due to a CopyGC promotion failure. | Y | N |
| 12 | EMJavaGCCommand | GC occurred because an Explicit memory block was released by the javagc command. | Y | Y |
| 13 | EHeapProfCommand | GC occurred due to the eheapprof command. | Y | Y |
| 14 | G1HumAllocFail | When G1GC was used, GC occurred because a Humongous area was allocated. | N | Y |
| 15 | G1EvacuationPause | An evacuation occurred when G1GC was used. | N | Y |
| 16 | Concurrent Marking | No GC occurred but the Concurrent Marking processing, which stops and executes applications, was logged. | N | Y |
| 17 | EvacuationFail | When G1GC was used, GC occurred due to an evacuation failure. | N | Y |
| 18 | MetaspaceAllocFail | GC occurred because the Metaspace area could not be allocated. | Y | Y |
| 19 | LastMetaspaceGC | The last GC occurred before a Metaspace OutOfMemory error occurred. | Y | Y |

Legend:

Y: Output.

N: Not output.

## Syntax

```
-XX:[+|-]HitachiVerboseGC
```

## Specifiable values

Type: String

`-XX:+HitachiVerboseGC`

Outputs the extended verbosegc information to the Java VM log file when GC occurs.

The information about each of the GC internal area types (Eden, Survivor, Tenured, and Metaspace) is output as the extended verbosegc information.

`-XX:-HitachiVerboseGC`

Does not output the extended verbosegc information to the Java VM log file when a GC occurs.

## Default value

If the definition item is omitted:

`-XX:-HitachiVerboseGC`

## Examples

Example of output 1

When SerialGC is used and the `-XX:HitachiVerboseGCIntervalTime` option is specified

```
[VGC]<Thu Oct 02 10:38:53.658 2014>(Skip Full:1,Copy:0)
[Full GC 770K->682K(8064K), 0.0050003 secs][DefNew::Eden: 88K->0K(2304K)]
[DefNew::Survivor: 0K->0K(256K)][Tenured: 681K->682K(5504K)]
[Metaspace: 3634K(4492K, 4492K)->3634K(4492K, 4492K)]
[class space: 356K(388K, 388K)->356K(388K, 388K)]
[cause:System.gc][User: 0.0000000 secs][Sys: 0.0000000 secs]
[IM: 11944K, 12448K, 0K][TC: 22][DOE: 0K, 0][CCI: 1173K, 245760K, 2496K]
```

Example of output 2

When G1GC is used

- GC-related log

```
[VG1]<Thu Oct 02 10:38:56.193 2014>
[Full GC 753K/2048K(8192K)->678K/1024K(8192K), 0.0097901 secs][Status:-]
[G1GC::Eden: 1024K(2048K)->0K(2048K)][G1GC::Survivor: 0K->0K]
[G1GC::Tenured: 1024K->1024K][G1GC::Humongous: 0K->0K]
[G1GC::Free: 6144K->7168K] [Metaspace: 3634K(4492K, 4492K)->3634K(4492K, 4492K)]
[class space: 356K(388K, 388K)->356K(388K, 388K)] [cause:System.gc]
[RegionSize: 1024K][Target: 0.2000000 secs][Predicted: 0.0000000 secs]
[TargetTenured: 0K][Reclaimable: 0K(0.00%)][User: 0.0000000 secs]
[Sys: 0.0000000 secs][IM: 20459K, 21920K, 0K][TC: 35][DOE: 0K, 0]
[CCI: 1172K, 245760K, 2496K]
```

- Concurrent Marking related log

```
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Root Region Scan Start]
[User: 0.0000000 secs][Sys: 0.0000000 secs]
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Root Region Scan End]
[User: 0.0126134 secs][Sys: 0.0146961 secs]
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Mark Start][User: 0.0000000 secs]
[Sys: 0.0000000 secs]
[VCM]<Wed Jul 24 11:45:34 2013>[Concurrent Mark End][User: 0.0156250 secs]
[Sys: 0.2495800 secs]
```

## 7.6.3 -XX:[+|-]HitachiVerboseGCCpuTime

`-XX:[+|-]HitachiVerboseGCCpuTime` outputs the user CPU time and the kernel CPU time in the extended verbosegc information

### Description

`-XX:[+|-]HitachiVerboseGCCpuTime` specifies whether the CPU usage time is to be output in the extended verbosegc information.

Prerequisite option

- `-XX:+HitachiVerboseGC`

### Syntax

```
-XX:[+|-]HitachiVerboseGCCpuTime
```

### Specifiable values

Type: `String`

`-XX:+HitachiVerboseGCCpuTime`

Outputs, to the extended verbosegc information, the amount of processor time that was spent by the GC execution thread in user mode and kernel mode, during a period from the start to the end of GC.

`-XX:-HitachiVerboseGCCpuTime`

Does not output, to the extended verbosegc information, the amount of processor time that was spent by the GC execution thread in user mode and kernel mode, during a period from the start to the end of GC.

### Default value

If the definition item is omitted:

`-XX:+HitachiVerboseGCCpuTime`

### Examples

Example 1 (if SerialGC is selected when the `-XX:+HitachiVerboseGC` option is selected)

```
[VGC]<Thu Oct 02 10:38:53.658 2014>(Skip Full:1,Copy:0)
[Full GC 770K->682K(8064K), 0.0050003 secs][DefNew::Eden: 88K->0K(2304K)]
[DefNew::Survivor: 0K->0K(256K)][Tenured: 681K->682K(5504K)]
[Metaspace: 3634K(4492K, 4492K)->3634K(4492K, 4492K)]
[class space: 356K(388K, 388K)->356K(388K, 388K)]
[cause:System.gc][User: 0.0000000 secs][Sys: 0.0000000 secs]
[IM: 11944K, 12448K, 0K][TC: 22][DOE: 0K, 0][CCI: 1173K, 245760K, 2496K]
```

Example 2 (if G1GC is selected when the `-XX:+HitachiVerboseGC` option is selected)

- GC-related log

```
[VG1]<Thu Oct 02 10:38:56.193 2014>
[Full GC 753K/2048K(8192K)->678K/1024K(8192K), 0.0097901 secs][Status:-]
[G1GC::Eden: 1024K(2048K)->0K(2048K)][G1GC::Survivor: 0K->0K]
[G1GC::Tenured: 1024K->1024K][G1GC::Humongous: 0K->0K]
[G1GC::Free: 6144K->7168K] [Metaspace: 3634K(4492K, 4492K)->3634K(4492K, 4492K)]
[class space: 356K(388K, 388K)->356K(388K, 388K)] [cause:System.gc]
```

```
[RegionSize: 1024K][Target: 0.2000000 secs][Predicted: 0.0000000 secs]
[TargetTenured: 0K][Reclaimable: 0K(0.00%)][User: 0.0000000 secs]
[Sys: 0.0000000 secs][IM: 20459K, 21920K, 0K][TC: 35][DOE: 0K, 0]
[CCI: 1172K, 245760K, 2496K]
```

- Concurrent Marking related log

```
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Root Region Scan Start]
[User: 0.0000000 secs][Sys: 0.0000000 secs]
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Root Region Scan End]
[User: 0.0126134 secs][Sys: 0.0146961 secs]
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Mark Start][User: 0.0000000 secs]
[Sys: 0.0000000 secs]
[VCM]<Wed Jul 24 11:45:34 2013>[Concurrent Mark End][User: 0.0156250 secs]
[Sys: 0.2495800 secs]
```

Example 3 (if SerialGC is selected when the `-XX:+HitachiCommaVerboseGC` option is selected)

```
VGC,Thu Oct 02 10:38:52.442 2014,1,0,0,Full GC,770,682,8064,0.0040002,88,0,2304,
0,0,256,681,682,5504,3634,3634,4492,3634,3634,4492,356,356,388,356,356,388,1,0.
0000000,0.0000000,11913,12448,0,22,0,0,1173,245760,2496
```

Example 4 (if G1GC is selected when the `-XX:+HitachiCommaVerboseGC` option is selected)

- GC-related log

```
VG1,Thu Oct 02 10:38:54.920 2014,Full GC,753,2048,8192,678,1024,8192,0.0064767,
-,1024,2048,0,2048,0,0,1024,1024,0,0,6144,7168,3634,3634,4492,3634,3634,4492,
356,356,388,356,356,388,1,1024,0.2000000,0.0000000,0,0,0.00,0.0000000,
0.0000000,20459,21920,0,35,0,0,1171,245760,2496
```

- Concurrent Marking related log

```
VCM,Fri Jul 26 21:35:50 2013,Concurrent Mark Start,0.0000000,0.0000000
VCM,Fri Jul 26 21:35:50 2013,Concurrent Mark End,0.0124532,0.0245698
```

## 7.6.4 -XX:HitachiVerboseGCIntervalTime

`-XX:HitachiVerboseGCIntervalTime` specifies the interval (in seconds) for outputting the extended verbosegc information.

### Description

`-XX:HitachiVerboseGCIntervalTime` specifies the interval (in seconds) for outputting the extended verbosegc information.

If this option is specified:

The extended verbosegc information for the GC that occurs after the specified interval elapses is output. The extended verbosegc information is not output for every GC. In addition, the number of times that the types of GC below were skipped during the period from the previous output to the current output, is also output. This information is always output.

Table 7-5: List of types of GC for which the number of times the GC was skipped is to be output

| Character string | Description |
|---|---|
| `Full` | Number of times full GC was skipped |
| `Copy` | Number of times CopyGC was skipped |

If this option is not specified:

0 seconds is set by default, and the extended verbosegc information is output for each GC.

Prerequisite option

- -XX:+HitachiVerboseGC

## Syntax

```
-XX:HitachiVerboseGCIntervalTime=integer_value
```

## Specifiable values

*integer_value*

Type: Integer

Specify an integer value (in seconds) from 0 to 2,147,483,647. If you specify a value outside of the specifiable range, 0 is set. If you specify a negative value, an error occurs.

## Default value

If the definition item is omitted:

-XX:HitachiVerboseGCIntervalTime=0

## Examples

Example 1 (if SerialGC is selected when the -XX:+HitachiVerboseGC option is selected)

```
[VGC]<Thu Oct 02 10:38:53.658 2014>(Skip Full:1,Copy:0)
[Full GC 770K->682K(8064K), 0.0050003 secs][DefNew::Eden: 88K->0K(2304K)]
[DefNew::Survivor: 0K->0K(256K)][Tenured: 681K->682K(5504K)]
[Metaspace: 3634K(4492K, 4492K)->3634K(4492K, 4492K)]
[class space: 356K(388K, 388K)->356K(388K, 388K)]
[cause:System.gc][User: 0.0000000 secs][Sys: 0.0000000 secs]
[IM: 11944K, 12448K, 0K][TC: 22][DOE: 0K, 0][CCI: 1173K, 245760K, 2496K]
```

Example 2 (if SerialGC is selected when the -XX:+HitachiCommaVerboseGC option is selected)

```
VGC,Thu Oct 02 10:38:52.442 2014,1,0,0,Full GC,770,682,8064,0.0040002,88,0,2304,
0,0,256,681,682,5504,3634,3634,4492,3634,3634,4492,356,356,388,356,356,388,1,0.
0000000,0.0000000,11913,12448,0,22,0,0,1173,245760,2496
```

# 7.6.5 -XX:[+|-]HitachiVerboseGCPrintCause

-XX:[+|-]HitachiVerboseGCPrintCause outputs details on the causes of GC.

## Description

-XX:[+|-]HitachiVerboseGCPrintCause specifies whether details on the causes of GC are to be output.

Prerequisite option

- -XX:+HitachiVerboseGC

If the -XX:+HitachiCommaVerboseGC option is specified, the following cause numbers are output.

Table 7-6: List of GC causes

| Cause number | Cause content | Description | GC type | |
|---|---|---|---|---|
| | | | Other than G1GC | G1GC |
| 0 | ObjAllocFail | GC occurred because the object area could not be allocated. | Y | Y |
| 1 | System.gc | GC occurred because the java.lang.System.gc method was called. | Y | Y |
| 3 | DelayedGC | GC that was suspended by JNI or JVMTI was started. | Y | Y |
| 4 | JavaGCCommand | GC occurred due to the javagc command. | Y | Y |
| 6 | JHeapProfCommand | GC occurred due to the jheapprof command. | Y | N |
| 8 | EMReclaimFail | Because objects were moved to the Java heap due to explicit release of Explicit memory, the Java heap overflowed. | Y | N |
| 9 | EMMigrateFail | Because objects were moved to the Java heap due to automatic release of Explicit memory, the Java heap overflowed. | Y | N |
| 10 | JVMTIForceGC | GC occurred due to the JVMTI function ForceGarbageCollection(). | Y | Y |
| 11 | PromotionFail | GC occurred due to a CopyGC promotion failure. | Y | N |
| 12 | EMJavaGCCommand | GC occurred because an Explicit memory block was released by the javagc command. | Y | Y |
| 13 | EHeapProfCommand | GC occurred due to the eheapprof command. | Y | Y |
| 14 | G1HumAllocFail | When G1GC was used, GC occurred because a Humongous area was allocated. | N | Y |
| 15 | G1EvacuationPause | An evacuation occurred when G1GC was used. | N | Y |
| 16 | Concurrent Marking | No GC occurred but the Concurrent Marking processing, which stops and executes applications, was logged. | N | Y |
| 17 | EvacuationFail | When G1GC was used, GC occurred due to an evacuation failure. | N | Y |
| 18 | MetaspaceAllocFail | GC occurred because the Metaspace area could not be allocated. | Y | Y |
| 19 | LastMetaspaceGC | The last GC occurred before a Metaspace OutOfMemory error occurred. | Y | Y |

Legend:

Y: Output.

N: Not output.

## Syntax

```
-XX:[+|-]HitachiVerboseGCPrintCause
```

## Specifiable values

Type: String

`-XX:+HitachiVerboseGCPrintCause`

Outputs details on the causes of GC at the end of the extended verbosegc information.

`-XX:-HitachiVerboseGCPrintCause`

Outputs the extended verbosegc information in the normal format.

## Default value

If the definition item is omitted:

`-XX:+HitachiVerboseGCPrintCause`

## Examples

Example 1 (if SerialGC is selected when the `-XX:+HitachiVerboseGC` option is selected)

```
[VGC]<Thu Oct 02 10:38:53.658 2014>(Skip Full:1,Copy:0)
[Full GC 770K->682K(8064K), 0.0050003 secs][DefNew::Eden: 88K->0K(2304K)]
[DefNew::Survivor: 0K->0K(256K)][Tenured: 681K->682K(5504K)]
[Metaspace: 3634K(4492K, 4492K)->3634K(4492K, 4492K)]
[class space: 356K(388K, 388K)->356K(388K, 388K)]
[cause:System.gc][User: 0.0000000 secs][Sys: 0.0000000 secs]
[IM: 11944K, 12448K, 0K][TC: 22][DOE: 0K, 0][CCI: 1173K, 245760K, 2496K]
```

Example 2 (if G1GC is selected when the `-XX:+HitachiVerboseGC` option is selected)

- GC-related log

```
[VG1]<Thu Oct 02 10:38:56.193 2014>
[Full GC 753K/2048K(8192K)->678K/1024K(8192K), 0.0097901 secs][Status:-]
[G1GC::Eden: 1024K(2048K)->0K(2048K)][G1GC::Survivor: 0K->0K]
[G1GC::Tenured: 1024K->1024K][G1GC::Humongous: 0K->0K]
[G1GC::Free: 6144K->7168K] [Metaspace: 3634K(4492K, 4492K)->3634K(4492K, 4492K)]
[class space: 356K(388K, 388K)->356K(388K, 388K)] [cause:System.gc]
[RegionSize: 1024K][Target: 0.2000000 secs][Predicted: 0.0000000 secs]
[TargetTenured: 0K][Reclaimable: 0K(0.00%)][User: 0.0000000 secs]
[Sys: 0.0000000 secs][IM: 20459K, 21920K, 0K][TC: 35][DOE: 0K, 0]
[CCI: 1172K, 245760K, 2496K]
```

- Concurrent Marking related log

```
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Root Region Scan Start]
[User: 0.0000000 secs][Sys: 0.0000000 secs]
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Root Region Scan End]
[User: 0.0126134 secs][Sys: 0.0146961 secs]
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Mark Start][User: 0.0000000 secs]
[Sys: 0.0000000 secs]
[VCM]<Wed Jul 24 11:45:34 2013>[Concurrent Mark End][User: 0.0156250 secs]
[Sys: 0.2495800 secs]
```

Example 3 (if SerialGC is selected when the `-XX:+HitachiCommaVerboseGC` option is selected)

```
VGC,Thu Oct 02 10:38:52.442 2014,1,0,0,Full GC,770,682,8064,0.0040002,88,0,2304,
0,0,256,681,682,5504,3634,3634,4492,3634,3634,4492,356,356,388,356,356,388,1,0.
0000000,0.0000000,11913,12448,0,22,0,0,1173,245760,2496
```

Example 4 (if G1GC is selected when the `-XX:+HitachiCommaVerboseGC` option is selected)

- GC-related log

```
VG1,Thu Oct 02 10:38:54.920 2014,Full GC,753,2048,8192,678,1024,8192,0.0064767,
-,1024,2048,0,2048,0,0,1024,1024,0,0,6144,7168,3634,3634,4492,3634,3634,4492,
```

```
356,356,388,356,356,388,1,1024,0.2000000,0.0000000,0,0,0.00,0.0000000,
0.0000000,20459,21920,0,35,0,0,1171,245760,2496
```

- Concurrent Marking related log

```
VCM,Fri Jul 26 21:35:50 2013,Concurrent Mark Start,0.0000000,0.0000000
VCM,Fri Jul 26 21:35:50 2013,Concurrent Mark End,0.0124532,0.0245698
```

## 7.6.6 -XX:[+|-]HitachiVerboseGCPrintDate

`-XX:[+|-]HitachiVerboseGCPrintDate` outputs the GC start date and time to the extended verbosegc information.

### Description

`-XX:[+|-]HitachiVerboseGCPrintDate` specifies whether the GC start date and time are to be output to the extended verbosegc information.

Prerequisite option

- `-XX:+HitachiVerboseGC`

### Syntax

```
-XX:[+|-]HitachiVerboseGCPrintDate
```

### Specifiable values

Type: `String`

`-XX:+HitachiVerboseGCPrintDate`

Outputs the GC start date and time at the beginning of each output line in the extended verbosegc information.

`-XX:-HitachiVerboseGCPrintDate`

Does not output the GC start date and time at the beginning of each output line in the extended verbosegc information.

### Default value

If the definition item is omitted:

`-XX:+HitachiVerboseGCPrintDate`

### Examples

Example 1 (if SerialGC is selected when the `-XX:+HitachiVerboseGC` option is selected)

```
[VGC]<Thu Oct 02 10:38:53.658 2014>(Skip Full:1,Copy:0)
[Full GC 770K->682K(8064K), 0.0050003 secs][DefNew::Eden: 88K->0K(2304K)]
[DefNew::Survivor: 0K->0K(256K)][Tenured: 681K->682K(5504K)]
[Metaspace: 3634K(4492K, 4492K)->3634K(4492K, 4492K)]
[class space: 356K(388K, 388K)->356K(388K, 388K)]
[cause:System.gc][User: 0.0000000 secs][Sys: 0.0000000 secs]
[IM: 11944K, 12448K, 0K][TC: 22][DOE: 0K, 0][CCI: 1173K, 245760K, 2496K]
```

Example 2 (if G1GC is selected when the -XX:+HitachiVerboseGC option is selected)

- GC-related log

```
[VG1]<Thu Oct 02 10:38:56.193 2014>
[Full GC 753K/2048K(8192K)->678K/1024K(8192K), 0.0097901 secs][Status:-]
[G1GC::Eden: 1024K(2048K)->0K(2048K)][G1GC::Survivor: 0K->0K]
[G1GC::Tenured: 1024K->1024K][G1GC::Humongous: 0K->0K]
[G1GC::Free: 6144K->7168K] [Metaspace: 3634K(4492K, 4492K)->3634K(4492K, 4492K)]
[class space: 356K(388K, 388K)->356K(388K, 388K)] [cause:System.gc]
[RegionSize: 1024K][Target: 0.2000000 secs][Predicted: 0.0000000 secs]
[TargetTenured: 0K][Reclaimable: 0K(0.00%)][User: 0.0000000 secs]
[Sys: 0.0000000 secs][IM: 20459K, 21920K, 0K][TC: 35][DOE: 0K, 0]
[CCI: 1172K, 245760K, 2496K]
```

- Concurrent Marking related log

```
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Root Region Scan Start]
[User: 0.0000000 secs][Sys: 0.0000000 secs]
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Root Region Scan End]
[User: 0.0126134 secs][Sys: 0.0146961 secs]
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Mark Start][User: 0.0000000 secs]
[Sys: 0.0000000 secs]
[VCM]<Wed Jul 24 11:45:34 2013>[Concurrent Mark End][User: 0.0156250 secs]
[Sys: 0.2495800 secs]
```

Example 3 (if SerialGC is selected when the -XX:+HitachiCommaVerboseGC option is selected)

```
VGC,Thu Oct 02 10:38:52.442 2014,1,0,0,Full GC,770,682,8064,0.0040002,88,0,2304,
0,0,256,681,682,5504,3634,3634,4492,3634,3634,4492,356,356,388,356,356,388,1,0.
0000000,0.0000000,11913,12448,0,22,0,0,1173,245760,2496
```

Example 4 (if G1GC is selected when the -XX:+HitachiCommaVerboseGC option is selected)

- GC-related log

```
VG1,Thu Oct 02 10:38:54.920 2014,Full GC,753,2048,8192,678,1024,8192,0.0064767,
-,1024,2048,0,2048,0,0,1024,1024,0,0,6144,7168,3634,3634,4492,3634,3634,4492,
356,356,388,356,356,388,1,1024,0.2000000,0.0000000,0,0,0.00,0.0000000,
0.0000000,20459,21920,0,35,0,0,1171,245760,2496
```

- Concurrent Marking related log

```
VCM,Fri Jul 26 21:35:50 2013,Concurrent Mark Start,0.0000000,0.0000000
VCM,Fri Jul 26 21:35:50 2013,Concurrent Mark End,0.0124532,0.0245698
```

## 7.6.7 -XX:[+|-]HitachiVerboseGCPrintDeleteOnExit

-XX:[+|-]HitachiVerboseGCPrintDeleteOnExit outputs the following information to the Java VM log file: the cumulative heap size allocated by Java VM when java.io.File.deleteOnExit() was called, and the number of times the method was called.

### Description

-XX:[+|-]HitachiVerboseGCPrintDeleteOnExit specifies whether the following information is to be output to the Java VM log file: the cumulative heap size allocated by Java VM when java.io.File.deleteOnExit() was called, and the number of times the method was called.

Each time java.io.File.deleteOnExit() is called, Java VM allocates heap space to store the path information of the specified file. However, the allocated area is not released until the process ends. As a result, the memory might become

insufficient. If the -XX:+HitachiVerboseGCPrintDeleteOnExit option is specified, the heap size that is allocated by Java VM when java.io.File.deleteOnExit() is called is output to a log. By using this log, you can monitor the heap size. As supplementary information for determining the call status of java.io.File.deleteOnExit(), the number of times a method was called can also be output.

When an error occurs, you can investigate the cause of a memory shortage by using the output information to determine the heap size that was allocated when java.io.File.deleteOnExit() was called. Before the start of production operation, you can also use this information in the development and test phases to check for trends in the increase of the heap size allocated when java.io.File.deleteOnExit() is called, and to check for any indications of memory shortage during operation.

Note that an error message is output when an error occurs.

Prerequisite option

- -XX:+HitachiVerboseGC

Format of output

The following shows the format of output for the Java VM log file:

```
[id] <date> (Skip Full:full_count, Copy:copy_count)
[gc_kind gc_info, gc_time secs][Eden: eden_info][Survivor: survivor_info]
[Tenured: tenured_info][Metaspace: Metaspace_info]
[class space: class_space_info][cause:cause_info] [User: user_cpu secs]
[Sys: system_cpu secs][IM: jvm_alloc_size, mmap_total_size, malloc_total_size]
[TC: thread_count][DOE: doe_alloc_size, called_count]
```

The following provides details about the output items and content when this option is specified.

| Output item | Output content |
|---|---|
| *doe_alloc_size* | Cumulative size of the heap that was allocated when java.io.File.deleteOnExit() was called |
| *called_count* | Number of times java.io.File.deleteOnExit() was called. |

The following shows the format of the message that is output when an error occurs.

```
[DOE]<date>Error occurred during processing of java.io.File.deleteOnExit's
heap size output function. (<maintenance_information>)
[DOE]java.io.File.deleteOnExit's heap size output function stopped.
```

The following provides details about the output content of the error message.

| Output item | Output content |
|---|---|
| DOE | Identifier indicating that an error occurred in the heap size output functionality for java.io.File.deleteOnExit() |
| *date* | Date and time the error occurred |

## Syntax

```
-XX:[+|-]HitachiVerboseGCPrintDeleteOnExit
```

## Specifiable values

Type: String

`-XX:+HitachiVerboseGCPrintDeleteOnExit`

Outputs the size of the heap allocated when java.io.File.deleteOnExit() was called, and the number of times the method was called.

`-XX:-HitachiVerboseGCPrintDeleteOnExit`

Does not output the size of the heap allocated when java.io.File.deleteOnExit() was called or the number of times the method was called.

## Default value

If the definition item is omitted:

`-XX:+HitachiVerboseGCPrintDeleteOnExit`

## Examples

The following are output examples of the Java VM log file.

Example 1 (if SerialGC is selected when the `-XX:+HitachiVerboseGC` option is selected)

```
[VGC]<Thu Oct 02 10:38:53.658 2014>(Skip Full:1,Copy:0)
[Full GC 770K->682K(8064K), 0.0050003 secs][DefNew::Eden: 88K->0K(2304K)]
[DefNew::Survivor: 0K->0K(256K)][Tenured: 681K->682K(5504K)]
[Metaspace: 3634K(4492K, 4492K)->3634K(4492K, 4492K)]
[class space: 356K(388K, 388K)->356K(388K, 388K)]
[cause:System.gc][User: 0.0000000 secs][Sys: 0.0000000 secs]
[IM: 11944K, 12448K, 0K][TC: 22][DOE: 0K, 0][CCI: 1173K, 245760K, 2496K]
```

Example 2 (if G1GC is selected when the `-XX:+HitachiVerboseGC` option is selected)

- GC-related log

```
[VG1]<Thu Oct 02 10:38:56.193 2014>
[Full GC 753K/2048K(8192K)->678K/1024K(8192K), 0.0097901 secs][Status:-]
[G1GC::Eden: 1024K(2048K)->0K(2048K)][G1GC::Survivor: 0K->0K]
[G1GC::Tenured: 1024K->1024K][G1GC::Humongous: 0K->0K]
[G1GC::Free: 6144K->7168K] [Metaspace: 3634K(4492K, 4492K)->3634K(4492K, 4492K)]
[class space: 356K(388K, 388K)->356K(388K, 388K)] [cause:System.gc]
[RegionSize: 1024K][Target: 0.2000000 secs][Predicted: 0.0000000 secs]
[TargetTenured: 0K][Reclaimable: 0K(0.00%)][User: 0.0000000 secs]
[Sys: 0.0000000 secs][IM: 20459K, 21920K, 0K][TC: 35][DOE: 0K, 0]
[CCI: 1172K, 245760K, 2496K]
```

- Concurrent Marking related log

```
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Root Region Scan Start]
[User: 0.0000000 secs][Sys: 0.0000000 secs]
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Root Region Scan End]
[User: 0.0126134 secs][Sys: 0.0146961 secs]
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Mark Start][User: 0.0000000 secs]
[Sys: 0.0000000 secs]
[VCM]<Wed Jul 24 11:45:34 2013>[Concurrent Mark End][User: 0.0156250 secs]
[Sys: 0.2495800 secs]
```

Example 3 (if SerialGC is selected when the `-XX:+HitachiCommaVerboseGC` option is selected)

```
VGC,Thu Oct 02 10:38:52.442 2014,1,0,0,Full GC,770,682,8064,0.0040002,88,0,2304,
0,0,256,681,682,5504,3634,3634,4492,3634,3634,4492,356,356,388,356,356,388,1,0.
0000000,0.0000000,11913,12448,0,22,0,0,1173,245760,2496
```

Example 4 (if G1GC is selected when the -XX:+HitachiCommaVerboseGC option is selected)

- GC-related log

```
VG1,Thu Oct 02 10:38:54.920 2014,Full GC,753,2048,8192,678,1024,8192,0.0064767,
-,1024,2048,0,2048,0,0,1024,1024,0,0,6144,7168,3634,3634,4492,3634,3634,4492,
356,356,388,356,356,388,1,1024,0.2000000,0.0000000,0,0,0.00,0.0000000,
0.0000000,20459,21920,0,35,0,0,1171,245760,2496
```

- Concurrent Marking related log

```
VCM,Fri Jul 26 21:35:50 2013,Concurrent Mark Start,0.0000000,0.0000000
VCM,Fri Jul 26 21:35:50 2013,Concurrent Mark End,0.0124532,0.0245698
```

The following is an example of an output error message.

Example of error message output

```
[DOE]<Wed Jan 27 13:03:36 2010> Error occurred during processing of
java.io.File.deleteOnExit's heap size output function.
(FindClass:java.lang.String)
[DOE]java.io.File.deleteOnExit's heap size output function stopped.
```

### Notes

- In the following cases, the cumulative heap size and the number of times the method was called are not calculated even if java.io.File.deleteOnExit() is called:
  - If a SecurityException occurs when java.io.File.deleteOnExit() is called. (This exception occurs if SecurityManager.checkDelete() of the security manager does not permit deletion access. In such cases, an exception is thrown at the beginning of the method, and heap space is not allocated.)
  - If java.io.File.deleteOnExit() is called from an application created by using the batch application execution infrastructure of Application Server.
  - If java.io.File.deleteOnExit() is called by using the File instance that was created with the same path name.
- Note the following points when checking the heap size output by this functionality:
  - The heap space that is allocated to java.io.File.deleteOnExit() is the JavaHeap.
  - The heap size is output in units of kilobytes, and values of less than 1 kilobyte are rounded down. The size of the heap that is allocated each time java.io.File.deleteOnExit() is called can vary from tens of bytes to approximately 100 bytes, depending on the length of the file path. For this reason, the output heap size sometimes does not increase even when java.io.File.deleteOnExit() is called. In such cases, you can check whether a method is being executed by checking the number of times the method was called.

## 7.6.8 -XX:[+|-]HitachiVerboseGCPrintJVMInternalMemory

-XX:[+|-]HitachiVerboseGCPrintJVMInternalMemory outputs the heap information that is managed in Java VM, to the Java VM log file.

### Description

-XX:[+|-]HitachiVerboseGCPrintJVMInternalMemory specifies whether the heap information that is managed in Java VM is to be output to the Java VM log file.

Of the C heap areas, the heap areas obtained by using the following two methods are managed in Java VM.

- C heap areas obtained by using mmap
- C heap areas obtained by using malloc

If the -XX:+HitachiVerboseGCPrintJVMInternalMemory option is enabled, the following information can be output: total C heap size obtained by using mmap (*mmap_total_size*) and the total C heap size obtained by using malloc (*malloc_total_size*). Of these allocated areas, the total size of the area in use (*jvm_alloc_size*) can also be output.

Prerequisite option

- -XX:+HitachiVerboseGC

Format of output

```
[id] <date> (Skip Full:full_count, Copy:copy_count)
[gc_kind gc_info, gc_time secs][Eden: eden_info][Survivor: survivor_info]
[Tenured: tenured_info][Metaspace: Metaspace_info]
[class space: class_space_info][cause:cause_info] [User: user_cpu secs]
[Sys: system_cpu secs][IM: jvm_alloc_size, mmap_total_size, malloc_total_size]
```

The following provides details about the output items and content when this option is specified.

| Output item | Output content |
|---|---|
| *jvm_alloc_size* | Of the total size of the areas managed in Java VM (the sum of *mmap_total_size* and *malloc_total_size*), the size of the area that is currently in use |
| *mmap_total_size* | Of the areas managed in Java VM, the total C heap size allocated by mmap |
| *malloc_total_size* | Of the areas managed in Java VM, the total C heap size allocated by malloc |

## Syntax

```
-XX:[+|-]HitachiVerboseGCPrintJVMInternalMemory
```

## Specifiable values

Type: String

-XX:+HitachiVerboseGCPrintJVMInternalMemory

Outputs the heap information that is managed in Java VM, to the Java VM log file.

-XX:-HitachiVerboseGCPrintJVMInternalMemory

Does not output the heap information that is managed in Java VM, to the Java VM log file.

## Default value

If the definition item is omitted:

-XX:+HitachiVerboseGCPrintJVMInternalMemory

## Examples

Example 1 (if SerialGC is selected when the -XX:+HitachiVerboseGC option is selected)

```
[VGC]<Thu Oct 02 10:38:53.658 2014>(Skip Full:1,Copy:0)
[Full GC 770K->682K(8064K), 0.0050003 secs][DefNew::Eden: 88K->0K(2304K)]
[DefNew::Survivor: 0K->0K(256K)][Tenured: 681K->682K(5504K)]
[Metaspace: 3634K(4492K, 4492K)->3634K(4492K, 4492K)]
[class space: 356K(388K, 388K)->356K(388K, 388K)]
```

```
[cause:System.gc][User: 0.0000000 secs][Sys: 0.0000000 secs]
[IM: 11944K, 12448K, 0K][TC: 22][DOE: 0K, 0][CCI: 1173K, 245760K, 2496K]
```

Example 2 (if G1GC is selected when the `-XX:+HitachiVerboseGC` option is selected)

- GC-related log

```
[VG1]<Thu Oct 02 10:38:56.193 2014>
[Full GC 753K/2048K(8192K)->678K/1024K(8192K), 0.0097901 secs][Status:-]
[G1GC::Eden: 1024K(2048K)->0K(2048K)][G1GC::Survivor: 0K->0K]
[G1GC::Tenured: 1024K->1024K][G1GC::Humongous: 0K->0K]
[G1GC::Free: 6144K->7168K] [Metaspace: 3634K(4492K, 4492K)->3634K(4492K, 4492K)]
[class space: 356K(388K, 388K)->356K(388K, 388K)] [cause:System.gc]
[RegionSize: 1024K][Target: 0.2000000 secs][Predicted: 0.0000000 secs]
[TargetTenured: 0K][Reclaimable: 0K(0.00%)][User: 0.0000000 secs]
[Sys: 0.0000000 secs][IM: 20459K, 21920K, 0K][TC: 35][DOE: 0K, 0]
[CCI: 1172K, 245760K, 2496K]
```

- Concurrent Marking related log

```
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Root Region Scan Start]
[User: 0.0000000 secs][Sys: 0.0000000 secs]
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Root Region Scan End]
[User: 0.0126134 secs][Sys: 0.0146961 secs]
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Mark Start][User: 0.0000000 secs]
[Sys: 0.0000000 secs]
[VCM]<Wed Jul 24 11:45:34 2013>[Concurrent Mark End][User: 0.0156250 secs]
[Sys: 0.2495800 secs]
```

Example 3 (if SerialGC is selected when the `-XX:+HitachiCommaVerboseGC` option is selected)

```
VGC,Thu Oct 02 10:38:52.442 2014,1,0,0,Full GC,770,682,8064,0.0040002,88,0,2304,
0,0,256,681,682,5504,3634,3634,4492,3634,3634,4492,356,356,388,356,356,388,1,0.
0000000,0.0000000,11913,12448,0,22,0,0,1173,245760,2496
```

Example 4 (if G1GC is selected when the `-XX:+HitachiCommaVerboseGC` option is selected)

- GC-related log

```
VG1,Thu Oct 02 10:38:54.920 2014,Full GC,753,2048,8192,678,1024,8192,0.0064767,
-,1024,2048,0,2048,0,0,1024,1024,0,0,6144,7168,3634,3634,4492,3634,3634,4492,
356,356,388,356,356,388,1,1024,0.2000000,0.0000000,0,0,0.00,0.0000000,
0.0000000,20459,21920,0,35,0,0,1171,245760,2496
```

- Concurrent Marking related log

```
VCM,Fri Jul 26 21:35:50 2013,Concurrent Mark Start,0.0000000,0.0000000
VCM,Fri Jul 26 21:35:50 2013,Concurrent Mark End,0.0124532,0.0245698
```

### Notes

To enable this option, you must also enable the extended VerboseGC functionality and the original memory management functionality.

## 7.6.9 -XX:[+|-]HitachiVerboseGCPrintTenuringDistribution

`-XX:[+|-]HitachiVerboseGCPrintTenuringDistribution` outputs the age distribution for the Survivor area to the Java VM log file.

## Description

`-XX:[+|-]HitachiVerboseGCPrintTenuringDistribution` specifies whether the Survivor area age distribution that is output when `-XX:+PrintTenuringDistribution` is specified, is to be output to the Java VM log file.

Prerequisite option

- `-XX:+HitachiVerboseGC`

Related options

- `-XX:+PrintTenuringDistribution`
- `-XX:+HitachiVerboseGCPrintDate`
- `-XX:+HitachiCommaVerboseGC`

Format of output

```
[id]<date>[Desired survivor:size bytes][New threshold:value]
[MaxTenuringThreshold:  max_value][age1:total_age1][age2:total_age2]...
[agen:total_agen]
```

The following provides details about the output.

| Output item | Output content |
|---|---|
| *id* | `PTD` (Java VM log file identifier) |
| *date* | Start date and time of GC |
| *size* | Target size of the objects in the Survivor area after GC |
| *value* | Age threshold for Java objects that are to be promoted to the Tenured area in the next CopyGC.<br>This value is dynamically set for each CopyGC, based on the values set for the `-XX:MaxTenuringThreshold=value` option, the memory size of the Survivor area, and the `-XX:TargetSurvivorRatio=value` option.<br>The Java objects whose age is equal to or greater than *value* will be promoted to the Tenured area in the next CopyGC. |
| *max_value* | Maximum value (value specified for the `MaxTenuringThreshold` option) of the age threshold (*value*) for the Java objects that are to be promoted to the Tenured area in the CopyGC.<br>*value* is dynamically set for each CopyGC but cannot exceed *max_value*.<br>The Java objects whose age is equal to or greater than *max_value* will always be promoted to the Tenured area in the next CopyGC. |
| *total_age1* | Total size (in bytes) of 1-year-old objects. |
| *total_age2* | Total size (in bytes) of 1-to 2-year-old objects. |
| *total_agen* | Total size (in bytes) of 1-to n-year-old objects.<br>If n is close to *max_value*, it means that an object with a long life exists. |

## Syntax

```
-XX:[+|-]HitachiVerboseGCPrintTenuringDistribution
```

## Specifiable values

Type: `String`

`-XX:+HitachiVerboseGCPrintTenuringDistribution`

Outputs the Survivor area age distribution that is output when `-XX:+PrintTenuringDistribution` is specified, to the Java VM log file.

`-XX:-HitachiVerboseGCPrintTenuringDistribution`

Does not output the Survivor area age distribution that is output when `-XX:+PrintTenuringDistribution` is specified, to the Java VM log file.

### Default value

If the definition item is omitted:

`-XX:-HitachiVerboseGCPrintTenuringDistribution`

### Example

```
[PTD]<Wed Jan 28 17:47:10 2009>[Desired survivor:32768 bytes][New threshold:30]
[MaxTenuringThreshold:30][age1:6872][age2:9632][age3:25632]
```

### Notes

The amount of log data that is output during CopyGC when this option is specified is two or more times the amount of data that is output when this option is not specified.

For this reason, use this option only for tuning purposes.

## 7.6.10 -XX:[+|-]HitachiVerboseGCPrintThreadCount

`-XX:[+|-]HitachiVerboseGCPrintThreadCount` specifies whether the number of Java threads is to be output to the Java VM log file.

### Description

`-XX:[+|-]HitachiVerboseGCPrintThreadCount` specifies whether the number of Java threads is to be output to the Java VM log file. This information can be used to monitor the number of Java threads.

The memory to be used for a stack is used by individual threads as the C heap. As the number of threads increases, the amount of memory used as the C heap also increases. By specifying the `-XX:+HitachiVerboseGCPrintThreadCount` option, you can monitor the number of Java threads and determine the amount of memory being used as the C heap.

If the number of threads reaches the maximum number set by the OS, you might not be able to create additional threads.

Prerequisite option

- `-XX:+HitachiVerboseGC`

Format of output

```
[id] <date> (Skip Full:full_count, Copy:copy_count)
[gc_kind gc_info, gc_time secs][Eden: eden_info][Survivor: survivor_info]
[Tenured: tenured_info][Metaspace: Metaspace_info]
[class space: class_space_info] [cause:cause_info] [User: user_cpu secs]
[Sys: system_cpu secs][IM: jvm_alloc_size, mmap_total_size, malloc_total_size]
[TC: thread_count]
```

The following provides details about the output item and content when this option is specified.

| Output item | Output content |
|---|---|
| *thread_count* | Number of Java threads |

## Syntax

```
-XX:[+|-]HitachiVerboseGCPrintThreadCount
```

## Specifiable values

Type: `String`

`-XX:+HitachiVerboseGCPrintThreadCount`

Outputs the number of Java threads.

`-XX:-HitachiVerboseGCPrintThreadCount`

Does not output the number of Java threads.

## Default value

If the definition item is omitted:

`-XX:+HitachiVerboseGCPrintThreadCount`

## Examples

Example 1 (if SerialGC is selected when the `-XX:+HitachiVerboseGC` option is selected)

```
[VGC]<Thu Oct 02 10:38:53.658 2014>(Skip Full:1,Copy:0)
[Full GC 770K->682K(8064K), 0.0050003 secs][DefNew::Eden: 88K->0K(2304K)]
[DefNew::Survivor: 0K->0K(256K)][Tenured: 681K->682K(5504K)]
[Metaspace: 3634K(4492K, 4492K)->3634K(4492K, 4492K)]
[class space: 356K(388K, 388K)->356K(388K, 388K)]
[cause:System.gc][User: 0.0000000 secs][Sys: 0.0000000 secs]
[IM: 11944K, 12448K, 0K][TC: 22][DOE: 0K, 0][CCI: 1173K, 245760K, 2496K]
```

Example 2 (if G1GC is selected when the `-XX:+HitachiVerboseGC` option is selected)

- GC-related log

```
[VG1]<Thu Oct 02 10:38:56.193 2014>
[Full GC 753K/2048K(8192K)->678K/1024K(8192K), 0.0097901 secs][Status:-]
[G1GC::Eden: 1024K(2048K)->0K(2048K)][G1GC::Survivor: 0K->0K]
[G1GC::Tenured: 1024K->1024K][G1GC::Humongous: 0K->0K]
[G1GC::Free: 6144K->7168K] [Metaspace: 3634K(4492K, 4492K)->3634K(4492K, 4492K)]
[class space: 356K(388K, 388K)->356K(388K, 388K)] [cause:System.gc]
[RegionSize: 1024K][Target: 0.2000000 secs][Predicted: 0.0000000 secs]
[TargetTenured: 0K][Reclaimable: 0K(0.00%)][User: 0.0000000 secs]
[Sys: 0.0000000 secs][IM: 20459K, 21920K, 0K][TC: 35][DOE: 0K, 0]
[CCI: 1172K, 245760K, 2496K]
```

- Concurrent Marking related log

```
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Root Region Scan Start]
[User: 0.0000000 secs][Sys: 0.0000000 secs]
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Root Region Scan End]
[User: 0.0126134 secs][Sys: 0.0146961 secs]
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Mark Start][User: 0.0000000 secs]
```

```
[Sys: 0.0000000 secs]
[VCM]<Wed Jul 24 11:45:34 2013>[Concurrent Mark End][User: 0.0156250 secs]
[Sys: 0.2495800 secs]
```

Example 3 (if SerialGC is selected when the -XX:+HitachiCommaVerboseGC option is selected)

```
VGC,Thu Oct 02 10:38:52.442 2014,1,0,0,Full GC,770,682,8064,0.0040002,88,0,2304,
0,0,256,681,682,5504,3634,3634,4492,3634,3634,4492,356,356,388,356,356,388,1,0.
0000000,0.0000000,11913,12448,0,22,0,0,1173,245760,2496
```

Example 4 (if G1GC is selected when the -XX:+HitachiCommaVerboseGC option is selected)

- GC-related log

```
VG1,Thu Oct 02 10:38:54.920 2014,Full GC,753,2048,8192,678,1024,8192,0.0064767,
-,1024,2048,0,2048,0,0,1024,1024,0,0,6144,7168,3634,3634,4492,3634,3634,4492,
356,356,388,356,356,388,1,1024,0.2000000,0.0000000,0,0,0.00,0.0000000,
0.0000000,20459,21920,0,35,0,0,1171,245760,2496
```

- Concurrent Marking related log

```
VCM,Fri Jul 26 21:35:50 2013,Concurrent Mark Start,0.0000000,0.0000000
VCM,Fri Jul 26 21:35:50 2013,Concurrent Mark End,0.0124532,0.0245698
```

## 7.7 Java VM options used for the functionality for that outputs the code cache area information

This section describes the options used to set up the output of the code cache area information.

### 7.7.1 -XX:CodeCacheInfoPrintRatio

`-XX:CodeCacheInfoPrintRatio` specifies the usage rate of the code cache area. This is the rate at which a message is output to indicate that usage has reached the threshold value.

#### Description

`-XX:CodeCacheInfoPrintRatio` specifies the usage rate of the code cache area. This is the rate at which a message is output to indicate that usage has reached the threshold value.

The threshold value is calculated by using the following formula based on the usage rate specified in this option:

*maximum_size_of_code_cache_area* * *value_of_-XX:CodeCacheInfoPrintRatio_option* / 100

The code cache area is the area that stores the JIT compile code generated by JIT compilation. By using JIT compilation to execute Java methods that have a large number of calls or loops, Java VM accelerates the execution processing.

The maximum size of the code cache area is specified in the `ReservedCodeCacheSize` option. Specify a value equal to or larger than the default value of the `ReservedCodeCacheSize` option.

In addition, consider extending the code cache area when the code cache area is depleted or if there is a risk of depletion. It is not possible to estimate or calculate the size of the JIT compile code. For this reason, measure the actual amount of space used by the code cache area in the Java application execution environment. After considering the amount of space used by the code cache area used by the system (a maximum of 500 kilobytes in the 32-bits version, and 2 megabytes in the 64-bits version), estimate the maximum size of the code cache area.

Prerequisite option

- `-XX:+PrintCodeCacheInfo`

#### Syntax

```
-XX:CodeCacheInfoPrintRatio=integer_value
```

#### Specifiable values

*integer_value*

Type: `Integer`

Specify an integer from 0 to 100 (unit: %). If the specified value is outside of the specifiable range, `80` is set.

#### Default value

If the definition item is omitted:

`-XX:CodeCacheInfoPrintRatio=80`

### Notes

- If the usage of the code cache area remains around the threshold value, no message is output even if a Java method is compiled by JIT.

  After the usage of the code cache area drops to less than the threshold value, if the usage reaches the threshold value again when a Java method is compiled by JIT, a message is output.
- The size of code cache area used by the system is a maximum of 500 kilobytes in a 32-bit system and a maximum of 2 megabytes in a 64-bit system. Therefore, depending on the size of code cache area used by the system, the code cache area might become insufficient even if the size of used code cache area does not reach the maximum.

  If a large value is specified for the usage threshold, the code cache area might become insufficient before a message is output. If you want to output a message before the code cache area becomes insufficient, specify a value for `-XX:CodeCacheInfoPrintRatio` (the option for specifying the usage of the code cache area) so that the value calculated by the formula *maximum_size_of_code_cache_area* - *threshold value* is 4 megabytes or more.

## 7.7.2 -XX:[+|-]PrintCodeCacheFullMessage

`-XX:[+|-]PrintCodeCacheFullMessage` outputs a message to the Java VM log file when the code cache area becomes insufficient during JIT compilation of a Java method.

### Description

`-XX:[+|-]PrintCodeCacheFullMessage` specifies whether a message is to be output to the Java VM log file when the code cache area becomes insufficient during JIT compilation of a Java method. The code cache area stores the JIT compile codes generated by JIT compilation. By using JIT compilation to execute Java methods that have a large number of calls or loops, processing is accelerated.

Prerequisite option

- `-XX:+HitachiVerboseGC`

Format of output

The following shows the format of output message.

```
[cc_id]<cc_date>CodeCache is full. Compiler has been disabled.
[cc_used_sizeK, cc_max_sizeK, cc_infoK]
```

The following provides details about the output content of the error message.

| Output item | Output content |
|---|---|
| *cc_id* | `CCI` (Java VM log file identifier) |
| *cc_date* | Date and time when JIT compilation was performed on the Java method |
| *cc_used_size* | Size of the used code cache area when JIT compilation was performed on the Java method. This information is output in units of kilobytes. |
| *cc_max_size* | Maximum size of the code cache area. This information is output in units of kilobytes. |
| *cc_info* | Maintenance information |

### Syntax

```
-XX:[+|-]PrintCodeCacheFullMessage
```

### Specifiable values

Type: `String`

`-XX:+PrintCodeCacheFullMessage`

Outputs a message when the code cache area becomes insufficient during JIT compilation of a Java method. This message is output only once.

`-XX:-PrintCodeCacheFullMessage`

Does not output a message even when the code cache area becomes insufficient during JIT compilation of a Java method.

### Default value

If the definition item is omitted:

`-XX:+PrintCodeCacheFullMessage`

### Example

The following is an example of the output message.

```
[CCI]<Wed Dec 26 14:38:29 2012>CodeCache is full. Compiler has been disabled.
[49151K, 49152K, 49152K]
```

### Notes

The maximum size of the code cache area that can be used by the system is 500 kilobytes in the 32-bit version and 2 megabytes in the 64-bit version. Therefore, depending on the size of code cache area used by the system, the code cache area might become insufficient even if the size of used code cache area is less than the maximum.

## 7.7.3 -XX:[+|-]PrintCodeCacheInfo

`-XX:[+|-]PrintCodeCacheInfo` specifies whether the usage rate of the code cache area is to be output. In addition, this option specifies whether the message indicating that usage has reached the threshold value is to be output to the Java VM log file.

### Description

`-XX:[+|-]PrintCodeCacheInfo` specifies whether the usage rate of the code cache area is to be output. In addition, this option specifies whether the message indicating that usage has reached the threshold value is to be output to the Java VM log file. The code cache area stores the JIT compile codes generated by JIT compilation. By using JIT compilation to execute Java methods that have a large number of calls or loops, processing is accelerated.

If this option is enabled, the usage rate of the code cache area is output to the extended verbosegc information. In addition, when the usage rate of the code cache area reaches the threshold value, a message is output.

The threshold value is calculated as follows: *maximum_size_of_code_cache_area* * *value_of_-XX:CodeCacheInfoPrintRatio_option* / 100. Specify the maximum size of the code cache area in the `-XX:ReservedCodeCacheSize` option.

Even if the `-XX:-HitachiVerboseGC` option is specified, the usage rate of the code cache area is output to the extended verbosegc information that is output by the `-v` and `-s` options of the `javagc` command.

Prerequisite option

- -XX:+HitachiVerboseGC

Related options

- -XX:+HitachiCommaVerboseGC
- -XX:CodeCacheInfoPrintRatio

Output format

The following shows the output format of the usage rate of the code cache area.

```
[id] <date> (Skip Full:full_count, Copy:copy_count)
[gc_kind gc_info, gc_time secs][Eden: eden_info][Survivor: survivor_info]
[Tenured: tenured_info][Metaspace: metaspace_info]
[class space: class_space_info] [cause:cause_info] [User: user_cpu secs]
[Sys: system_cpu secs][IM: jvm_alloc_size, mmap_total_size, malloc_total_size]
[TC: thread_count][DOE: doe_alloc_size, called_count]
[CCI: cc_used_sizeK, cc_max_sizeK, cc_infoK]
```

The following provides details about the output items and content when this option is specified.

| Output item | Output content |
|---|---|
| *cc_used_size* | Size of the used code cache area when GC occurred. This information is output in units of kilobytes. |
| *cc_max_size* | Maximum size of the code cache area. This information is output in units of kilobytes. |
| *cc_info* | Maintenance information |

The following shows the output format of the message indicating that usage has reached the threshold value.

```
[cc_id]<cc_date>CodeCache usage has exceeded the threshold.
[cc_used_sizeK, cc_max_sizeK, cc_infoK]
```

The following provides details about the output content of the error message.

| Output item | Output content |
|---|---|
| *cc_id* | CCI (Java VM log file identifier) |
| *cc_date* | Date and time when JIT compilation was performed |
| *cc_used_size* | Size of the used code cache area after JIT compilation. This information is output in units of kilobytes. |
| *cc_max_size* | Maximum size of the code cache area. This information is output in units of kilobytes. |
| *cc_info* | Maintenance information |

## Syntax

```
-XX:[+|-]PrintCodeCacheInfo
```

## Specifiable values

Type: String

-XX:+PrintCodeCacheInfo

Outputs the usage rate of the code cache area.

The message indicating that usage has reached the threshold value is also output.

`-XX:-PrintCodeCacheInfo`

Does not output the usage rate of the code cache area.

The message indicating that usage has reached the threshold value is also not output.

## Default value

If the definition item is omitted:

`-XX:+PrintCodeCacheInfo`

## Examples

The following shows output examples of the usage rate of the code cache area.

Example 1 (if SerialGC is selected when the `-XX:+HitachiVerboseGC` option is selected)

```
[VGC]<Thu Oct 02 10:38:53.658 2014>(Skip Full:1,Copy:0)
[Full GC 770K->682K(8064K), 0.0050003 secs][DefNew::Eden: 88K->0K(2304K)]
[DefNew::Survivor: 0K->0K(256K)][Tenured: 681K->682K(5504K)]
[Metaspace: 3634K(4492K, 4492K)->3634K(4492K, 4492K)]
[class space: 356K(388K, 388K)->356K(388K, 388K)]
[cause:System.gc][User: 0.0000000 secs][Sys: 0.0000000 secs]
[IM: 11944K, 12448K, 0K][TC: 22][DOE: 0K, 0][CCI: 1173K, 245760K, 2496K]
```

Example 2 (if G1GC is selected when the `-XX:+HitachiVerboseGC` option is selected)

- GC-related log

```
[VG1]<Thu Oct 02 10:38:56.193 2014>
[Full GC 753K/2048K(8192K)->678K/1024K(8192K), 0.0097901 secs][Status:-]
[G1GC::Eden: 1024K(2048K)->0K(2048K)][G1GC::Survivor: 0K->0K]
[G1GC::Tenured: 1024K->1024K][G1GC::Humongous: 0K->0K]
[G1GC::Free: 6144K->7168K] [Metaspace: 3634K(4492K, 4492K)->3634K(4492K, 4492K)]
[class space: 356K(388K, 388K)->356K(388K, 388K)] [cause:System.gc]
[RegionSize: 1024K][Target: 0.2000000 secs][Predicted: 0.0000000 secs]
[TargetTenured: 0K][Reclaimable: 0K(0.00%)][User: 0.0000000 secs]
[Sys: 0.0000000 secs][IM: 20459K, 21920K, 0K][TC: 35][DOE: 0K, 0]
[CCI: 1172K, 245760K, 2496K]
```

- Concurrent Marking related log

```
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Root Region Scan Start]
[User: 0.0000000 secs][Sys: 0.0000000 secs]
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Root Region Scan End]
[User: 0.0126134 secs][Sys: 0.0146961 secs]
[VCM]<Wed Jul 24 11:45:20 2013>[Concurrent Mark Start][User: 0.0000000 secs]
[Sys: 0.0000000 secs]
[VCM]<Wed Jul 24 11:45:34 2013>[Concurrent Mark End][User: 0.0156250 secs]
[Sys: 0.2495800 secs]
```

Example 3 (if SerialGC is selected when the `-XX:+HitachiCommaVerboseGC` option is selected)

```
VGC,Thu Oct 02 10:38:52.442 2014,1,0,0,Full GC,770,682,8064,0.0040002,88,0,2304,
0,0,256,681,682,5504,3634,3634,4492,3634,3634,4492,356,356,388,356,356,388,1,0.
0000000,0.0000000,11913,12448,0,22,0,0,1173,245760,2496
```

Example 4 (if G1GC is selected when the `-XX:+HitachiCommaVerboseGC` option is selected)

- GC-related log

```
VG1,Thu Oct 02 10:38:54.920 2014,Full GC,753,2048,8192,678,1024,8192,0.0064767,
-,1024,2048,0,2048,0,0,1024,1024,0,0,6144,7168,3634,3634,4492,3634,3634,4492,
```

```
356,356,388,356,356,388,1,1024,0.2000000,0.0000000,0,0,0.00,0.0000000,
0.0000000,20459,21920,0,35,0,0,1171,245760,2496
```

- Concurrent Marking related log

```
VCM,Fri Jul 26 21:35:50 2013,Concurrent Mark Start,0.0000000,0.0000000
VCM,Fri Jul 26 21:35:50 2013,Concurrent Mark End,0.0124532,0.0245698
```

The following shows an example of the output message indicating that usage has reached the threshold value.

Example

```
[CCI]<Wed Dec 26 14:27:53 2012>CodeCache usage has exceeded the threshold.
[39358K, 49152K, 39360K]
```

## Notes

- If the usage of the code cache area remains around the threshold value, no message is output even if a Java method is compiled by JIT.

  After the usage of the code cache area drops to less than the threshold value, if the usage reaches the threshold value again when a Java method is compiled by JIT, a message is output.

- The size of code cache area used by the system is a maximum of 500 kilobytes in a 32-bit system and a maximum of 2 megabytes in a 64-bit system. Therefore, depending on the size of code cache area used by the system, the code cache area might become insufficient even if the size of used code cache area does not reach the maximum.

  If a large value is specified for the usage threshold, the code cache area might become insufficient before a message is output. If you want to output a message before the code cache area becomes insufficient, specify a value for `-XX:CodeCacheInfoPrintRatio` (the option for specifying the usage of the code cache area) so that the value calculated by the formula *maximum_size_of_code_cache_area* - *threshold value* is 4 megabytes or more.

## 7.8 Java VM options used for the extended functionality when an OutOfMemoryError occurs

This section describes the options used for configuring settings related to the output information and behavior when an OutOfMemoryError occurs.

### 7.8.1 -XX:[+|-]HitachiOutOfMemoryAbort

`-XX:[+|-]HitachiOutOfMemoryAbort` specifies whether to enable the functionality that forcibly terminates processing when an OutOfMemoryError occurs.

#### Description

If an OutOfMemoryError occurs due to one of the following reasons, `-XX:[+|-]HitachiOutOfMemoryAbort` outputs a message to the standard output and then forcibly terminates processing:

- JavaHeap shortage
- Metaspace shortage
- Compressed Class Space shortage
- C heap shortage in the J2SE class library

Note that, if a C heap shortage occurs during Java VM processing, the processing is forcibly terminated regardless of the specification of this option.

Java VM exit code when processing is forcibly terminated

`6`

Note, however, that if the processing was executed on a UNIX shell (such as sh and csh), the exit code is `0x86`, which is calculated by adding `0x80` to `6`.

#### Syntax

```
-XX:[+|-]HitachiOutOfMemoryAbort
```

#### Specifiable values

Type: `String`

`-XX:+HitachiOutOfMemoryAbort`

Forcibly terminates the processing when an OutOfMemoryError occurs.

`-XX:-HitachiOutOfMemoryAbort`

Does not forcibly terminate the processing even when an OutOfMemoryError occurs.

#### Default value

If the definition item is omitted:

`-XX:-HitachiOutOfMemoryAbort`

### Example

```
java.lang.OutOfMemoryError occurred.
JavaVM aborted because of specified -XX:+HitachiOutOfMemoryAbort options.
```

### Notes

- If the `-XX:+HitachiOutOfMemoryStackTrace` option is specified, the stack trace is output to the Java VM log file and then processing is terminated.
- When an OutOfMemoryError occurs, the core dump is output to the current directory.
- If this option is specified, the processing will be forcibly terminated. At this time, the Java VM termination processing that is registered by using the methods java.io.File.deleteOnExit and java.lang.Runtime.addShutdownHook will not be executed.

## 7.8.2 -XX:[+|-]HitachiOutOfMemoryAbortThreadDump

`-XX:[+|-]HitachiOutOfMemoryAbortThreadDump` outputs thread dumps when an OutOfMemoryError occurs.

### Description

`-XX:[+|-]HitachiOutOfMemoryAbortThreadDump` outputs thread dumps when an OutOfMemoryError occurs. When the C heap in the J2SE class library is insufficient, thread dumps are not output, to prevent the recurrence of C heap insufficiency due to the output of thread dumps.

Specify the output destination of thread dumps by using the `JAVACOREDIR` environment variable or the `-XX:+HitachiThreadDumpToStdout` option.

Prerequisite options

- `-XX:+HitachiOutOfMemoryAbort`
- `-XX:+HitachiThreadDump`

### Syntax

```
-XX:[+|-]HitachiOutOfMemoryAbortThreadDump
```

### Specifiable values

Type: `String`

`-XX:+HitachiOutOfMemoryAbortThreadDump`

Outputs thread dumps when an OutOfMemoryError occurs.

You can specify this option if the `-XX:+HitachiOutOfMemoryAbort` option is specified.

`-XX:-HitachiOutOfMemoryAbortThreadDump`

Does not output thread dumps when an OutOfMemoryError occurs.

### Default value

If the definition item is omitted:

`-XX:+HitachiOutOfMemoryAbortThreadDump`

## 7.8.3 -XX:[+|-]HitachiOutOfMemoryAbortThreadDumpWithJHeapProf

`-XX:[+|-]HitachiOutOfMemoryAbortThreadDumpWithJHeapProf` outputs class-wide statistics to the thread dump log file that is output when an OutOfMemoryError occurs.

### Description

`-XX:[+|-]HitachiOutOfMemoryAbortThreadDumpWithJHeapProf` specifies whether to output class-wide statistics to the thread dump log file that is output when `-XX:+HitachiOutOfMemoryAbortThreadDump` is specified.

If G1GC is used, this functionality is disabled. If the option that enables this functionality is specified when G1GC is being used, the specification is not applied, and the functionality is disabled.

Prerequisite options

- `-XX:+HitachiOutOfMemoryAbort`
- `-XX:+HitachiOutOfMemoryAbortThreadDump`
- `-XX:+HitachiThreadDump`

### Syntax

```
-XX:[+|-]HitachiOutOfMemoryAbortThreadDumpWithJHeapProf
```

### Specifiable values

Type: `String`

`-XX:+HitachiOutOfMemoryAbortThreadDumpWithJHeapProf`

Outputs class-wide statistics to the thread dump log file that is output when `-XX:+HitachiOutOfMemoryAbortThreadDump` is specified.

`-XX:-HitachiOutOfMemoryAbortThreadDumpWithJHeapProf`

Does not output class-wide statistics to the thread dump log file that is output when `-XX:+HitachiOutOfMemoryAbortThreadDump` is specified.

### Default value

If the definition item is omitted:

`-XX:-HitachiOutOfMemoryAbortThreadDumpWithJHeapProf`

### Example

```
Java Heap Profile
-----------------------
_________________Size__Instances__Class_________________
```

```
              856560          5 [Ljava.io.ObjectStreamField;
              113488          2 java.lang.ThreadGroup
              113280          2 [Ljava.lang.Thread;
              108264          2 java.io.PrintStream
...
                  64          1 classA
...
                  32          1 classB
...
                  16          1 classD
...
                  16          1 classC
...
```

## 7.8.4 -XX:[+|-]HitachiOutOfMemoryCause

`-XX:[+|-]HitachiOutOfMemoryCause` outputs the type of the cause of the error when an OutOfMemoryError occurs.

### Description

`-XX:[+|-]HitachiOutOfMemoryCause` specifies whether to output the type of the cause of the error when an OutOfMemoryError occurs.

The following shows the cause types that can be output.

Table 7-7: List of exception cause types

| No. | Cause message | Description |
|---|---|---|
| 1 | `C Heap` | Exception caused when allocating a C heap |
| 2 | `Java Heap` | Exception caused when allocating a Java heap |
| 3 | `Meta Space` | Exception caused when allocating Metaspace |
| 4 | `Compressed Class Space` | Exception caused when allocating Compressed Class Space |
| 5 | `Unknown` | Exception that cannot be identified as one of the above exceptions |
| 6 | `Thread Limit` | Exception caused when the maximum number of threads is specified in the `-XX:HitachiThreadLimit` option and the number of created threads exceeds the specified maximum number. |

### Syntax

```
-XX:[+|-]HitachiOutOfMemoryCause
```

### Specifiable values

Type: `String`

`-XX:+HitachiOutOfMemoryCause`

Outputs the exception cause type to the Java VM log file when an OutOfMemoryError occurs.

When the `-XX:+HitachiOutOfMemoryStackTrace` option is specified, this option is also set.

`-XX:-HitachiOutOfMemoryCause`

Does not output the exception cause type to the Java VM log file when an OutOfMemoryError occurs.

### Default value

If the definition item is omitted:

`-XX:-HitachiOutOfMemoryCause`

### Example

```
[OOM][Thread:  0x00062fd0]<Tue Dec 2 16:42:39 2003>[java.lang.OutOfMemoryError
:(C Heap) : unable to create thread : 340 threads exist]
```

## 7.8.5 -XX:[+|-]HitachiOutOfMemorySize

`-XX:[+|-]HitachiOutOfMemorySize` outputs the requested memory size when an OutOfMemoryError occurs.

### Description

`-XX:[+|-]HitachiOutOfMemorySize` outputs the requested memory size when an OutOfMemoryError occurs.

### Syntax

```
-XX:[+|-]HitachiOutOfMemorySize
```

### Specifiable values

Type: `String`

`-XX:+HitachiOutOfMemorySize`

Outputs the requested memory size (in bytes) when an OutOfMemoryError occurs.

When the `-XX:+HitachiOutOfMemoryStackTrace` option is specified, this option is also set.

`-XX:-HitachiOutOfMemorySize`

Does not output the requested memory size when an OutOfMemoryError occurs.

### Default value

If the definition item is omitted:

`-XX:-HitachiOutOfMemorySize`

### Example

```
[OOM][Thread:  0x00062fd0]<Tue Dec 2 16:42:39 2003>
[java.lang.OutOfMemoryError :   requested 1024 bytes. (Java Heap) :
20 threads exist]
```

### Notes

In the following cases, the requested memory size cannot be collected:

- When the Java memory allocation functionality is not used and an OutOfMemoryError (including errors thrown by the J2SE class library) is explicitly thrown.

  Example:

  ```
  throw new OutOfMemoryError();
  ```

- When an OutOfMemoryError is caused by verifier during class loading.

```
[OOM][Thread:  0x00062fd0]<Tue Dec 2 16:42:39 2003>
[java.lang.OutOfMemoryError :   requested size unknown. (Unknown) :
10 threads exist]
```

## 7.8.6 -XX:[+|-]HitachiOutOfMemoryStackTrace

`-XX:[+|-]HitachiOutOfMemoryStackTrace` outputs the exception information and stack trace to the Java VM log file when an OutOfMemoryError occurs.

### Description

`-XX:[+|-]HitachiOutOfMemoryStackTrace` specifies whether to output the exception information and stack trace to the Java VM log file when an OutOfMemoryError occurs.

Format of output

```
[id] [Thread:thread_id]<date>[java.lang.OutOfMemoryError :
requested size bytes (cause) : reason : thread_count threads exist]
[id] [Thread:thread_id] stack_trace
```

The following provides details about the output.

| Output item | Output content |
|---|---|
| *id* | `OOM` (Java VM log file identifier). |
| *thread_id* | Thread ID (the tid that is output to the thread dump). |
| *date* | Date and time when the OutOfMemory exception occurred. |
| *size* | Size (in bytes) of the memory that was to be allocated. This information is not output when the `-XX:-HitachiOutOfMemorySize` option is specified.<br>In the following cases, the requested memory size cannot be collected, and `unknown` is output instead of the size:<br>• When the Java memory allocation functionality is not used and an OutOfMemoryError is explicitly thrown<br>This includes errors that are thrown by the standard class library. For example, if an error is thrown by processing such as `throw new OutOfMemoryError();`, the memory size cannot be output.<br>• When an OutOfMemoryError is caused by verifier during class loading |
| *cause* | Exception cause type#. This information is not output if the `-XX:-HitachiOutOfMemoryCause` option is specified. |
| *reason* | Exception reason. This information is output when thread creation fails. |
| *thread_count* | Number of threads when the OutOfMemoryError occurred. This value includes the number of threads that could not be created. |
| *stack_trace* | Stack trace. |

#:

The exception cause types are as follows.

Table 7-8: List of exception cause types

| No. | Cause message | Description |
|---|---|---|
| 1 | `C Heap` | Exception caused when allocating a C heap |
| 2 | `Java Heap` | Exception caused when allocating a Java heap |
| 3 | `Meta Space` | Exception caused when allocating Metaspace |
| 4 | `Compressed Class Space` | Exception caused when allocating Compressed Class Space |
| 5 | `Unknown` | Exception that cannot be identified as one of the above exceptions |
| 6 | `Thread Limit` | Exception caused when the maximum number of threads is specified in the `-XX:HitachiThreadLimit` option and the number of created threads exceeds the specified maximum number. |

## Syntax

```
-XX:[+|-]HitachiOutOfMemoryStackTrace
```

## Specifiable values

Type: `String`

`-XX:+HitachiOutOfMemoryStackTrace`

Outputs the exception information and stack trace to the Java VM log file when an OutOfMemoryError occurs.

The stack trace is stored in the buffer for each stack and then output after the code is converted. The stack trace is output each time an OutOfMemoryError is thrown. Therefore, if an OutOfMemoryError is caught and then thrown again, the stack trace is output multiple times. Note that, if an OutOfMemoryError occurs during thread creation, no stack trace is output.

`-XX:-HitachiOutOfMemoryStackTrace`

Does not output the stack trace to the Java VM log file when an OutOfMemoryError occurs.

## Default value

If the definition item is omitted:

`-XX:-HitachiOutOfMemoryStackTrace`

## Example

```
[OOM][Thread:  0x00062fd0] <Wed Mar 17 00:41:17 2004>
[java.lang.OutOfMemoryError :requested 400000 bytes.(C Heap):
unable to create thread : 1500 threads exist]
[OOM][Thread:  0x00062fd0] at java.lang.Thread.start(Native Method)
[OOM][Thread:  0x00062fd0] at sub1.<init>(Thread0012.java:22)
[OOM][Thread:  0x00062fd0] at Thread0012.test01(Thread0012.java:73)
[OOM][Thread:  0x00062fd0] at Thread0012.main(Thread0012.java:57)
```

### Notes

If Java VM fails to create a thread because of a memory shortage, only the exception information will be output. The stack trace will not be output.

## 7.8.7 -XX:HitachiOutOfMemoryStackTraceLineSize

`-XX:HitachiOutOfMemoryStackTraceLineSize` specifies the number of characters (in bytes) per line of the stack trace that is output when an OutOfMemoryError occurs.

### Description

`-XX:HitachiOutOfMemoryStackTraceLineSize` specifies the number of characters (in bytes) per line of the stack trace that is output when an OutOfMemoryError occurs. If this option is not specified, `1024` bytes are set by default. When the specified number of bytes cannot be allocated, a warning message is output and no stack trace is output. In addition, if the number of characters in a row exceeds the specified number of characters, characters after "at" are deleted in order until the number of characters in that row is equal to the specified number. Then the character string of length equal the specified number of bytes is output.

Note that, when the `-XX:+JavaLogAsynchronous` option is specified, `4096` is set for this option.

Prerequisite options

- `-XX:+HitachiOutOfMemoryStackTrace`

### Syntax

```
-XX:HitachiOutOfMemoryStackTraceLineSize=integer_value
```

### Specifiable values

*integer_value*

Type: `Integer`

Specify an integer value (in bytes) from 1,024 to 2,147,483,647. If you specify a value outside of this range, `1024` is set. If you specify a negative value, an error occurs.

### Default value

If the definition item is omitted:

`-XX:HitachiOutOfMemoryStackTraceLineSize=1024`

## 7.9 Java VM options used by the functionality for the class library trace

This section describes the options used to configure settings related to the output information of the stack traces of the class library.

### 7.9.1 -XX:[+|-]HitachiJavaClassLibTrace

`-XX:[+|-]HitachiJavaClassLibTrace` outputs the stack trace for the class library.

#### Description

`-XX:[+|-]HitachiJavaClassLibTrace` outputs the stack trace for the API to the Java VM log file when one of the following method that affects the entire system is used:

- java.lang.System.gc
- java.lang.System.exit
- java.lang.System.runFinalizersOnExit
- java.lang.Runtime.exit
- java.lang.Runtime.halt
- java.lang.Runtime.runFinalizersOnExit

Format of output

```
[id] [Thread:thread_id]<date>
[id] [Thread:thread_id] stack_trace
```

| Output item | Output content |
|---|---|
| *id* | `CLT` (Java VM log file identifier) |
| *thread_id* | Thread ID (the tid that is output to the thread dump) |
| *date* | Date and time the class library is used |
| *stack_trace* | Stack trace |

#### Syntax

```
-XX:[+|-]HitachiJavaClassLibTrace
```

#### Specifiable values

Type: `String`

`-XX:+HitachiJavaClassLibTrace`

Outputs the stack trace for the class library.

`-XX:-HitachiJavaClassLibTrace`

Does not output the stack trace for the class library.

### Default value

When the definition item is omitted:

`-XX:-HitachiJavaClassLibTrace`

### Examples

Example of output 1

```
[CLT][Thread:  0x00286348]<Thu Oct 21 14:55:50 2004>
[CLT][Thread:  0x00286348] at java.lang.Shutdown.halt0(Native Method)
[CLT][Thread:  0x00286348] at java.lang.Shutdown.halt(Shutdown.java:145)
[CLT][Thread:  0x00286348] at java.lang.Shutdown.exit(Shutdown.java:222)
[CLT][Thread:  0x00286348] at java.lang.Runtime.exit(Runtime.java:90)
[CLT][Thread:  0x00286348] at java.lang.System.exit(System.java:715)
[CLT][Thread:  0x00286348] at J250048_02.main(J250048_02.java:4)
```

Example of output 2

```
[CLT][Thread:  0x009c4000]<Tue Oct 09 15:36:18 2012>
[CLT][Thread:  0x009c4000] at java.lang.Runtime.outputJavaClassLibTrace
(Native Method)
[CLT][Thread:  0x009c4000] at java.lang.Runtime.runFinalizersOnExit
(Runtime.java:378)
[CLT][Thread:  0x009c4000] at java.lang.System.runFinalizersOnExit
(System.java:978)
[CLT][Thread:  0x009c4000] at Program.main(Program.java:8)
```

## 7.9.2 -XX:HitachiJavaClassLibTraceLineSize

`-XX:HitachiJavaClassLibTraceLineSize` specifies the number of characters (in bytes) per line of the stack trace for the class library.

### Description

`-XX:HitachiJavaClassLibTraceLineSize` specifies the number of characters (in bytes) per line of the stack trace for the class library that is output when the `-XX:+HitachiJavaClassLibTrace` option is specified.

Note that `4096` is set for this option when the `-XX:+JavaLogAsynchronous` option is specified.

Prerequisite option

- `-XX:+HitachiJavaClassLibTrace`

### Syntax

```
-XX:HitachiJavaClassLibTraceLineSize=integer_value
```

### Specifiable values

*integer_value*

Type: `Integer`

Specify an integer value (in bytes) from 1024 to 2147483647. If you specify a value outside of this range, `1024` is set.

## Default value

If the definition item is omitted:

```
-XX:HitachiJavaClassLibTraceLineSize=1024
```

## Example

```
[CLT][Thread:  0x00286c58]<Thu Oct 21 14:56:24 2004>
[CLT][Thread:  0x00286c58] at java.lang.Runtime.gc(Native Method)
[CLT][Thread:  0x00286c58] at java.lang.System.gc(System.java:737)
[CLT][Thread:  0x00286c58] at mple.func_012345678 ... (omitted)... xyz(Sample.java:9)
[CLT][Thread:  0x00286c58] at Sample.main(Sample.java:5)
```

If the number of characters in a line exceeds the specified number of bytes, the characters after `at` are deleted in order from left to right, until the number of characters in the line is equal to the specified number of bytes. In the fourth line of the above output example, the characters "Sa" have been deleted from `Sample`, and only `mple` appears.

## 7.10 Java VM options used for the functionality that outputs local variable information

This section describes the options used for configuring the functionality that outputs local variable information.

### 7.10.1 -XX:HitachiCallToString

`-XX:HitachiCallToString` outputs the character strings of the String objects that were obtained via a local variable object in the applicable class, as strings that represent variable values.

#### Description

`-XX:HitachiCallToString` outputs the character strings of the String objects that were obtained via a local variable object in a class corresponding to *applicable_range*, as strings that represent variable values.

Note that, if there are no objects stored in the local variable or the objects are Java VM internal objects, the local variable information is not output.

Prerequisite option

- `-XX:+HitachiLocalsInThrowable`

#### Syntax

```
-XX:HitachiCallToString=applicable_range
```

#### Specifiable values

*applicable_range*

Type: `String`

Specify `minimal` or `full`.

`minimal`

The following classes in the package java.lang are targets:

- `String`
- `StringBuffer`
- `Boolean`
- `Byte`
- `Character`
- `Short`
- `Integer`
- `Long`
- `Float`
- `Double`

Note that the target classes when a null character ("") is specified are the same as those when `minimal` is specified.

full

All classes and array types are targets.

## Default value

If the definition item is omitted:

```
-XX:HitachiCallToString=minimal
```

## Examples

Examples of output (in the simple output format) when the following Java program example is used are shown below.

Java program example

```
class Example3 {
    public static void main(String[] args) {
        Example3 e3 = new Example3();
        e3.method();  // 4th line
    }

    void method() {
        String l1 = "local 1";
        StringBuffer l2 = new StringBuffer(l1);
        l2.append(" + local 2");
        Boolean l3 = new Boolean(false);
        Character l4 = new Character('X');
        Long l5 = new Long(Long.MIN_VALUE);  // Minimum value of the long data
type
        Object l6 = new Thread();
        Object[] l7 = new Thread[10];

        try {
          <An exception occurred!>  // 18th line
        } catch (Exception e) {
          e.printStackTrace();
        }
    }

    public String toString() {
        return "I am an Example3 instance.";
    }
}
```

Example 1

When -XX:HitachiCallToString=minimal is specified:

```
  at Example3.method(Example3.java:18)
    locals:
      (Example3) this = <0xaa07db58>
      (java.lang.String) l1 = <0xae173a28> "local 1"
      (java.lang.StringBuffer) l2 = <0xaa07dca0> "local 1 + local 2"
      (java.lang.Boolean) l3 = <0xaa07de18> "false"
      (java.lang.Character) l4 = <0xaa07df68> "X"
      (java.lang.Long) l5 = <0xaa07e078> "-9223372036854775808"
      (java.lang.Object) l6 = <0xaa07e1a8>
      (java.lang.Object[]) l7 = <0xaa07e298>
  at Example3.main(Example3.java:4)
    locals:
...
```

Example 2

When -XX:HitachiCallToString=full is specified:

```
  at Example3.method(Example3.java:18)
    locals:
      (Example3) this = <0xaa07db58> "I am an Example3 instance."
      (java.lang.String) l1 = <0xae173a28> "local 1"
      (java.lang.StringBuffer) l2 = <0xaa07dca0> "local 1 + local 2"
      (java.lang.Boolean) l3 = <0xaa07de18> "false"
      (java.lang.Character) l4 = <0xaa07df68> "X"
      (java.lang.Long) l5 = <0xaa07e078> "-92233720368547758O8"
      (java.lang.Object) l6 = <0xaa07e1a8> "Thread[Thread-0,5,main]"
      (java.lang.Object[]) l7 = <0xaa07e298> "[Ljava.lang.Thread;@26e431"
  at Example3.main(Example3.java:4)
    locals:
...
```

### Notes

To collect all local variable information, when you create the class file by using `javac`, you must embed local variable information in the class file by specifying the `-g` option or the `-g:vars` option. If you create the class file without specifying either the `-g` option or the `-g:vars` option, the local variable information will be output within the collectable range.

Note that the specification of full is not supported in version 10-00 and later.

## 7.10.2 -XX:[+|-]HitachiLocalsInStackTrace

`-XX:[+|-]HitachiLocalsInStackTrace` adds the local variable information of each method to the stack traces that are generated when thread dumps are output, and then outputs the stack traces.

### Description

`-XX:[+|-]HitachiLocalsInStackTrace` adds the local variable information of each method to the stack traces that are generated when thread dumps are output, and then outputs the stack traces.

### Syntax

```
-XX:[+|-]HitachiLocalsInStackTrace
```

### Specifiable values

Type: `String`

`-XX:+HitachiLocalsInStackTrace`

Outputs local variable information to the stack traces that are generated when thread dumps are output.

`-XX:-HitachiLocalsInStackTrace`

Does not output local variable information to the stack traces that are generated when thread dumps are output.

## Default value

If the definition item is omitted:

```
-XX:-HitachiLocalsInStackTrace
```

## Examples

An example of the output (in the simple output format) when the following Java program example is used is shown below.

Java program example

```
class Example2 {
    public static void main(String[] args) {
        Example2 e2 = new Example2();
        e2.method();  // 4th line
    }

    synchronized void method() {
        int l1 = 1;
        float l2 = 2.0f;
        String l3 = "local 3";
        Character l4 = new Character('X');
        Object l5 = new Thread();
        Object[] l6 = new Thread[10];

        <Here, a thread dump is output!>  // 15th line
    }
}
```

Example of output

When the `-XX:+HitachiLocalsSimpleFormat` option and the `-XX:+HitachiTrueTypeInLocals` option are specified:

```
"main" #1 prio=5 os_prio=0 jid=<N/A> tid=0x0000000000297800 nid=0x11500
runnable [0x0000000002a8f000..0x0000000002a8f6c0]
   java.lang.Thread.State:  RUNNABLE
  stack=
[0x0000000002a90000..0x0000000002994000..0x0000000002991000..0x0000000002990000]
  [user cpu time=3790ms, kernel cpu time=78ms] [blocked count=0, waited count=0]
 at Example2.method(Unknown Source)
 - locked <0x00000000120d03a8> (a Example2)
   locals:
     (Example2) this = <0x00000000120d03a8>
     (int) l1 = 1
     (float) l2 = 2
     (java.lang.String) l3 = <0x00000000120d03b8>
     (java.lang.Character) l4 = <0x00000000120d0600>
     (java.lang.Object) l5 = <0x00000000120d07f8>
     (java.lang.Object[]) l6 = <0x00000000120d0bc8>
 at Example2.main(Unknown Source)
   locals:
     (java.lang.String[]) args [arg1] = <0x00000000120d0390>
     (Example2) e2 = <0x00000000120d03a8>
```

## Notes

- To collect all local variable information, when you create the class file by using `javac`, you must embed local variable information in the class file by specifying the `-g` option or the `-g:vars` option. If you create the class

file without specifying either the `-g` option or the `-g:vars` option, the local variable information will be output within the collectable range.

- In general, the threads collecting the stack trace information do not match the threads that are to be collected. To collect the information, the target threads must be terminated, and the `toString` method cannot be called. For this reason, the specification of the `-XX:HitachiCallToString` option becomes invalid.
- When the local variable information of a method containing a complicated control structure and many lines is output, analysis takes a long time. Therefore, the output of extended thread dumps and the acquisition of thread stack traces might take a long time.

## 7.10.3 -XX:[+|-]HitachiLocalsInThrowable

`-XX:[+|-]HitachiLocalsInThrowable` outputs the local variable information of the methods in the stack traces.

### Description

`-XX:[+|-]HitachiLocalsInThrowable` collects the local variable information of the methods in the stack traces when the `java.lang.Throwable.fillInStackTrace` method is executed.

Format of output

```
    locals:
      name:  name
      type:  type
      value:  value
...
```

- In the first line, `locals:` is output as the header.
- From second line onwards, information about collected local variables is output to one line for each variable.

The following information about local variables is output:

1. Variable name
2. Type name (basic type name, class name or array type name)
3. Character string that indicates a variable value

Note that the content output for each local variable is delimited by blank lines.

| Output item | Output content |
|---|---|
| *name* | Local variable name.<br>If this variable is passed to a method, `[arg***]` (*** indicates the argument number) appears after the variable name. |
| *type* | Type of the local variable (basic type, class name, or array type). |
| *value* | String that represents the value of the local variable.<br>• Basic type<br>Character string that is generated by converting the value<br>• Class or array type<br>When the variable is `null`: `(null)`<br>Other: *address_where_the_object_exists* |

| Output item | Output content |
|---|---|
| | The maximum number of characters that represent the value is 64. If the maximum number is exceeded, the first 64 characters and the character string "`...`" are output. For class or array type, you can add more detailed expressions by specifying the following additional options:<br>• `-XX:+HitachiLocalsSimpleFormat`<br>• `-XX:+HitachiTrueTypeInLocals`<br>• `-XX:HitachiCallToString` |

## Syntax

```
-XX:[+|-]HitachiLocalsInThrowable
```

## Specifiable values

Type: `String`

`-XX:+HitachiLocalsInThrowable`

Outputs the local variable information of the methods in the stack trace.

This option is ignored when `java.lang.StackOverflowError` occurs.

`-XX:-HitachiLocalsInThrowable`

Does not output the local variable information of the methods in the stack trace.

## Default value

If the definition item is omitted:

`-XX:-HitachiLocalsInThrowable`

## Examples

Examples of output (in the simple output format) when the following Java program example is used are shown below.

Java program example

```
class Example1 {
    public static void main(String[] args) {
        Example1 e1 = new Example1();
        Object obj = new Object();
        e1.method(1, 'Q', obj);  // 5th line
    }

    void method(int l1, char l2, Object l3) {
        float l4 = 4.0f;
        boolean l5 = true;
        double l6 = Double.MAX_VALUE; // Maximum value of the double data type
        Object[] l7 = new Object[10];

        try {
          <An exception occurred!>  // 15th line
        } catch (Exception e) {
          e.printStackTrace();
        }
    }
}
```

Example of output 1

When all local variable information is output:

```
  at Example1.method(Example1.java:15)
    locals:
      name:  this
      type:  Example1
      value:  <0x922f42d0>

      name:  l1 [arg1]
      type:  int
      value:  1

      name:  l2 [arg2]
      type; char
      value:  'Q'

      name:  l3 [arg3]
      type:  java.lang.Object
      value:  <0xaf112f08>

      name:  l4
      type:  float
      value:  4

      name:  l5
      type:  boolean
      value:  true

      name:  l6
      type:  double
      value:  1.79769E+308

      name:  l7
      type:  java.lang.Object[]
      value:  <0x922f42d8>

  at Example1.main(Example1.java:5)
    locals:
...
```

Example of output 2

When no local variable information exists:

- When the class file is generated without specifying the `-g` option or the `-g:vars` option.
- The native method of a class file is generated by specifying the `-g` option or the `-g:vars` option.

```
  at Example1.method(Example1.java:15)
    locals:
      name:  this
      type:  Example1
      value:  <0x922f42d0>

      name:  [arg1]
      type:  int
      value:  1

      name:  [arg2]
      type; char
      value:  'Q'
```

```
      name:  [arg3]
      type:  java.lang.Object
      value:  <0xaf112f08>

  at Example1.main(Example1.java:5)
    locals:
...
```

## Notes

- To collect all local variable information, when you create the class file by using `javac`, you must embed local variable information in the class file by specifying the `-g` option or the `-g:vars` option. If you create the class file without specifying either the `-g` option or the `-g:vars` option, the local variable information will be output within the collectable range.
- No local variable information exists for the native method, even if the class file was generated by specifying the `-g` option or the `-g:vars` option.
- When the JIT compiler compiles a method, as a part of optimization, local variables that are determined to be unnecessary might be removed.

  Example: Declarations (such as "int not_used = 12345") and local variables that are not used after initialization

  In this example, one of the following values is output as the local variable information when an exception occurs:

| Type name | Output information |
|---|---|
| `boolean` type | `false` |
| `char` type | `'\0'` |
| `byte` type<br>`short` type<br>`int` type<br>`long` type<br>`float` type<br>`double` type | `0` |
| Class type<br>Array type | `(null)` |

- During the output the local variable information of a method containing a complicated control structure and many lines, analysis takes more time. As a result, the generation of an exception object when an exception occurs might take more time.
- To output the local variable information to the stack trace of the current thread obtained by using the method `getStackTrace` of the class `java.lang.Thread`, the option (`-XX:+HitachiLocalsInThrowable`) that collects and outputs the local variable information to the stack trace when an exception occurs is necessary.

# 7.10.4 -XX:[+|-]HitachiLocalsSimpleFormat

`-XX:[+|-]HitachiLocalsSimpleFormat` changes the output format of the local variable information to the simple output format, where one variable is output per line.

## Description

`-XX:[+|-]HitachiLocalsSimpleFormat` changes the output format of the local variable information to the simple output format, where one variable is output per line.

Prerequisite options

- `-XX:+HitachiLocalsInThrowable`
- `-XX:+HitachiLocalsInStackTrace`

Format of output

```
    locals:
      (type) name = value
      (type) name = value
...
```

The following provides details on the output content.

| Output item | Output content |
|---|---|
| *name* | Local variable name.<br>If this variable is passed to a method, `[arg***]` (*** indicates the argument number) appears after the variable name. |
| *type* | Type of the local variable (basic type, class name, or array type). |
| *value* | String that represents the value of the local variable.<br>• Basic type<br>Character string that is generated by converting the value<br>• Class or array type<br>When the variable is `null`: `(null)`<br>Other: *address_where_the_object_exists*<br>The maximum number of characters that represent the value is 64. If the maximum number is exceeded, the first 64 characters and the character string "`...`" are output. For class or array type, you can add more detailed expressions by specifying the following additional options:<br>• `-XX:+HitachiLocalsSimpleFormat`<br>• `-XX:+HitachiTrueTypeInLocals`<br>• `-XX:HitachiCallToString` |

## Syntax

```
-XX:[+|-]HitachiLocalsSimpleFormat
```

## Specifiable values

Type: `String`

`-XX:+HitachiLocalsSimpleFormat`

Outputs the local variable information in the simple format.

`-XX:-HitachiLocalsSimpleFormat`

Outputs the local variable information in the normal format.

## Default value

If the definition item is omitted:

`-XX:-HitachiLocalsSimpleFormat`

## Examples

An output example when the following Java program example is used is shown below.

Java program example

```
class Example1 {
    public static void main(String[] args) {
        Example1 e1 = new Example1();
        Object obj = new Object();
        e1.method(1, 'Q', obj);  // 5th line
    }

    void method(int l1, char l2, Object l3) {
        float l4 = 4.0f;
        boolean l5 = true;
        double l6 = Double.MAX_VALUE; // Maximum value of the double data type
        Object[] l7 = new Object[10];

        try {
          <An exception occurred!>  // 15th line
        } catch (Exception e) {
          e.printStackTrace();
        }
    }
}
```

Example of output

```
  at Example1.method(Example1.java:15)
    locals:
      (Example1) this = <0x922f42d0>
      (int) l1 [arg1] = 1
      (char) l2 [arg2] = 'Q'
      (java.lang.Object) l3 [arg3] = <0xaf112f08>
      (float) l4 = 4
      (boolean) l5 = true
      (double) l6 = 1.79769E+308
      (java.lang.Object[]) l7 = <0x922f42d8>
  at Example1.main(Example1.java:5)
    locals:
...
```

# 7.10.5 -XX:[+|-]HitachiTrueTypeInLocals

`-XX:[+|-]HitachiTrueTypeInLocals` outputs the actual object type names to the local variable information.

## Description

`-XX:[+|-]HitachiTrueTypeInLocals` outputs the name of the object type that is set for a class or an array-type local variable when local variable information is collected. The type name appears in the parentheses after the character string that represents the variable value.

Note that, if the class or array-type object stored in the local variable is a Java VM internal object, `internal type` is output.

Prerequisite options

- `-XX:+HitachiLocalsInThrowable`
- `-XX:+HitachiLocalsInStackTrace`

## Syntax

```
-XX:[+|-]HitachiTrueTypeInLocals
```

## Specifiable values

Type: `String`

`-XX:+HitachiTrueTypeInLocals`

Outputs the actual object type names to the local variable information.

`-XX:-HitachiTrueTypeInLocals`

Does not output the actual object type names to the local variable information.

## Default value

If the definition item is omitted:

`-XX:-HitachiTrueTypeInLocals`

## Example

An output example when the following Java program example is used is shown below.

Java program example

```
class Example3 {
    public static void main(String[] args) {
        Example3 e3 = new Example3();
        e3.method();  // 4th line
    }

    void method() {
        String l1 = "local 1";
        StringBuffer l2 = new StringBuffer(l1);
        l2.append(" + local 2");
        Boolean l3 = new Boolean(false);
        Character l4 = new Character('X');
        Long l5 = new Long(Long.MIN_VALUE);  // Minimum value of the long data
type
        Object l6 = new Thread();
        Object[] l7 = new Thread[10];

        try {
          <An exception occurred!>  // 18th line
        } catch (Exception e) {
          e.printStackTrace();
        }
    }

    public String toString() {
        return "I am an Example3 instance.";
    }
}
```

Example

When the -XX:+HitachiLocalsSimpleFormat option and -XX:HitachiCallToString=full are specified

```
  at Example3.method(Example3.java:18)
    locals:
      (Example3) this = <0xaa07db58> "I am an Example3 instance." (Example3)
      (java.lang.String) l1 = <0xae173a28> "local 1" (java.lang.String)
      (java.lang.StringBuffer) l2 = <0xaa07dca0> "local 1 + local 2"
      (java.lang.StringBuffer)
      (java.lang.Boolean) l3 = <0xaa07de18> "false" (java.lang.Boolean)
      (java.lang.Character) l4 = <0xaa07df68> "X" (java.lang.Character)
      (java.lang.Long) l5 = <0xaa07e078> "-9223372036854775808" (java.lang.Long)
      (java.lang.Object) l6 = <0xaa07e1a8> "Thread[Thread-0,5,main]"
      (java.lang.Thread)
      (java.lang.Object[]) l7 = <0xaa07e298> "[Ljava.lang.Thread;@26e431"
      (java.lang.Thread[])
  at Example3.main(Example3.java:4)
    locals:
...
```

## 7.11 Java VM option used for releasing system resources

This section describes the option used for changing the system resource settings.

### 7.11.1 -XX:[+|-]HitachiFullCore

`-XX:[+|-]HitachiFullCore` creates the `core` file by ignoring the user limit when a failure occurs.

#### Description

`-XX:[+|-]HitachiFullCore` specifies whether to change the setting of the system resource `RLIMIT_CORE`.

#### Syntax

```
-XX:[+|-]HitachiFullCore
```

#### Specifiable values

Type: `String`

`-XX:+HitachiFullCore`

Forcibly increases the value of the system resource `RLIMIT_CORE` to the maximum value, and creates the `core` file by ignoring the user limit when a failure occurs.

`-XX:-HitachiFullCore`

Does not change the value of the system resource `RLIMIT_CORE`.

#### Default value

If the definition item is omitted:

`-XX:-HitachiFullCore`

## 7.12 Java VM options used for the explicit memory management functionality

This section describes the options for using the functionality (the explicit memory management functionality) for suppressing the occurrence of FullGC.

### 7.12.1 -XX:ExplicitMemoryAutoReclaimTargetBlockRatio

`-XX:ExplicitMemoryAutoReclaimTargetBlockRatio` specifies the maximum release rate that can be specified in the automatic release processing of the explicit memory management functionality.

#### Description

`-XX:ExplicitMemoryAutoReclaimTargetBlockRatio` is used when the size of the used Explicit heap area continues to increase, even when automatic release processing is repeatedly executed after Explicit heap tuning has been performed and the objects to be allocated to the Explicit heap by the automatic placement functionality have been selected. In the automatic release processing for Explicit memory blocks, the Explicit memory blocks to be automatically released are selected. However, depending on the reference relationships among objects, you might not be able to delete certain objects just by specifying one Explicit memory block. Instead, you might need to specify multiple Explicit memory blocks. This option can be used to increase the number of memory blocks that are selected to be released.

Specify the maximum release rate that can be set in the automatic release processing of the explicit memory management functionality. The release rate is the ratio of the amount of the heap area that is actually released by automatic release processing, to the amount selected during the automatic release processing.

The explicit memory management functionality uses the previous release rate for the automatic release processing to determine the number of memory blocks to be selected for release. Based on this release rate, the number of memory blocks to be selected for release is adjusted according to the inflow amount of the Explicit heap. As a result, increases in the amount of used Explicit heap area can be prevented. Note, however, that if the number of memory blocks selected for release increases, the automatic release processing takes more time. Similar to the case of full GC, while the automatic release processing is running, the execution of applications stops. For this reason, an upper limit is set for the number of memory blocks selected for release, so that the automatic release processing does not take an excessively long time.

If you specify `0`, the upper limit is the same as the limit that is set when this option is omitted. If you specify `100`, the upper limit of the release rate that was set in the previous automatic release processing is increased to the maximum value. However, because of the behavior of the automatic release processing, even if you specify `100`, this does not mean that all objects in the Explicit heap become targets of automatic release processing.

Prerequisite options

- `-XX:+HitachiUseExplicitMemory`
- `-XX:+HitachiExplicitMemoryAutoReclaim`

#### Syntax

```
-XX:ExplicitMemoryAutoReclaimTargetBlockRatio=integer_value
```

### Specifiable values

*integer_value*

Type: `Integer`

Specify a value (as a percentage) from 0 to 100.

### Default value

If the definition item is omitted:

`-XX:ExplicitMemoryAutoReclaimTargetBlockRatio=0`

If the value is omitted:

The following message is output to the standard error and Java VM is terminated with return code `1`.

```
Improperly specified VM option 'ExplicitMemoryAutoReclaimTargetBlockRatio='
Error:  Could not create the Java Virtual Machine.
Error:  A fatal exception has occurred. Program will exit.
```

## 7.12.2 -XX:ExplicitMemoryExcludeClassListFile

`-XX:ExplicitMemoryExcludeClassListFile` specifies the file path for the explicit memory management functionality exclusion configuration file.

### Description

`-XX:ExplicitMemoryExcludeClassListFile` specifies the file path for the explicit memory management functionality exclusion configuration file that is used by the functionality that excludes classes from the explicit memory management functionality. The explicit memory management functionality is not applied to the classes specified in this file.

When Java VM starts, the file whose path is specified for this option is loaded as the explicit memory management functionality exclusion configuration file. If you omit this option or specify a null character for this option, the file in the default file path is loaded as the explicit memory management functionality exclusion configuration file.

Prerequisite options

- `-XX:+HitachiUseExplicitMemory`
- `-XX:+ExplicitMemoryUseExcludeClass`

Related options

- `-XX:ExplicitMemoryFullGCPolicy`
- `-XX:+HitachiAutoExplicitMemory`
- `-XX:ExplicitMemoryNotExcludeClassListFile`

### Syntax

```
-XX:ExplicitMemoryExcludeClassListFile:character_string
```

### Specifiable values

*character_string*

Type: `String`

Specify a relative path from the current directory for the Java VM process or an absolute path. You can specify a path that includes directory names.

Note that you can specify only one file as the explicit memory management functionality exclusion configuration file. In addition, use ASCII code as the character encoding for the file.

### Default value

If the definition item is omitted:

`-XX:ExplicitMemoryExcludeClassListFile:<null character>`

The path of the file to be loaded when <null character> is specified is as follows:

*installation_directory_for_JDK*`/usrconf/exmemexcludeclass.cfg`

### Notes

- If the specified file cannot be opened or loaded, a warning message is output to the event log for the explicit memory management functionality, and then the configuration file in the default path is loaded. If the file in the default path cannot be opened or loaded, the functionality that excludes classes from the explicit memory management functionality does not become enabled.
- If the format of the specified file is incorrect, a warning message is output to the event log for the explicit memory management functionality, and then syntax analysis processing continues from the next line.
- If the same class name is specified in both the explicit memory management functionality exclusion configuration file and the configuration file that disables exclusions from the explicit memory management functionality, the configuration file that disables exclusions from the explicit memory management functionality has priority. In such cases, the functionality that excludes classes from the explicit memory management functionality is disabled for those classes.

## 7.12.3 -XX:ExplicitMemoryFullGCPolicy

`-XX:ExplicitMemoryFullGCPolicy` controls (based on the reference relationships among objects) the movement of objects from the JavaHeap to Explicit memory blocks when full GC occurs.

### Description

`-XX:ExplicitMemoryFullGCPolicy` specifies whether to control (based on reference relationships) the movement of objects from the JavaHeap to Explicit memory blocks when full GC occurs. This option enables the objects that were moved to the Explicit heap when full GC occurred, to be moved to the Tenured area.

Prerequisite options

- `-XX:+HitachiUseExplicitMemory`

Related options

- `-XX:+HitachiAutoExplicitMemory`
- `-XX:+ExplicitMemoryUseExcludeClass`

### Syntax

```
-XX:ExplicitMemoryFullGCPolicy=numeric_value
```

### Specifiable values

*numeric_value*

Type: `Integer`

Specify `0` or `1`. If you specify any other value, `0` is set.

If `0` is specified, objects in the JavaHeap that are referenced by objects in an Explicit memory block will be transferred to the Explicit memory block when full GC occurs.

If `1` is specified, objects in the JavaHeap that are referenced by objects in an Explicit memory block will not be transferred to the Explicit memory block even when full GC occurs. The objects in the New area are transferred to the Tenured area.

### Default value

If the definition item is omitted:

`-XX:ExplicitMemoryFullGCPolicy=0`

## 7.12.4 -XX:ExplicitMemoryNotExcludeClassListFile

`-XX:ExplicitMemoryNotExcludeClassListFile` specifies the file path for the configuration file that disables exclusions from the explicit memory management functionality.

### Description

`-XX:ExplicitMemoryNotExcludeClassListFile` specifies the file path for the configuration file that disables exclusions from the explicit memory management functionality. This file is used by the functionality that excludes classes from the explicit memory management functionality. The functionality that excludes classes from the explicit memory management functionality is not applied to the classes specified in this file, even if those classes are also specified in the explicit memory management functionality exclusion configuration file.

When Java VM starts, the file whose path is specified for this option is loaded as the configuration file that disables exclusions from the explicit memory management functionality. If you omit this option or specify a null character for this option, the file in the default file path is loaded as the configuration file that disables exclusions from the explicit memory management functionality.

Prerequisite options

- `-XX:+HitachiUseExplicitMemory`
- `-XX:+ExplicitMemoryUseExcludeClass`

Related options

- `-XX:ExplicitMemoryFullGCPolicy`
- `-XX:HitachiAutoExplicitMemory`
- `-XX:ExplicitMemoryExcludeClassListFile`

### Syntax

```
-XX:ExplicitMemoryNotExcludeClassListFile:character_string
```

### Specifiable values

*character_string*

Type: String

Specify a relative path from the current directory for the Java VM process or an absolute path. You can specify a path that includes directory names.

Note that you can specify only one file as the configuration file that disables exclusions from the explicit memory management functionality. In addition, use ASCII code as the character encoding for the file.

### Default value

If the definition item is omitted:

-XX:ExplicitMemoryNotExcludeClassListFile:<null character>

The path of the file to be loaded when <null character> is specified is as follows:

*installation_directory_for_JDK*/usrconf/exmemnotexcludeclass.cfg

### Notes

- If the specified file cannot be opened or loaded, a warning message is output to the event log for the explicit memory management functionality, and then the configuration file in the default path is loaded. If the file in the default path cannot be opened or loaded, the functionality that excludes classes from the explicit memory management functionality does not become disabled.
- If the format of the specified file is incorrect, a warning message is output to the event log for the explicit memory management functionality, and then syntax analysis processing continues from the next line.
- If the same class name is specified in both the explicit memory management functionality exclusion configuration file and the configuration file that disables exclusions from the explicit memory management functionality, the configuration file that disables exclusions from the explicit memory management functionality has priority. In such cases, the functionality that excludes classes from the explicit memory management functionality is disabled for those classes.

## 7.12.5 -XX:[+|-]ExplicitMemoryUseExcludeClass

-XX:[+|-]ExplicitMemoryUseExcludeClass specifies whether to enable or disable the functionality that excludes classes from the explicit memory management functionality.

### Description

-XX:[+|-]ExplicitMemoryUseExcludeClass specifies whether to enable or disable the functionality that excludes classes from the explicit memory management functionality. If the functionality that excludes classes from the explicit memory management functionality is enabled, the explicit memory management functionality is not applied to the classes specified in the files below. As a result, the objects of the classes that are specified in these files will be moved to the Tenured area instead of to the Explicit heap.

- *installation_directory_for_JDK*/jre/lib/explicitmemory/sysexmemexcludeclass.cfg

- *installation_directory_for_JDK*/usrconf/exmemexcludeclass.cfg

Prerequisite option

- -XX:+HitachiUseExplicitMemory

Related options

- -XX:+HitachiAutoExplicitMemory
- -XX:ExplicitMemoryFullGCPolicy
- -XX:ExplicitMemoryExcludeClassListFile
- -XX:ExplicitMemoryNotExcludeClassListFile

### Syntax

```
-XX:[+|-]ExplicitMemoryUseExcludeClass
```

### Specifiable values

Type: String

-XX:+ExplicitMemoryUseExcludeClass

Enables the functionality that excludes classes from the explicit memory management functionality.

-XX:-ExplicitMemoryUseExcludeClass

Disables the functionality that excludes classes from the explicit memory management functionality.

### Default value

If the definition item is omitted:

-XX:-ExplicitMemoryUseExcludeClass

### Notes

- If you enable the functionality that excludes classes from the explicit memory management functionality, the functionality for controlling the movement of objects to Explicit memory blocks will also be enabled.
- You cannot specify Java VM classes (such as java.lang and java.util) as classes to be excluded from the explicit memory management functionality.

## 7.12.6 -XX:[+|-]HitachiAutoExplicitMemory

-XX:[+|-]HitachiAutoExplicitMemory specifies whether to enable or disable the functionality for automatically placing Explicit memory blocks.

### Description

-XX:[+|-]HitachiAutoExplicitMemory specifies whether to enable or disable the functionality for automatically placing Explicit memory blocks. When this option is enabled, the required Explicit memory blocks are secured when Java VM starts, regardless of the version (32-bit or 64-bit). Note that Java VM cannot start if a continuous area cannot be secured in memory space at startup.

Furthermore, when this option is enabled, the minimum size of an Explicit memory block is 16 kilobytes. When this option is disabled, the minimum size of an Explicit memory block is 64 kilobytes.

Prerequisite options

- `-XX:+HitachiUseExplicitMemory`
- `-XX:+HitachiExplicitMemoryAutoReclaim`
- `-XX:-HitachiExplicitMemoryCompatibleToV8`

Related option

- `-XX:HitachiAutoExplicitMemoryFile`

### Syntax

```
-XX:[+|-]HitachiAutoExplicitMemory
```

### Specifiable values

Type: `String`

`-XX:+HitachiAutoExplicitMemory`
Enables the automatic placement functionality for the explicit memory management functionality.

`-XX:-HitachiAutoExplicitMemory`
Disables the automatic placement functionality for the explicit memory management functionality.

### Default value

If the definition item is omitted:
`-XX:-HitachiAutoExplicitMemory`

## 7.12.7 -XX:HitachiAutoExplicitMemoryFile

`-XX:HitachiAutoExplicitMemoryFile` specifies the file path for the automatic placement configuration file used by the functionality for automatically placing Explicit memory blocks.

### Description

`-XX:HitachiAutoExplicitMemoryFile` specifies the file path for the automatic placement configuration file used by the functionality for automatically placing Explicit memory blocks.

Prerequisite option

- `-XX:+HitachiAutoExplicitMemory`

### Syntax

```
-XX:HitachiAutoExplicitMemoryFile:character_string
```

## Specifiable values

*character_string*

Type: `String`

Specify a relative path from the current directory for the Java VM processing or an absolute path. You can specify a path that includes directory names.

Note that you can specify only one file as the automatic placement configuration file.

If you specify one or more characters, the default automatic placement setting for the explicit memory management functionality and the file settings specified for this option are enabled.

## Default value

If the definition item is omitted:

```
-XX:HitachiAutoExplicitMemoryFile:<null character>
```

## Notes

- Specify class names, method arguments, and java.lang package classes by using fully qualified class names.

  Example of incorrect specification:

  String

  Example of correct specification:

  java.lang.String

- You cannot specify class names that use generics (general names). Specify class names (`raw` type) that are not parameterized.

  Example of incorrect specification:

  java.util.HashMap<java.lang.String, java.lang.Object>

  Example of correct specification:

  java.util.HashMap

- For nested classes, specify their names by using the delimiter `$` instead of `.`.

  Example of incorrect specification:

  java.util.AbstractMap.SimpleEntry

  Example of correct specification:

  java.util.AbstractMap$SimpleEntry

- To specify a constructor, specify the same class name and method name, or specify <init>. The following is an example for specifying the constructor of the class MyMain.

  Example:

  MyMain.MyMain() or MyMain.<init>()

- If there is a method that has the same name as the class name, it will be impossible to determine whether a constructor is specified or a method is specified. For this reason, in such cases, both the constructor and the method are considered to be specified.

  Example:

  If MyMain.MyMain(int) is specified, both the constructor that possesses the argument int of the class # MyMain, and the method # MyMain(int) are treated as generation points.

- To specify a static initializer, specify <clinit>. The following is a specification example of the static initializer for the class MyMain.

Example:

MyMain.<clinit>()

- To specify the point where objects are generated by substituting values in field declarations as the generation point, specify the default constructor in the generation point.
- Arrays cannot be specified for the fully qualified class names of user-specified objects.

  Example:

  java.lang.String[]
- If there is a line that contains a class or a method name that does not exist, or a line that contains a method ("native" method or "abstract" method) that does not have a byte code, that line is ignored.
- If a J2SE internal class is specified for the class name of a user-specified object, the explicit memory management functionality sometimes changes the class name to the correct name. For example, java.util.HashMap$Entry is changed to java.util.HashMap.

## 7.12.8 -XX:HitachiExplicitHeapMaxSize

`-XX:HitachiExplicitHeapMaxSize` specifies the maximum size of the entire Explicit heap.

### Description

`-XX:HitachiExplicitHeapMaxSize` specifies the maximum size of the entire Explicit heap.

Prerequisite option

- `-XX:+HitachiUseExplicitMemory`

### Syntax

```
-XX:HitachiExplicitHeapMaxSize=integer_value
```

### Specifiable values

*integer_value*

Type: `Integer`

Specify an integer (in bytes) in the following range.

For the 32-bit version of Java VM:

1 to $2^{31}$- 1 (2147483647)

For the 64-bit version of Java VM:

1 to $2^{63}$- 1 (9223372036854775807)

You can use the characters below when specifying this value (in bytes). Note that the specification of this value is not case sensitive.

- `k` for kilo
- `m` for mega
- `g` for giga
- `t` for tera

If the specified value is outside of the valid range, the following message is output to the standard output, and the Java VM terminates with the return code 1.

```
Invalid maximum explicit heap size:  -
XX:HitachiExplicitHeapMaxSize=[specified_value]
Could not create the Java virtual machine.
```

### Default value

If the definition item is omitted:

-XX:HitachiExplicitHeapMaxSize=64m

## 7.12.9 -XX:[+|-]HitachiExplicitMemoryAutoReclaim

-XX:[+|-]HitachiExplicitMemoryAutoReclaim specifies whether to enable the automatic release function of the explicit memory management functionality.

### Description

-XX:[+|-]HitachiExplicitMemoryAutoReclaim specifies whether to enable the automatic release function of the explicit memory management functionality.

Prerequisite option

- -XX:-HitachiExplicitMemoryCompatibleToV8

Related option

- -XX:+HitachiAutoExplicitMemory

### Syntax

```
-XX:[+|-]HitachiExplicitMemoryAutoReclaim
```

### Specifiable values

Type: String

-XX:+HitachiExplicitMemoryAutoReclaim

Enables the automatic release function of the explicit memory management functionality.

-XX:-HitachiExplicitMemoryAutoReclaim

Disables the automatic release function of the explicit memory management functionality.

### Default value

If the definition item is omitted:

-XX:+HitachiExplicitMemoryAutoReclaim

## 7.12.10 -XX:[+|-]HitachiExplicitMemoryAutoRefReclaim

`-XX:[+|-]HitachiExplicitMemoryAutoRefReclaim` specifies whether to enable the functionality that saves the amount of memory in the Explicit heap that is used for HTTP sessions.

### Description

`-XX:[+|-]HitachiExplicitMemoryAutoRefReclaim` specifies whether to enable the functionality that saves the amount of memory in the Explicit heap that is used for HTTP sessions.

If this functionality is disabled, the automatic release of the Explicit memory blocks created by Application Server will not be reserved automatically.

If this functionality is enabled, automatic release will be automatically reserved for the Explicit memory blocks created by Application Server to be allocated HTTP session objects, and the Explicit memory blocks created by the automatic deployment configuration file. As a result, you can reduce the required Explicit heap size.

However, if this functionality is enabled, you must pay attention to the operation information that is output.

Table 7-9: Items that are output differently in the operation information file

| Type of operation information | Item (character string output in the header file) | If the memory-saving functionality is enabled | If the memory-saving functionality is disabled |
|---|---|---|---|
| Number of the Explicit memory blocks acquired by the HTTP session | `HTTPSessionEMemoryBlockCount.HighWaterMark`<br>`HTTPSessionEMemoryBlockCount.LowWaterMark`<br>`HTTPSessionEMemoryBlockCount.Current` | A value other than the number of enabled HTTP sessions in the system is output, because an internal operation has been applied to the value. | The number of enabled HTTP sessions in the system is output. |
| Size of the Explicit heap area used by the application | `ApplicationEHeapSize.HighWaterMark`<br>`ApplicationEHeapSize.LowWaterMark` | The sum of the following two values is output: *size_of_the_Explicit_memory_subject_to_automatic_release_by_this_functionality* and *size_of_the_Explicit_memory_used_by_the_automatic_deployment_functionality*. | The size of the Explicit memory used by the automatic deployment functionality is output. |

Prerequisite option

- `-XX:+HitachiExplicitMemoryAutoReclaim`

### Syntax

```
-XX:[+|-]HitachiExplicitMemoryAutoRefReclaim
```

### Specifiable values

Type: `String`

`-XX:+HitachiExplicitMemoryAutoRefReclaim`

Enables the memory-saving functionality for the Explicit heap used by the HTTP session.

`-XX:-HitachiExplicitMemoryAutoRefReclaim`

Disables the memory-saving functionality for the Explicit heap used by the HTTP session.

### Default value

If the definition item is omitted:

`-XX:-HitachiExplicitMemoryAutoRefReclaim`

## 7.12.11 -XX:[+|-]HitachiExplicitMemoryCompatibleToV8

`-XX:[+|-]HitachiExplicitMemoryCompatibleToV8` specifies whether to allocate Explicit memory blocks by using the same method as the method used in 08-00.

### Description

`-XX:[+|-]HitachiExplicitMemoryCompatibleToV8` specifies whether to allocate Explicit memory blocks by using the same method as the method used in 08-00. Enable this option if the applications that were used in 08-00 are to be used in 08-50, instead of the new functionality implemented in 08-50 and later.

Note that, if this option is enabled, the automatic release function of the explicit memory management functionality is disabled.

Prerequisite option

- `-XX:+HitachiUseExplicitMemory`

Related options

- `-XX:+HitachiExplicitMemoryAutoReclaim`
- `-XX:+HitachiAutoExplicitMemory`

### Syntax

```
-XX:[+|-]HitachiExplicitMemoryCompatibleToV8
```

### Specifiable values

Type: `String`

`-XX:+HitachiExplicitMemoryCompatibleToV8`

Allocates Explicit memory blocks by using the same method as the method used in 08-00.

`-XX:-HitachiExplicitMemoryCompatibleToV8`

Allocates Explicit memory blocks by using a method other than the method used in 08-00.

### Default value

If the definition item is omitted:

`-XX:-HitachiExplicitMemoryCompatibleToV8`

## 7.12.12 -XX:HitachiExplicitMemoryJavaLog

-XX:HitachiExplicitMemoryJavaLog specifies the prefix and output destination directory for the log files of the explicit memory management functionality.

### Description

-XX:HitachiExplicitMemoryJavaLog specifies the prefix and output destination directory for the log files of the explicit memory management functionality.

If you simultaneously execute multiple Java VM processes that are in the same current directory or for which the same log output directory was specified by using the -XX:HitachiExplicitMemoryJavaLog option, the information will not be output correctly in the log file of the explicit memory management functionality. When you execute multiple Java VM processes, specify a different log output path for each process by using the -XX:HitachiExplicitMemoryJavaLog option.

Related option

- -XX:HitachiJavaLog

### Syntax

```
-XX:HitachiExplicitMemoryJavaLog:character_string
```

### Specifiable values

*character_string*

Type: String

Specify the prefix and path. If you do not specify this option, "ehjavalog" will be set in *character_string*. Excluding the prefix, the file name varies depending on the log file rotation type of the explicit memory management functionality.

If the log file rotation type of the explicit memory management functionality is the wraparound method, log files are generated with the file name *character_string??*.log (where *??* is a serial number from 01 to 99). For example, if you specify "Samp" in *character_string*, the name of one of the log files becomes Samp01.log.

When the log file rotation type of explicit memory management functionality is the shift method, a current log file to which information is to be output and a backup file are generated. The current log file is generated with the file name *character_string*.log, and the backup log file is generated with the file name *character_string??*.log (where *??* is a serial number from 01 to 98). For example, if you specify "Samp" in *character_string*, the current log file name will be Samp.log. When the current log file is backed up, the name of the backup log file becomes Samp01.log.

When specifying the prefix and path, you can use any of the three patterns below.

When specifying the prefix only:

The log is output to the file with the file name specified in *character_string* in the current directory.

When specifying the path only:

If you specify a directory in *character_string*, a file with the default name ehjavalog is created in that directory.

When specifying both the path and the prefix:

If you specify both the directory and the prefix in *character_string*, a file is created in that directory. For example, if you specify "d:\temp\Samp" in *character_string*, in the d:\temp directory, Samp01.log is created in case of the wraparound method, and Samp.log is created in case of the shift method.

### Default value

If the definition item is omitted:

```
-XX:HitachiExplicitMemoryJavaLog:ehjavalog
```

## 7.12.13 -XX:HitachiExplicitMemoryJavaLogFileSize

`-XX:HitachiExplicitMemoryJavaLogFileSize` specifies the maximum size (in bytes) per log file of the explicit memory management functionality.

### Description

`-XX:HitachiExplicitMemoryJavaLogFileSize` specifies the maximum size (in bytes) per file.

Related option

- `-XX:HitachiJavaLogFileSize`

### Syntax

```
-XX:HitachiExplicitMemoryJavaLogFileSize=integer_value
```

### Specifiable values

*integer_value*

Type: `Integer`

Specify an integer (in bytes) from 8192 to 2147483647.

If the specified value is outside of the specifiable range, `8192` is set.

### Default value

If the definition item is omitted:

For the wraparound method:

```
-XX:HitachiExplicitMemoryJavaLogFileSize=256k
```

For the shift method:

```
-XX:HitachiExplicitMemoryJavaLogFileSize=128M
```

### Notes

If a value other than a natural number is specified, the behavior will be the same as when an undefined option is specified.

## 7.12.14 -XX:HitachiExplicitMemoryJavaLogNumberOfFile

`-XX:HitachiExplicitMemoryJavaLogNumberOfFile` specifies the maximum number of log files to be created by the explicit memory management functionality.

## Description

`-XX:HitachiExplicitMemoryJavaLogNumberOfFile` specifies the maximum number of log files to be created and thus prevents the number of created log files from increasing.

If the rotation type is the wraparound method, when the number of files exceeds the maximum number, the log data will again be output to the file that was created first.

If the rotation type is the shift method, when the number of files exceeds the maximum number, the oldest backup file will be deleted.

Related option

- `-XX:HitachiJavaLogNumberOfFile`

## Syntax

```
-XX:HitachiExplicitMemoryJavaLogNumberOfFile=integer_value
```

## Specifiable values

*integer_value*

Type: `Integer`

Specify an integer from 1 to 99.

If you specify a value equal to or greater than `100`, the value becomes `99`, If you specify `0`, the value becomes `1`.

## Default value

If the definition item is omitted:

For the wraparound method:

```
-XX:HitachiExplicitMemoryJavaLogNumberOfFile=4
```

For the shift method:

```
-XX:HitachiExplicitMemoryJavaLogNumberOfFile=8
```

## Notes

If a value other than a natural number is specified, the behavior will be the same as when an undefined option is specified.

# 7.12.15 -XX:HitachiExplicitMemoryLogLevel

`-XX:HitachiExplicitMemoryLogLevel` specifies the event log level for the explicit memory management functionality.

## Description

`-XX:HitachiExplicitMemoryLogLevel` specifies the event log level for the explicit memory management functionality.

Prerequisite option

- `-XX:+HitachiUseExplicitMemory`

### Syntax

```
-XX:HitachiExplicitMemoryLogLevel:applicable_range
```

### Specifiable values

*applicable_range*

Type: `String`

`none`

Does not output the event log for the explicit memory management functionality.

`normal`

To be specified during normal operation. The status of the explicit heap is output periodically (each time GC occurs). In addition, the status is output when an event occurs that significantly changes the status of the Explicit heap.

`verbose`

In addition to the output times for `normal` described above, the status of the Explicit heap is output when an event occurs that changes the status of the Explicit heap. The amount of output log data when `verbose` is specified is greater than the amount of data when `normal` is specified.

`debug`

In addition to the output times for `verbose`, detailed information is output when certain events occur. Performance is significantly degraded, because a large amount of log data is output.

### Default value

If the definition item is omitted:

`-XX:HitachiExplicitMemoryLogLevel:none`

### Notes

If you specify a value other than `none`, `normal`, `verbose`, and `debug`, the following message is output to the standard output and the Java VM terminates with the return code `1`.

```
Invalid explicit heap log level:  -XX:HitachiExplicitMemoryLogLevel:applicable_range
Could not create the Java virtual machine.
(log levels: none normal verbose debug)
```

## 7.12.16 -XX:[+|-]HitachiExplicitMemoryMoveToTenuredFirst

`-XX:[+|-]HitachiExplicitMemoryMoveToTenuredFirst` changes the location where objects are to be moved during the release of Explicit memory blocks, to the Tenured area.

### Description

`-XX:[+|-]HitachiExplicitMemoryMoveToTenuredFirst` specifies the location where objects are to be moved during the release of Explicit memory blocks.

Prerequisite option

- `-XX:HitachiUseExplicitMemory`

## Syntax

```
-XX:[+|-]HitachiExplicitMemoryMoveToTenuredFirst
```

## Specifiable values

Type: `String`

`-XX:+HitachiExplicitMemoryMoveToTenuredFirst`

Sets the Tenured area as the location where objects are to be moved during the release of Explicit memory blocks.

`-XX:-HitachiExplicitMemoryMoveToTenuredFirst`

Sets the New area as the location where objects are to be moved during the release of Explicit memory blocks.

## Default value

If the definition item is omitted:

`-XX:+HitachiExplicitMemoryMoveToTenuredFirst`

## Notes

If this option is enabled, the referenced object moves to the Tenured area when a release process is executed.

When the reference-source object is a temporary short-lived object, if you disable this option and move the referenced object in the Explicit memory block to the New area, you will be able to perform concurrent collection of the referenced object and the reference-source object during the next CopyGC. This action prevents an increase in the used size of the Tenured area when this option is disabled.

However, you must note the following points:

- Increase of CopyGC frequency

  When the Explicit memory block is released, the referenced object moves to the New area. Thus, the moved object uses the New area. As a result, the interval until the next CopyGC is shortened, which might result in a decrease in throughput and the accelerated aging of the object.

- Circulation of objects moved to the Tenured area, between the New area and the explicit memory management area

  If an object (such as a data definition common to applications) is referenced by objects in multiple Explicit memory blocks, the referenced object becomes a long-lived object. If this option is enabled, after the object moves to the Explicit memory block, when the release process of the Explicit memory block is executed, the object moves to and then remains in the Tenured area for the remainder of its life (for example, until the application is terminated).

  On the other hand, if this option is enabled and the object moves to the New area when the release process of the Explicit memory block is executed, the object will move to another Explicit memory block when CopyGC is executed to the threshold value. As this process repeats, the object circulates between the New area and the Explicit memory management area, resulting in an increase in the overhead of the release processes of the CopyGC and Explicit memory block.

## 7.12.17 -XX:[+|-]HitachiUseExplicitMemory

`-XX:[+|-]HitachiUseExplicitMemory` specifies whether to enable the explicit memory management functionality.

### Description

`-XX:[+|-]HitachiUseExplicitMemory` specifies whether to enable the explicit memory management functionality. Note that to enable the explicit memory management functionality, we recommend that you specify the same value for `-Xms` and `-Xmx`.

Related options

- `-Xms`
- `-Xmx`

### Syntax

```
-XX:[+|-]HitachiUseExplicitMemory
```

### Specifiable values

Type: `String`

`-XX:+HitachiUseExplicitMemory`
Enables the explicit memory management functionality.

`-XX:-HitachiUseExplicitMemory`
Disables the explicit memory management functionality.

### Default value

If the definition item is omitted:
`-XX:-HitachiUseExplicitMemory`

### Notes

This option cannot be specified when the following option is specified: `-XX:+UseG1GC` If you specify both of these options, the following message is output to the standard output, and Java VM terminates with the return code `1`.

# 7.13 Java VM options used for specifying the maximum values for resources

This section describes the options for setting the maximum values for resources.

## 7.13.1 -XX:HitachiJITCompileMaxMemorySize

`-XX:HitachiJITCompileMaxMemorySize` specifies the maximum memory size of the C heap to be allocated during JIT compilation.

### Description

`-XX:HitachiJITCompileMaxMemorySize` specifies the maximum memory size of the C heap to be allocated during JIT compilation. If the size of the C heap memory allocated by JIT compilation exceeds the specified value, a log entry is output to the Java VM log file, and subsequent processing for JIT compilation is suppressed. After the specified value is exceeded, Java methods that were the targets of JIT compilation will be executed by the interpreter only. Even when JIT compilation is suppressed, Java VM is not forcibly terminated and continues processing.

If `0` is specified, there is no upper limit on the size of the memory to be allocated during JIT compilation.

Note that Java VM internal threads (JIT compiler threads) are used for JIT compilation. Because there are two JIT compiler threads, the upper limit for one JIT compiler thread is half of the value specified in this option.

Even when an upper limit is set by using this option, if the size of the C heap that is actually available is less than the upper limit, a C heap shortage might occur before the upper limit is reached. In such cases, Java VM is forcibly terminated.

Prerequisite option

- `-server`

Format of output

```
[id][Thread:  thread_id]<date>["thread_name" exceeded max memory size.]
[current_sizeK->new_sizeK/limit_size_per_threadK/limit_sizeK]
[compile_target][byte_code_size]
```

The following provides details about the output.

| Output item | Output content |
|---|---|
| *id* | `JMS` (Java VM log file identifier) |
| *thread_id* | Thread ID of the JIT compiler thread for which JIT compilation was suppressed |
| *date* | Date and time JIT compilation was suppressed<br>If the `-XX:+HitachiOutputMilliTime` option is specified, this item is output in milliseconds. |
| *thread_name* | Thread name of the JIT compiler thread for which JIT compilation was suppressed |
| *current_size* | Size (in kilobytes) of the memory currently allocated to the JIT compiler thread for which JIT compilation was suppressed |
| *new_size* | Sum of the sizes (in kilobytes) of the memory currently allocated to the JIT compiler thread for which JIT compilation was suppressed and of the additional memory that was to be allocated |
| *limit_size_per_thread* | Upper limit (in kilobytes) per JIT compiler thread |

| Output item | Output content |
|---|---|
| *limit_size* | Upper limit (in kilobytes) of all JIT compiler threads |
| *compile_target* | Java method that is subject to JIT compilation |
| *byte_code_size* | Byte code size (in bytes) of the Java method that is subject to JIT compilation |

## Syntax

```
-XX:HitachiJITCompileMaxMemorySize=integer_value
```

## Specifiable values

*integer_value*

Type: `Integer`

Specify the maximum size of the memory to be allocated during JIT compilation. Specify the size in units of bytes. You can also specify `k` for kilo, `m` for mega, and `g` for giga. The specifiable values are described below. If you specify a value outside of these ranges, `0` is set.

For 32-bit Java VM:

0 to $2^{32}$-1 (4,294,967,295)

For 64-bit Java VM:

0 to $2^{64}$-1 (18,446,744,073,709,551,615)

If you specify `0`, the will be no upper limit on the size of the memory to be allocated during JIT compilation. If a C heap shortage occurs during JIT compilation, Java VM is forcibly terminated.

## Default value

If the definition item is omitted:

`-XX:HitachiJITCompileMaxMemorySize=0`

## Example

In the following example of output when the upper limit is reached, `-XX:HitachiJITCompileMaxMemorySize=536870912` is specified as an option, and `262145` kilobytes of the C heap has been allocated to one JIT compiler thread.

```
[JMS][Thread:  0x03bf1150]<Wed Feb 24 14:33:58 2010>
["CompilerThread0" exceeded  max memory size.][262143K->262145K/262144K/524288K]
[test1.func][213]
```

## Notes

- If the size of the memory allocated during JIT compilation exceeds the upper limit specified for this option and JIT compilation is suppressed, application throughput will decrease.
- If a value other than a natural number is specified, the operation is the same as that when an undefined option is specified.

## 7.13.2 -XX:HitachiThreadLimit

`-XX:HitachiThreadLimit` specifies the maximum number of threads.

### Description

`-XX:HitachiThreadLimit` specifies the maximum number of threads. The OutOfMemoryError exception is thrown if the number of threads exceeds the specified value. However, if the number of threads exceeds the specified value before Java VM starts, no exception is thrown. In addition, the number of threads does not include threads that were created outside the management range of Java VM by the application by using JNI. If `0` is specified, the no maximum value is set.

Note that, if this option and the `-XX:+HitachiOutOfMemoryAbort` option are specified at the same time, or if the OutOfMemoryError exception is thrown by this option, Java VM will not be forcibly terminated.

In addition, if this option and the `-XX:+HitachiOutOfMemoryStackTrace` option are both specified, an exception message is output to the Java VM log file.

Output format

```
Could not create "name" thread. Threadlimit Exceeded. num threads exist.
```

You can acquire this message by using java.lang.Throwable.getMessage(). Furthermore, if the entire message contains 128 single-byte characters or more, the end of the message is omitted.

| Output item | Output content |
|---|---|
| *name* | Name of the thread that could not be created |
| *num* | Current number of threads |

When the `-XX:+HitachiOutOfMemoryStackTrace` option is specified, the exception information and stack trace can be output to the Java VM log files. The type of the cause of the exception is `Thread Limit`. The exception cause types are as follows.

Table 7-10: List of exception cause types

| No. | Cause message | Description |
|---|---|---|
| 1 | `C Heap` | Exception caused when allocating a C heap |
| 2 | `Java Heap` | Exception caused when allocating a Java heap |
| 3 | `Meta Space` | Exception caused when allocating Metaspace |
| 4 | `Compressed Class Space` | Exception caused when allocating Compressed Class Space |
| 5 | `Unknown` | Exception that cannot be identified as one of the above exceptions |
| 6 | `Thread Limit` | Exception caused when the maximum number of threads is specified in the `-XX:HitachiThreadLimit` option and the number of created threads exceeds the specified maximum number. |

### Syntax

```
-XX:HitachiThreadLimit=integer_value
```

## Specifiable values

*integer_value*

Type: `Integer`

Specify the maximum number of threads as an integer from 0 to 2147483647. If you specify a value outside of the specifiable range, `0` is set. If you specify a negative value, an error occurs.

## Default value

If the definition item is omitted:

`-XX:HitachiThreadLimit=0`

## Example

```
Could not create "Thread-1" thread. Threadlimit Exceeded. 9 threads exist.
```

This example shows the message that is extracted by using java.lang.Throwable.getMessage(), when java.lang.Thread.start is called by the main thread and an exception is thrown by this function.

## Notes

If you specify a small value for the maximum number, an exception will be thrown before startup. Do not specify a value that is smaller than the number of threads used by the Java EE server.

## 7.14 Java VM options used for the JIT compiler continuation functionality

This section describes the options for specifying the Java VM behavior when JIT compilation fails.

### 7.14.1 -XX:[+|-]JITCompilerContinuation

`-XX:[+|-]JITCompilerContinuation` specifies whether to enable the JIT compiler continuation functionality.

#### Description

`-XX:[+|-]JITCompilerContinuation` specifies whether to enable the JIT compiler continuation functionality.

We recommend that you enable this functionality, so that applications continue to run normally even if JIT compilation fails due to a logical inconsistency in the methods that make up the application.

If you enable the JIT compiler continuation functionality, even if the JIT compilation fails due to a logical inconsistency in the methods that make up the application, Java VM outputs the log of this functionality to the Java VM log file and then continues processing. In such cases, subsequent compilation of methods for which JIT compilation failed will be executed by using the interpreter. Of the methods that make up an application, methods other than those for which JIT compilation failed will be executed by using JIT compilation. As a result, the application continues to run normally. However, if JIT compilation fails six times or more, Java VM outputs an error report file, and a memory dump or core dump, and then forcibly terminates the processing.

If you disable the JIT compiler continuation functionality, when JIT compilation fails due to a logical inconsistency in the methods that make up the application, Java VM outputs an error report file, and a memory dump or core dump, and then forcibly terminates the processing.

Prerequisite options

- `-server`
- `-XX:+HitachiVerboseGC`

Format of output

```
[id]
```

Note

After [*id*], the log of the JIT compiler continuation functionality is output.

The following provides details about the output.

| Output item | Output content |
|---|---|
| *id* | `JCC` (Java VM log file identifier) |

#### Syntax

```
-XX:[+|-]JITCompilerContinuation
```

#### Specifiable values

Type: `String`

-XX:+JITCompilerContinuation

Enables the JIT compiler continuation functionality.

-XX:-JITCompilerContinuation

Disables the JIT compiler continuation functionality.

## Default value

If the definition item is omitted:

-XX:+JITCompilerContinuation

## Example

```
[JCC][Thread:  0x05432c00]<Thu Nov 15 17:10:40 2012>[Method:  jit_sample.func()V]
[Fail:  3][JITCT:  1]
[JCC][Thread:  0x05432c00][PC:  0x083aff9a][Lib:  D:\work\jdk\jre\bin\server\
jvm.dll+0x3aff9a][VM:  Java HotSpot(TM) Server VM
(20.8-b03-CDK0950-20121115 mixed mode windows-x86 )]
[JCC][Thread:  0x05432c00][EAX=0x00000000, EBX=0x00618128, ECX=0x00000000,
 EDX=0x05485340]
[JCC][Thread:  0x05432c00][ESP=0x0566d3c0, EBP=0x0566d3c4, ESI=0x00618278,
 EDI=0x00000000]
[JCC][Thread:  0x05432c00][EIP=0x083aff9a, EFLAGS=0x00010202]
[JCC][Thread:  0x05432c00][siginfo:  read 0x00000000]
[JCC][Thread:  0x05432c00][Unlock:  MethodCompileQueue_lock]
[JCC][Thread:  0x05432c00][NewJITCT:  0x05438800][JITCT:  2]
[JCC][Thread:  0x05432c00][Free:  "ResourceArea" 524288 bytes.]
[JCC][Thread:  0x05432c00][stop]
[JCC][Fail:  1][date:  Thu Nov 15 10:10:40 2012][Method:  jit_sample.func1
(Ljava/lang/String;)V][PC:  0x083ff00a]
[Lib:  D:\work\jdk\jre\bin\server\jvm.dll+0x3ff00a]
[JCC][Fail:  2][date:  Thu Nov 15 11:11:16 2012][Method:  jit_sample.func2()V]
[PC:  0x083afe3a][Lib:  D:\work\jdk\jre\bin\server\jvm.dll+0x3afe3a]
```

## 7.15 Java VM options used to execute Java application programs

This section describes the options that are used to execute Java application programs by using the `java` command or the `javaw` command.

### 7.15.1 -Xhras

`-Xhras` is an option that can be used for the `java` and `javaw` commands. This option executes Java application programs.

#### Description

> **Important note**
>
> If you are using a Java program that is not related to Application Server in an Application Server execution environment (an environment other than the application development environment), to use this option, separately purchase Application Server - Optional License for Java.

If you execute the `java` or `javaw` command with this option specified, you will be able to execute Java application programs. When a Java application program is executed, the following options for outputting Java VM operation information are automatically specified:

- `-XX:+HitachiFullCore`
- `-XX:+HitachiJavaClassLibTrace`
- `-XX:+HitachiLocalsInStackTrace`
- `-XX:+HitachiLocalsSimpleFormat`
- `-XX:+HitachiOutOfMemoryAbort`
- `-XX:+HitachiOutOfMemoryStackTrace`
- `-XX:+HitachiOutputMilliTime`
- `-XX:-HitachiThreadDumpToStdout`
- `-XX:+HitachiVerboseGC`

You can execute Java application programs by using the `java` command, the `java_hras` command, or the `javaw` command. The following shows how to execute each of these commands.

To execute the `java` command:

Use either of the methods below.

- Execute the command with the `-Xhras` option specified.
- Execute the command with the `JAVA_HRAS` environment variable set.

If you execute the command by using a method other than the above, the command fails and the following message is output:

```
Java command cannot be used except in some special cases.
When starting a Java program, use the java_hras command, etc.
```

```
Depending on the Java program executed,
it might be necessary to purchase the other product.
```

To execute the java_hras command:

Execute the java_hras command in *installation_directory_for_Application_Server*/jdk/jre/bin/.

The functionality of the java_hras command is equivalent to that of the java command. Unlike the java command, you do not need to specify the -Xhras option or the JAVA_HRAS environment variable when executing the java_hras command.

To execute the javaw command:

Use either of the methods below.

- Execute the command with the -Xhras option specified.
- Execute the command with the JAVAW_HRAS environment variable set.

If you execute the command by using a method other than the above, the command fails and the following message is output:

```
Javaw command cannot be used except in some special cases.
When starting a Java program, use the java_hras command, etc.
Depending on the Java program executed,
it might be necessary to purchase the other product.
```

## Syntax

```
-Xhras
```

## Default value

If the definition item is omitted:

Nothing is set.

## Notes

To specify this option and another option at the same time, specify this option before the other option.

# 7.16 Java VM options used for the functionality for the compressed object pointer

This section describes the options that can be used with the function that compresses the size of managed Java objects to reduce the size of the JavaHeap area and the Explicit heap area when Java VM is running.

## 7.16.1 -XX:[+|-]UseCompressedOops

`-XX:[+|-]UseCompressedOops` specifies whether to enable the functionality for the compressed object pointer.

### Description

`-XX:[+|-]UseCompressedOops` specifies whether to enable the functionality for the compressed object pointer. By compressing the size of Java objects for management, the functionality for the compressed object pointer reduces the usage sizes of the JavaHeap area and the Explicit heap area during Java VM execution. Note that this functionality applies to the Explicit heap area only when the explicit memory management functionality is enabled.

To enable this functionality, the following conditions must be met:

- You must be using 64-bit Java VM.
- The sum of the sizes specified for the JavaHeap area and the Explicit heap area must be less than 32 gigabytes.

When Java VM starts up, if the sum of the sizes specified for the JavaHeap area and the Explicit heap area is equal to or greater than 32 gigabytes, Java VM outputs the message below to the standard output and disables the functionality for the compressed object pointer.

```
Java HotSpot(TM) 64-Bit Server VM warning:  Max heap size too large for
Compressed Oops
```

### Syntax

```
-XX:[+|-]UseCompressedOops
```

### Specifiable values

Type: `String`

`-XX:+UseCompressedOops`
Java VM compresses the size of Java objects in the JavaHeap area and Explicit heap area for management.

`-XX:-UseCompressedOops`
Java VM does not compress the size of Java objects in the JavaHeap area and Explicit heap area.

### Default value

If the definition item is omitted:
`-XX:-UseCompressedOops`

# 7.17 Java VM properties used for the finalize-retention-cancellation functionality

This section describes the properties used for the functionality that detects whether finalization processing is retained in Java VM and cancels retained finalization processing.

## 7.17.1 JP.co.Hitachi.soft.jvm.autofinalizer

`JP.co.Hitachi.soft.jvm.autofinalizer` specifies whether to enable the finalize-retention-cancellation functionality.

### Description

`JP.co.Hitachi.soft.jvm.autofinalizer` specifies whether to enable or disable the finalize-retention-cancellation functionality.

If a value other than `true` and `false` is specified, the default value is set.

### Syntax

```
JP.co.Hitachi.soft.jvm.autofinalizer={true | false}
```

### Specifiable values

Type: `boolean`

`true`
Generates the finalizer process monitoring thread that monitors FinalizerThread when Java starts.

`false`
Does not generate the finalizer process monitoring thread that monitors FinalizerThread when Java starts.

### Default value

If the definition item is omitted:

`JP.co.Hitachi.soft.jvm.autofinalizer=true`

### Examples

When the retention of a finalizer process is detected, and a new finalizer process monitoring thread is generated

```
# FinalizerWatcherThread:  Create:  create secondary finalizer thread.
[queue length = 128] <Mon May 26 18:00:36 JST 2008>
```

When the generated finalizer process monitoring thread ends

```
# FinalizerWatcherThread:  Finish:  secondary finalizer thread is finished.
<Mon May 26 20:12:26 JST 2008>
```

# 7.18 Java VM properties used for performance-based trace analysis

This section describes the properties used for specifying settings related to the behavior and output information of performance-based trace analysis.

## 7.18.1 jvm.userprf.Enable

`jvm.userprf.Enable` specifies whether to enable performance-based trace analysis.

### Description

`jvm.userprf.Enable` specifies whether to enable performance-based trace analysis.

There are no prerequisite properties.

### Syntax

```
jvm.userprf.Enable={true | false}
```

### Specifiable values

Type: `Boolean`

`true`
: Enables performance-based trace analysis.

`false`
: Disables performance-based trace analysis.

If a value other than `true` or `false` is specified, the default value is set.

### Default value

If the definition item is omitted:

```
jvm.userprf.Enable=false
```

If the value is omitted:

```
jvm.userprf.Enable=false
```

### Example

```
-Djvm.userprf.Enable=true
```

### Notes

If `true` is specified, the performance-based trace analysis function automatically reads the performance-based trace analysis configuration file. Before enabling the performance-based trace analysis function, specify the performance-based trace analysis configuration file in the `jvm.userprf.File` property.

## 7.18.2 jvm.userprf.ExtendedSetting

`jvm.userprf.ExtendedSetting` specifies the specification format for the performance-based trace analysis configuration file.

### Description

`jvm.userprf.ExtendedSetting` specifies whether to enable the following methods in the specification format for the performance-based trace analysis configuration file.

- Method of specifying both the package name and the class name
- Method of specifying the class name only

Prerequisite property

- `jvm.userprf.Enable=true`

### Syntax

```
jvm.userprf.ExtendedSetting={true | false}
```

### Specifiable values

Type: `Boolean`

`true`

The following specification methods can be used in the performance-based trace analysis configuration file:

- Method of specifying both the package name and the class name
- Method of specifying the class name only

`false`

The following specification methods cannot be used in the performance-based trace analysis configuration file:

- Method of specifying both the package name and the class name
- Method of specifying the class name only

If a value other than `true` or `false` is specified, the default value is set.

### Default value

If the definition item is omitted:

`jvm.userprf.ExtendedSetting=false`

If the value is omitted:

`jvm.userprf.ExtendedSetting=false`

### Example

```
-Djvm.userprf.ExtendedSetting=true
```

### Notes

If you specify `false` for this property but the performance-based trace analysis configuration file is specified by using a specification method that is enabled only when `true` is specified for this property, a format error of the performance-based trace analysis configuration file occurs.

## 7.18.3 jvm.userprf.File

`jvm.userprf.File` specifies the file path of the performance-based trace analysis configuration file.

### Description

`jvm.userprf.File` specifies the file path of the performance-based trace analysis configuration file.

The performance-based trace analysis function reads the file corresponding to the file path specified in this property as the performance-based trace analysis configuration file. Note that, if this property is not specified, the file of the default file path will be set and read as the performance-based trace analysis configuration file.

The method specified in the performance-based trace analysis configuration file is the target of performance-based trace analysis.

Prerequisite property

- `jvm.userprf.Enable=true`

### Syntax

```
jvm.userprf.File=character_string
```

### Specifiable values

*character_string*

Type: `String`

- Specify the file path of the performance-based trace analysis configuration file.
- Only one file path can be specified.
- For the path, you can specify either the relative path from the current directory or the absolute path.

### Default value

If the definition item is omitted:

*installation_directory_for_JDK*`/usrconf/userprf.cfg`

If the value is omitted:

Outputs a warning message to the Java VM log file to indicate that the file does not exist.

### Example

```
-Djvm.userprf.File=/test/setting.txt
```

### Notes

- The default character encoding for the JDK operation platform is used to read the performance-based trace analysis configuration file. If the character encoding of the file is not the default encoding, the file will be processed as if it were specified by using the default encoding.
- To specify different performance-based trace analysis settings for each server, prepare a performance-based trace analysis configuration file for each server, and then specify the file path for each server in this property.
- If the file of the specified path cannot be read or the settings that are read are not valid, the logs regarding the reading of the performance-based trace analysis configuration file will be output to the Java VM log file.

## 7.18.4 jvm.userprf.Limit

`jvm.userprf.Limit` specifies the maximum number of methods that are subject to performance-based trace analysis.

### Description

`jvm.userprf.Limit` specifies the maximum number of methods that are subject to performance-based trace analysis.

Prerequisite property

- `jvm.userprf.Enable=true`

### Syntax

```
jvm.userprf.Limit=integer_value
```

### Specifiable values

*integer_value*

Type: `Integer`

Specifies an integer from 0 to 2147483647. If you specify a value outside of this range, the default value is set.

### Default value

If the definition item is omitted:

`jvm.userprf.Limit=2147483647`

If the value is omitted:

`jvm.userprf.Limit=2147483647`

### Example

```
-Djvm.userprf.Limit=100
```

### Notes

Of the methods specified in the performance-based trace analysis configuration file, the same number of methods that are subject to performance-based trace analysis cannot exceed the value specified in this property. The first time the

number of specified methods exceeds the value specified in this property, a log message will be output to the Java VM log file.

## 7.18.5 jvm.userprf.LineNumber

`jvm.userprf.LineNumber` outputs the number of the last executed line of the method to the trace information.

### Description

`jvm.userprf.LineNumber` specifies whether the number of the last executed line of the method is to be output to the trace information when the method ends normally.

Prerequisite property

- `jvm.userprf.Enable=true`

### Syntax

```
jvm.userprf.LineNumber={true | false}
```

### Specifiable values

Type: `Boolean`

`true`
: Outputs to the operation information (`OPR`) of the trace information, the number of the last executed line of the method.

`false`
: Does not output to the trace information, the number of the last executed line of the method.

If a value other than `true` or `false` is specified, the default value is set.

### Default value

If the definition item is omitted:

`jvm.userprf.LineNumber=false`

If the value is omitted:

`jvm.userprf.LineNumber=false`

### Example

```
-Djvm.userprf.LineNumber=true
```

### Notes

If the debug information of the line number is not generated by using the `-g` option of the `javac` command, the line number will not be output even when `true` is specified in this property.

## 7.18.6 jvm.userprf.LogLevel

`jvm.userprf.LogLevel` specifies the trace output level for performance-based trace analysis.

### Description

`jvm.userprf.LogLevel` specifies the output level for the names of traced methods. The names are output in the specified level to the optional information (`OPT`) of the performance-based trace analysis information.

Prerequisite property

- `jvm.userprf.Enable=true`

### Syntax

```
jvm.userprf.LogLevel={class | package | method | signature}
```

### Specifiable values

Type: `String`

`class`
: class_name

`package`
: Fully-qualified class name

`method`
: Fully-qualified class name and method name

`signature`
: Fully-qualified class name, method name, and method argument type

If `true` is specified for the `jvm.userprf.ThrowableName` property, depending on the specification of this property, the following operation information (`OPR`) is output in the abnormal exit:

- When `class` is specified, the name of the exception or error class is output.
- When `package`, `method`, or `signature` is specified, the fully-qualified class name of the exception or error class is output.

### Default value

If the definition item is omitted:
`jvm.userprf.LogLevel=class`

If the value is omitted:
`jvm.userprf.LogLevel=class`

### Example

The following is an example when the trace information of the package name com.sample, the class name ClassA, and the method name methodA is output in the form of fully-qualified class name and method name, to the optional information (`OPT`) of the trace information:

```
-Djvm.userprf.LogLevel=method
```

The information that is output to the trace information is as follows:

```
com.sample.ClassA.methodA
```

## 7.18.7 jvm.userprf.ThrowableName

`jvm.userprf.ThrowableName` outputs the names of exception or error classes to the trace information.

### Description

`jvm.userprf.ThrowableName` specifies whether the names of exception or error classes are to be output to the operation information (`OPR`) of the trace information when a method ends abnormally.

Prerequisite property

- `jvm.userprf.Enable=true`

### Syntax

```
jvm.userprf.ThrowableName={true | false}
```

### Specifiable values

Type: `Boolean`

`true`
Outputs the names of exception or error classes to the trace information.

`false`
Does not output the names of exception or error classes to the trace information.

If a value other than `true` or `false` is specified, the default value is set.

### Default value

If the definition item is omitted:
`jvm.userprf.ThrowableName=false`

If the value is omitted:
`jvm.userprf.ThrowableName=false`

### Example

```
-Djvm.userprf.ThrowableName=true
```

### Notes

If `true` is specified for this property, class names are output by using the editing method specified in the `jvm.userprf.ThrowableNameEditMethod` property.

## 7.18.8 jvm.userprf.ThrowableNameEditMethod

`jvm.userprf.ThrowableNameEditMethod` specifies how the name of an exception or error class is to be modified if the length of the name exceeds 32 characters.

### Description

`jvm.userprf.ThrowableNameEditMethod` specifies how the name of an exception or error class is to be modified if the length of the name exceeds 32 characters. If the length of the name of an exception or error class is 32 characters or less, all characters are output to the trace information regardless of the specification in this property.

Prerequisite properties

- `jvm.userprf.Enable=true`
- `jvm.userprf.ThrowableName=true`

### Syntax

```
jvm.userprf.ThrowableNameEditMethod={FRONT_CUT | BACK_CUT | CENTER_CUT}
```

### Specifiable values

Type: `String`

`FRONT_CUT`
: The last 32 characters of the name of the exception or error class are output. In addition, the modified character string is prefixed with an asterisk (`*`) to indicate the omission.

`BACK_CUT`
: The first 32 characters of the name of the exception or error class are output. In addition, the modified character string is suffixed with an asterisk (`*`) to indicate the omission.

`CENTER_CUT`
: The first 16 characters and the last 16 characters of the name of the exception or error class are output. In addition, the symbol `*` is added after the first 16 characters and before the last 16 characters to indicate the omission.

If a value other than the above is specified, the default value is set.

### Default value

If the definition item is omitted:

`jvm.userprf.ThrowableNameEditMethod=FRONT_CUT`

If the value is omitted:

`jvm.userprf.ThrowableNameEditMethod=FRONT_CUT`

### Example

In the following example, the first 32 characters of the exception class name or the fully-qualified class name are output to the operation information (`OPR`) of the trace information, when a process ends with the exception whose package name is com.sample and whose class name is Class01234567890123456789012345678901234567890:

```
-Djvm.userprf.ThrowableNameEditMethod=BACK_CUT
```

Depending on the specification of the jvm.userprf.LogLevel property, the operation information (OPR) of the trace information is output as shown below.

When class is specified:

Class012345678901234567890123456*

When package, method, or signature is specified:

com.sample.Class0123456789012345*

## 7.18.9 jvm.userprf.Trace

jvm.userprf.Trace outputs logs when the class file specified in the performance-based trace analysis configuration file is successfully overwritten.

### Description

jvm.userprf.Trace specifies whether logs are to be output when the class file specified in the performance-based trace analysis configuration file is successfully overwritten.

Prerequisite property

- jvm.userprf.Enable=true

### Syntax

```
jvm.userprf.Trace={true | false}
```

### Specifiable values

Type: Boolean

True

Outputs logs when the target class of the performance-based trace analysis is successfully overwritten.

false

Does not output logs when the target class of the performance-based trace analysis is successfully overwritten.

If a value other than true or false is specified, the default value is set.

### Default value

If the definition item is omitted:

jvm.userprf.Trace=false

If the value is omitted:

jvm.userprf.Trace=false

### Example

```
-Djvm.userprf.Trace=true
```

## Notes

If an attempt to overwrite the target class of the performance-based trace analysis fails, a log message is output to the Java VM log file, regardless of the specification of this property.

## 7.19 Java HotSpot VM options used in Application Server

This section describes the options for specifying the settings related to Java HotSpot VM.

### 7.19.1 -agentlib:hndlwrap2

In an environment that includes JDK version 6 or later, `-agentlib:hndlwrap2` continues Java VM execution after the user logs off from Windows.

#### Description

`-agentlib:hndlwrap2` specifies whether to continue Java VM execution when a user logs off from Windows in an environment that includes JDK version 6 or later.

This option cannot be used at the same time as other JVMTI programs. Use of this option is not guaranteed when another JVMTI program is being used. If this option is used at the same time as another JVMTI program, the behavior of this option depends on the behavior of JVMTI.

#### Default value

If the definition item is omitted:

Nothing is set.

### 7.19.2 -agentlib:libname

`-agentlib:libname` loads the native agent library.

#### Description

`-agentlib:libname` loads the native agent library *libname*.

#### Syntax

```
-agentlib:libname[=options]
```

#### Specifiable values

There are no input restrictions.

#### Default value

If the definition item is omitted:

Nothing is set.

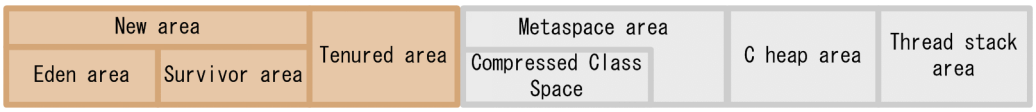
### 7.19.3 -XX:CompressedClassSpaceSize

`-XX:CompressedClassSpaceSize` specifies the maximum size of the Compressed Class Space.

## Description

`-XX:CompressedClassSpaceSize` specifies the maximum size of the Compressed Class Space.

If the functionality for the compressed object pointer is enabled, the Compressed Class Space is created in the Metaspace area.




In this case, the following information is deployed to each area.

- Compressed Class Space
  Class information referred to by the objects in the JavaHeap
- Metaspace area (excluding the Compressed Class Space)
  Method and other information excluding the above information

Prerequisite option

- `-XX:+UseCompressedOops`

## Syntax

```
-XX:CompressedClassSpaceSize=size
```

## Specifiable values

*size*

Type: `Integer`

Specify a natural number followed by one of the following units:

- "`k`" for kilo
- "`m`" for mega
- "`g`" for giga

You can specify an integer value from 1024 k to 3 g.

Note that the specification of this value is not case sensitive.

## Default value

If the definition item is omitted:

For Linux [server]

```
-XX:CompressedClassSpaceSize=1G
```

Legend

[server]: Indicates that Java HotSpot Server VM is used.

## 7.19.4 -XX:ConcGCThreads

`-XX:ConcGCThreads` specifies the number of threads that can execute processing for concurrent marking in parallel.

### Description

`-XX:ConcGCThreads` specifies the number of threads that can execute processing for Concurrent Marking in parallel when G1GC is enabled.

When Java VM starts, the number of Concurrent Marking processing threads specified in this option is created, and then the processing is executed. When this option is omitted, the number of Concurrent Marking processing threads calculated by the following formula is created:

Max((*ParallelGCThreads*[#]+2)/4,1)

Note

The calculated value is rounded down to the nearest integer. Max(A,B) indicates that the larger value of A and B is to be selected.

#

*ParallelGCThreads* is the value specified in `-XX:ParallelGCThreads`.

When you specify this option, note the following points:

- If you specify 1, parallel execution is performed for a single thread, resulting in a decrease in execution performance.
- If you specify a value that exceeds the number of threads that can be created in the execution environment, Java VM cannot start, because the creation of Concurrent Marking processing threads during Java VM startup fails.
- The Concurrent Marking processing threads cannot be created in excess of the number of GC threads. If you specify a value that exceeds the number of GC threads, the following message is output to the standard output, and Java VM fails to start.

```
Error occurred during initialization of VM
Can't have more ConcGCThreads than ParallelGCThreads.
```

- If the specified value is outside the valid range, the following message is output to the standard output, and Java VM terminates with the return code `1`.

```
Invalid number of concurrent marking threads:  -XX:ConcGCThreads=[specified_value]
```

Prerequisite option

- `-XX:+UseG1GC`

Related option

- `-XX:ParallelGCThreads`

### Syntax

```
-XX:ConcGCThreads=integer_value
```

### Specifiable values

*integer_value*

Type: `Integer`

Specify an integer from 0 to 1000.

### Default value

If the definition item is omitted:

Max((*ParallelGCThreads*+2)/4,1)

If the value is omitted:

Max((*ParallelGCThreads*+2)/4,1)

## 7.19.5 -XX:MaxGCPauseMillis

`-XX:MaxGCPauseMillis` specifies the target amount of time (in milliseconds) for which applications are to be stopped by GC for G1GC.

### Description

`-XX:MaxGCPauseMillis` specifies the target amount of time (in milliseconds) for which applications are to be stopped by GC for G1GC.

### Syntax

```
-XX:MaxGCPauseMillis=integer_value
```

### Specifiable values

Type: `Integer`

Specify an integer from 1 to 4,294,967,295.

### Default value

If the definition item is omitted:

```
-XX:MaxGCPauseMillis=200
```

## 7.19.6 -XX:MaxMetaspaceSize

`-XX:MaxMetaspaceSize` specifies the maximum value of the Metaspace area.

### Description

`-XX:MaxMetaspaceSize` specifies the maximum value of the Metaspace area.

The Metaspace area stores the class information that was loaded.

You can estimate the size of the Metaspace area based on the size of the class information required for applications. Specify the estimated value for the `-XX:MetaspaceSize` option and the `-XX:MaxMetaspaceSize` option. By specifying an appropriate size for the Metaspace area, the occurrence of an OutOfMemoryError in the Metaspace area can be prevented. In addition, by specifying the same value for the `-XX:MetaspaceSize` option and the `-XX:MaxMetaspaceSize` option, the occurrence of full GCs that originate in the Metaspace area can be prevented.

The memory usage rate of the Metaspace area is the size of the memory that is actually being used by applications. Therefore, the memory of the size specified for the `-XX:MetaspaceSize` option and the `-XX:MaxMetaspaceSize` option is not used. By using this feature, you can tune the Metaspace area as follows:

- You can reduce the risk of an OutOfMemoryError in the Metaspace area.

  When the memory usage rate of the Metaspace area exceeds the estimated value, an OutOfMemoryError in the Metaspace area might occur. To reduce this risk, estimate and specify appropriate values for the following options:

  - `-XX:MaxMetaspaceSize`
  - `-XX:CompressedClassSpaceSize`

  An OutOfMemoryError occurs in the Metaspace area only when the memory usage rate of the Metaspace area exceeds the values specified for these options.

- You can reduce the risk of full GCs that originate in the Metaspace area.

  If the memory usage rate of the Metaspace area exceeds the estimated value, a full GC that originates in the Metaspace area might occur. To reduce this risk, estimate and specify appropriate values for the following options:

  - `-XX:MetaspaceSize`
  - `-XX:MaxMetaspaceSize`
  - `-XX:CompressedClassSpaceSize`

  A full GC that originates in the Metaspace area occurs only when the memory usage rate of the Metaspace area exceeds the values specified for these options.

## Syntax

```
-XX:MaxMetaspaceSize=size
```

## Specifiable values

*size*

Type: `Integer`

Specify a natural number followed by one of the following characters. The size is specified in units of bytes.

- `k` for kilo
- `m` for mega
- `g` for giga
- `t` for tera

The specifiable values are described below.

For 32-bit Java VM:

An integer value from `256K` to $2^{32}-1$.

For 64-bit Java VM:

An integer value from `256K` to $2^{64}-1$.

Note that the specification of this value is not case sensitive.

### Default value

If the definition item is omitted:

For Linux [server]

`-XX:MaxMetaspaceSize=2`$^{64}$`-1`

Legend

[server]: Indicates that Java HotSpot Server VM is used.

## 7.19.7 -XX:MaxTenuringThreshold

`-XX:MaxTenuringThreshold` specifies the threshold for the number of times Java objects are replaced in the From space and in the To space when CopyGC is executed.

### Description

`-XX:MaxTenuringThreshold` specifies the threshold for the number of times Java objects are replaced in the From space and in the To space when CopyGC is executed. When the specified threshold is exceeded, the Java objects to be replaced are moved to the Tenured area.

The range of valid values for this option is from 0 to the default value. If the specified value is outside of this range, the functionality that moves objects to the Tenured area when the threshold value is exceeded will be disabled.

### Syntax

```
-XX:MaxTenuringThreshold=value
```

### Specifiable values

*value*

Type: `Integer`

Specify a natural number.

### Default value

If the definition item is omitted:

For Linux [server]

`-XX:MaxTenuringThreshold=14`

Legend

[server]: Indicates that Java HotSpot Server VM is used.

## 7.19.8 -XX:MetaspaceSize

`-XX:MetaspaceSize` specifies the standard value for full GCs that originate in the Metaspace area.

## Description

`-XX:MetaspaceSize` specifies the standard value for full GCs that originate in the Metaspace area.

The Metaspace area stores the class information that was loaded.

You can estimate the size of the Metaspace area based on the size of the class information required for applications. Specify the estimated value for the `-XX:MetaspaceSize` option and the `-XX:MaxMetaspaceSize` option. By specifying an appropriate size for the Metaspace area, the occurrence of an OutOfMemoryError in the Metaspace area can be prevented. In addition, by specifying the same value for the `-XX:MetaspaceSize` option and the `-XX:MaxMetaspaceSize` option, the occurrence of full GCs that originate in the Metaspace area can be prevented.

The memory usage rate of the Metaspace area is the size of the memory that is actually being used by applications. Therefore, the memory of the size specified for the `-XX:MetaspaceSize` option and the `-XX:MaxMetaspaceSize` option is not used. By using this feature, you can tune the Metaspace area as follows:

- You can reduce the risk of an OutOfMemoryError in the Metaspace area.

  When the memory usage rate of the Metaspace area exceeds the estimated value, an OutOfMemoryError in the Metaspace area might occur. To reduce this risk, estimate and specify appropriate values for the following options:

  - `-XX:MaxMetaspaceSize`
  - `-XX:CompressedClassSpaceSize`

  An OutOfMemoryError occurs in the Metaspace area only when the memory usage rate of the Metaspace area exceeds the values specified for these options.
- You can reduce the risk of full GC that originates in the Metaspace area.

  If the memory usage rate of the Metaspace area exceeds the estimated value, a full GC that originates in the Metaspace area might occur. To reduce this risk, estimate and specify appropriate values for the following options:

  - `-XX:MetaspaceSize`
  - `-XX:MaxMetaspaceSize`
  - `-XX:CompressedClassSpaceSize`

  A full GC that originates in the Metaspace area occurs only when the memory usage rate of the Metaspace area exceeds the values specified for these options.

## Syntax

```
-XX:MetaspaceSize=size
```

## Specifiable values

*size*

Type: `Integer`

Specify a natural number followed by one of the following characters. The size is specified in units of bytes.

- `k` for kilo
- `m` for mega
- `g` for giga
- `t` for tera

The specifiable values are described below.

For 32-bit Java VM:

An integer value from `256K` to $2^{32}-1$.

For 64-bit Java VM:

An integer value from `256K` to $2^{64}-1$.

Note that the specification of this value is not case sensitive.

### Default value

If the definition item is omitted:

For Linux [server]

```
-XX:MetaspaceSize=16M
```

Legend

[server]: Indicates that Java HotSpot Server VM is used.

## 7.19.9 -XX:NewRatio

`-XX:NewRatio` specifies the ratio of the Tenured area to the New area.

### Description

`-XX:NewRatio` specifies the ratio of the Tenured area to the New area.

If *value* is set to 2, the ratio of the New area to the Tenured area is 1:2.

When the value of *size_of_used_New_area* becomes greater than the value of *size_of_free_space_in_Tenured_area*, full GC occurs. Note that, if `1` is specified for this option, full GC frequently occurs.

### Syntax

```
-XX:NewRatio=value
```

### Specifiable values

*value*

Type: `Integer`

Specify a natural number.

### Default value

If the definition item is omitted:

For Linux [server]

```
-XX:NewRatio=2
```

Legend

[server]: Indicates that Java HotSpot Server VM is used.

## 7.19.10 -XX:ParallelGCThreads

`-XX:ParallelGCThreads` specifies the number of threads that can execute G1GC in parallel.

### Description

`-XX:ParallelGCThreads` specifies the number of threads that can execute G1GC in parallel. This option is enabled when `-XX:+UseG1GC` is specified. We recommend that you use the default value for this option. However, if you want to change the value, set an appropriate value calculated based on the value measured during actual Java VM operation.

When Java VM starts, the number of GC threads specified in this option is created, and then processing is executed.

If `0` is specified for this option, the default value is set.

When specifying this option, note the following points:

- If you specify `1`, parallel execution will be performed for a single thread, resulting in a decrease in execution performance.
- If you specify a value that exceeds the number of threads that can be created in the execution environment, Java VM will not be able to start, because the creation of GC threads during Java VM startup will fail.
- If the specified value is outside of the valid range, a message is output to the standard output, and Java VM terminates with the return code `1`.
- For G1GC, if you increase the value of this option, the number of Evacuation processing threads will increase. As a result, the resources allocated to Evacuation processing might increase and throughput might decrease. If you change the value of this option, verify that performance requirements are met.

### Syntax

```
-XX:ParallelGCThreads=value
```

### Specifiable values

*value*

Type: `Integer`

Specify a natural number.

### Default value

If the definition item is omitted:

If the number of logical CPUs in the execution environment is 8 or less:

`-XX:ParallelGCThreads=`*`number_of_CPUs`*

If the number of logical CPUs in the execution environment is 9 or more:

`-XX:ParallelGCThreads=(8 + (`*`number_of_CPUs`*` - 8)*(5 / 8))`#

#:

The calculated value is rounded down to the nearest integer.

For example, when the number of logical CPUs is 4, the default value is 4: `ParallelGCThreads` = 4. Similarly, when the number of logical CPUs is 72, the default value is 48: `ParallelGCThreads` = 8 + (72 - 8)*(5 / 8) = 48.

## 7.19.11 -XX:ReservedCodeCacheSize

`-XX:ReservedCodeCacheSize` specifies the maximum size of the code cache area.

### Description

`-XX:ReservedCodeCacheSize` specifies the maximum size of the code cache area.

### Syntax

```
-XX:ReservedCodeCacheSize=integer_value
```

### Specifiable values

*integer_value*

Type: `Integer`

Specify an integer followed by one of the following characters. The size is specified in units of bytes.

- `k` for kilo
- `m` for mega
- `g` for giga
- `t` for tera

Note that the specification of this value is not case sensitive.

### Default value

If the definition item is omitted:

For Linux [server]

`-XX:ReservedCodeCacheSize=48M`

Legend

[server]: Indicates that Java HotSpot Server VM is used.

## 7.19.12 -XX:SurvivorRatio

`-XX:SurvivorRatio` specifies the ratio of the Eden area to each of the following spaces in the Survivor area: the From space and the To space.

### Description

`-XX:SurvivorRatio` specifies the ratio of the New::Eden area to each of the following spaces in the New::Survivor area: the From space and the To space.

If `8` is set for *value*, the ratio of the New::Eden area to the From space to the To space is 8:1:1.

### Syntax

```
-XX:SurvivorRatio=value
```

### Specifiable values

*value*

Type: `Integer`

Specify a natural number.

### Default value

If the definition item is omitted:

For Linux [server]

```
-XX:SurvivorRatio=32
```

Legend

[server]: Indicates that Java HotSpot Server VM is used.

## 7.19.13 -XX:TargetSurvivorRatio

`-XX:TargetSurvivorRatio` specifies the target proportion of the Survivor area to be made up of Java objects after GC is executed.

### Description

`-XX:TargetSurvivorRatio` specifies the target proportion (0% to 100%) of the New::Survivor area that is to be made up of Java objects after GC is executed.

### Syntax

```
-XX:TargetSurvivorRatio=value
```

### Specifiable values

*value*

Type: `Integer`

Specify a natural number.

### Default value

If the definition item is omitted:

For Linux [server]

```
-XX:TargetSurvivorRatio=50
```

Legend

[server]: Indicates that Java HotSpot Server VM is used.

## 7.19.14 -XX:[+|-]UseG1GC

`-XX:[+|-]UseG1GC` executes G1GC.

### Description

`-XX:[+|-]UseG1GC` specifies whether to execute G1GC.

This option cannot be specified at the same time as the options (`UseSerialGC` and `HitachiUseExplicitMemory`) that are used for selecting other GC types.

### Syntax

```
-XX:[+|-]UseG1GC
```

### Specifiable values

Type: `String`

`-XX:+UseG1GC`
Executes G1GC.

`-XX:-UseG1GC`
Does not execute G1GC.

### Default value

If the definition item is omitted:
`-XX:-UseG1GC`

## 7.19.15 -XX:[+|-]UseSerialGC

`-XX:[+|-]UseSerialGC` executes SerialGC.

### Description

`-XX:[+|-]UseSerialGC` specifies whether to execute SerialGC.

### Syntax

```
-XX:[+|-]UseSerialGC
```

### Specifiable values

Type: `String`

`-XX:+UseSerialGC`
Executes SerialGC.

`-XX:-UseSerialGC`
Does not execute SerialGC.

### Default value

If the definition item is omitted:

`-XX:+UseSerialGC`

### Notes

- You can select either SerialGC (`UseSerialGC`) or G1GC (`UseG1GC`) as the GC for Application Server. Do not specify the both at the same time. If you specify both at the same time, the Java process will be unable to start.
- If you specify both `-XX:+UseSerialGC` and `-XX:+UseG1GC`, an error message is output to the standard error output and then the command fails to start. If JNI is used, JNI_CreateJavaVM returns `JNI_ERR(-1)`.

## 7.19.16 -verbose:information-type

`-verbose:information-type` outputs the information specified in *information_type*.

### Description

`-verbose:information-type` outputs the information specified in *information_type*.

### Syntax

```
-verbose:information_type
```

### Specifiable values

*information_type*

Type: `String`

`class`

Outputs information about the class each time a class is loaded.

`gc`

Sends a report whenever a GC event occurs.

`jni`

Reports information about the use of the native method and other Java Native Interface (JNI) activities.

### Default value

If the definition item is omitted:

Nothing is set.

## 7.19.17 -Xloggc:file

`-Xloggc:file` outputs logs to the file specified in *file* whenever a GC event occurs.

### Description

Similar to `-verbose:gc`, `-Xloggc:file` sends a report whenever a GC event occurs. In addition, the data about that event is recorded in the file specified in *file*. In addition to the information that is reported when `-verbose:gc` is specified, the amount of time (in seconds) that has elapsed from the first GC event, is included at the beginning of each event report.

### Syntax

```
-Xloggc:file
```

### Specifiable values

There are no input restrictions.

### Default value

If the definition item is omitted:

Nothing is set.

## 7.19.18 -Xms

`-Xms` specifies the initial size of the JavaHeap.

### Description

`-Xms` specifies the initial size of the JavaHeap.

### Syntax

```
-Xmssize
```

### Specifiable values

*size*

Type: `Integer`

Specify a natural number followed by one of the following characters. The size is specified in units of bytes.

- `k` for kilo
- `m` for mega
- `g` for giga
- `t` for tera

Note that the specification of this value is not case sensitive.

### Default value

If the definition item is omitted:

For Linux [server]

```
-Xms7.8M
```

Legend

[server]: Indicates that Java HotSpot Server VM is used.

## 7.19.19 -Xmx

`-Xmx` specifies the maximum size of the JavaHeap.

### Description

`-Xmx` specifies the maximum size of the JavaHeap.

### Syntax

```
-Xmxsize
```

### Specifiable values

*size*

Type: `Integer`

Specify a natural number followed by one of the following characters. The size is specified in units of bytes.

- `k` for kilo
- `m` for mega
- `g` for giga
- `t` for tera

Note that the specification of this value is not case sensitive.

### Default value

If the definition item is omitted:

For Linux [server]

```
-Xmx83M
```

Legend

[server]: Indicates that Java HotSpot Server VM is used.

## 7.19.20 -Xprof

`-Xprof` generates a profile for a running program, and outputs the profiling data to the standard output.

### Description

`-Xprof` generates a profile for a running program, and the profiling data is output to the standard output. This option is provided as a program development utility. This option is not intended for use in a system that is running in the production environment.

### Default value

If the definition item is omitted:

Nothing is set.

## 7.19.21 -Xss

`-Xss` specifies the maximum area size per stack.

### Description

`-Xss` specifies the maximum area size per stack.

### Syntax

```
-Xsssize
```

### Specifiable values

*size*

Type: `Integer`

Specify a natural number followed by one of the following characters. The size is specified in units of bytes.

- `k` for kilo
- `m` for mega
- `g` for giga
- `t` for tera

Note that the specification of this value is not case sensitive.

### Default value

If the definition item is omitted:

For Linux [server]

`-Xss1M`

Legend

[server]: Indicates that Java HotSpot Server VM is used.

## 7.20 Environment variables used in Java VM

This section describes the Java VM environment variables that can be used in the system.

### 7.20.1 JAVA_HRAS

JAVA_HRAS is an environment variable that enables execution of the java command.

#### Description

If you are using a Java program that is not related to Application Server in an Application Server execution environment (an environment other than the application development environment), to use this environment variable, separately purchase Application Server - Optional License for Java.

If you execute the java command with this environment variable specified, you will be able to execute Java application programs that do not link with Application Server. When a Java application program is executed, the following options for outputting Java VM operation information are automatically specified:

- -XX:+HitachiFullCore
- -XX:+HitachiJavaClassLibTrace
- -XX:+HitachiLocalsInStackTrace
- -XX:+HitachiLocalsSimpleFormat
- -XX:+HitachiOutOfMemoryAbort
- -XX:+HitachiOutOfMemoryStackTrace
- -XX:+HitachiOutputMilliTime
- -XX:-HitachiThreadDumpToStdout
- -XX:+HitachiVerboseGC

If you do not set this environment variable, the command fails and the following message is output:

```
Java command cannot be used except in some special cases.
When starting a Java program, use the java_hras command, etc.
Depending on the Java program executed,
it might be necessary to purchase the other product.
```

Note that Java application programs that do not link with Application Server can be executed by using the java, java_hras, or javaw command. The following shows how to execute each of these commands.

To execute the java command:

Use either of the methods below.

- Execute the command with the -Xhras option specified.
- Execute the command with the JAVA_HRAS environment variable set.

To execute the java_hras command:

Execute the java_hras command in *installation_directory_for_Application_Server*/jdk/jre/bin/.

The functionality of the java_hras command is equivalent to that of the java command. Unlike the java command, you do not need to specify the -Xhras option or the JAVA_HRAS environment variable when executing the java_hras command.

To execute the javaw command:

Use either of the methods below.

- Execute the command with the -Xhras option specified.
- Execute the command with the JAVAW_HRAS environment variable set.

### Specifiable values

There are no input restrictions.

### Default value

If the definition item is omitted:

Nothing is set.

If the value is omitted:

Specifying nothing for the JAVA_HRAS environment also enables execution of the java command.

## 7.20.2 JAVACOREDIR

JAVACOREDIR specifies the directory where thread dump files are output.

### Description

JAVACOREDIR specifies the directory where thread dump files are to be output, by using C shell.

Prerequisite option

- -XX:+HitachiThreadDump

### Syntax

```
setenv JAVACOREDIR output_destination_directory_of_thread_dump_files
```

### Specifiable values

*output_destination_directory_of_thread_dump_files*

Type: String

By default, thread dump files are output in the current directory.

The current directory is as follows:

*work_directory*/ejb/*server_name*

### Default value

If the definition item is omitted:

Nothing is set.

If the value is omitted:

Current directory

### Example

To output thread dump files to `/home/user/threaddump`:

```
setenv JAVACOREDIR /home/user/threaddump
```

### Notes

- If the output of thread dump files to the directory specified in `JAVACOREDIR` fails, the thread dump files are output to the current directory.
- If output to the current directory also fails, the thread dump is output to the standard error output only. In such cases, the thread dump is not output to the standard output.

## 7.20.3 JAVAW_HRAS

`JAVAW_HRAS` is an environment variable that enables execution of the `javaw` command.

### Description

If you are using a Java program that is not related to Application Server in an Application Server execution environment (an environment other than the application development environment), to use this environment variable, separately purchase Application Server - Optional License for Java.

If you execute the `javaw` command with this environment variable specified, you will be able to execute Java application programs that do not link with Application Server. When a Java application program is executed, the following options for outputting Java VM operation information are automatically specified:

- `-XX:+HitachiFullCore`
- `-XX:+HitachiJavaClassLibTrace`
- `-XX:+HitachiLocalsInStackTrace`
- `-XX:+HitachiLocalsSimpleFormat`
- `-XX:+HitachiOutOfMemoryAbort`
- `-XX:+HitachiOutOfMemoryStackTrace`
- `-XX:+HitachiOutputMilliTime`
- `-XX:-HitachiThreadDumpToStdout`
- `-XX:+HitachiVerboseGC`

If you do not set this environment variable, the command fails and the following message is output:

```
Javaw command cannot be used except in some special cases.
When starting a Java program, use the java_hras command, etc.
Depending on the Java program executed,
it might be necessary to purchase the other product.
```

Note that Java application programs that do not link with Application Server can be executed by using the `java`, `java_hras`, or `javaw` command. The following shows how to execute each of these commands.

To execute the `java` command:

Use either of the methods below.

- Execute the command with the `-Xhras` option specified.
- Execute the command with the `JAVA_HRAS` environment variable set.

To execute the `java_hras` command:

Execute the `java_hras` command in *`installation_directory_for_Application_Server`*`/jdk/jre/bin/`.

The functionality of the `java_hras` command is equivalent to that of the `java` command. Unlike the `java` command, you do not need to specify the `-Xhras` option or the `JAVA_HRAS` environment variable when executing the `java_hras` command.

To execute the `javaw` command:

Use either of the methods below.

- Execute the command with the `-Xhras` option specified.
- Execute the command with the `JAVAW_HRAS` environment variable set.

## Specifiable values

There are no input restrictions.

## Default value

If the definition item is omitted:

Nothing is set.

If the value is omitted:

Specifying nothing for the `JAVAW_HRAS` environment variable also enables this environment variable.

# 8

# Definition files used in Java VM

This chapter describes the definition files used to set up the explicit memory management functionality and performance-based trace analysis.

# 8.1 List of definition files used in Java VM

The following table describes the definition files used to set up the explicit memory management functionality and performance-based trace analysis.

## Definition files used in Java VM

| Definition file | Overview | Details |
|---|---|---|
| 8.2 exmemexcludeclass.cfg | File for specifying classes of objects that you do not want to move to the Explicit heap (the explicit memory management functionality exclusion configuration file) | Specifies the classes of objects that are not to be moved to the Explicit heap. Even if GC occurs, objects of the classes specified in this configuration file are not moved to the Explicit heap. The objects are moved to the Tenured area at the time of promotion. |
| 8.3 exmemnotexcludeclass.cfg | File for specifying classes for which you want to disable the exclusion setting for the classes specified in the file for specifying exclusions from the explicit memory management functionality (the configuration file that disables exclusions from the explicit memory management functionality) | Specifies the classes that are specified in the explicit memory management functionality exclusion configuration file but for which exclusion is to be disabled. When GC occurs, objects of the classes specified in this file are moved to the Explicit heap. |
| 8.4 userprf.cfg | File for specifying the settings for performance-based trace analysis (the performance-based trace analysis configuration file) | Specifies information about the trace target methods of the performance-based trace analysis. |

# 8.2 exmemexcludeclass.cfg

`exmemexcludeclass.cfg` is the configuration file for specifying the classes of objects that are not to be moved to the Explicit heap. This configuration file is known as the explicit memory management functionality exclusion configuration file.

## Description

`exmemexcludeclass.cfg` specifies the classes of objects that are not to be moved to the Explicit heap. Even if GC occurs, objects of the classes specified in this configuration file are not moved to the Explicit heap. The objects are moved to the Tenured area at the time of promotion.

The system provides an explicit memory management functionality exclusion configuration file. This configuration file (`sysexmemexcludeclass.cfg`) provided by the system is used if the functionality that excludes classes from the explicit memory management functionality is enabled. In addition to the classes specified in the configuration file provided by the system, if you want to add classes to be excluded from the explicit memory management functionality, update the configuration file that is stored in the file path below or create a new configuration file. If you create a new configuration file, specify the file path for the `-XX:ExplicitMemoryExcludeClassListFile` option.

The path of the configuration file that is provided by the system is as follows:

*installation_directory_for_JDK*`/jre/lib/explicitmemory/sysexmemexcludeclass.cfg`

You can disable exclusion for the classes specified in this configuration file by using the configuration file that disables exclusions from the explicit memory management functionality. Specifications in the configuration file that disables exclusions from the explicit memory management functionality have priority over those in this configuration file.

The following explains the specification of each configuration file and the scope of the explicit memory management functionality, by using the package "com.sample" as an example. The package "com.sample" includes the following two classes: ClassA and ClassB. The following are specification examples of the configuration files.

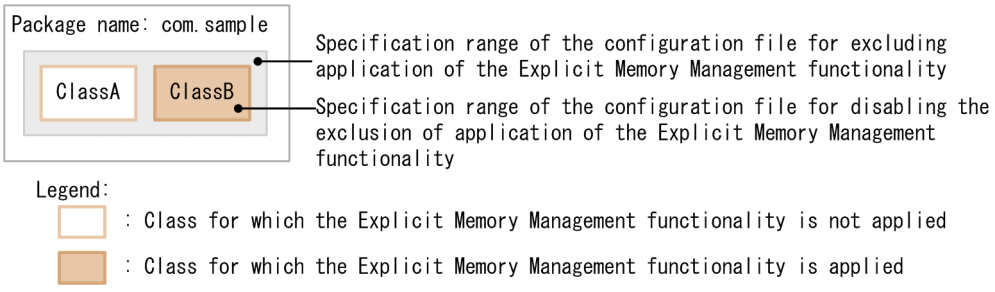
Specification example of the explicit memory management functionality exclusion configuration file

```
com.sample.*
```

Specification example of the configuration file that disables exclusions from the explicit memory management functionality

```
com.sample.ClassB
```

The specification in the explicit memory management functionality exclusion configuration file includes both ClassA and ClassB. However, because the specification in the configuration file that disables exclusions from the explicit memory management functionality has priority, as shown in the figure below, the explicit memory management functionality is applied to ClassB. Only ClassA is excluded from the explicit memory management functionality.



## Syntax

For types other than the array type:

```
fully_qualified_class_name_of_the_specified_class#comment
...
fully_qualified_class_name_of_the_specified_class
```

For the array type:

```
"["_repeated_by_the_number_of_dimensions_of_the_array#Lfully_qualified_class_name_of_the_specified_class;
```

#

For multidimensional arrays, specify `[` the same number of times as the number of the dimensions. For example, for a three-dimensional array, specify `[[[`.

Example for a one-dimensional array of the class aaa.bbb.Myclass:

`[`Laaa.bbb.Myclass;

The following are the specification rules for this configuration file:

- Specify one class name per line.
- Specify no more than 1,024 characters (including null characters and comments) per line. If 1,025 or more characters are specified in a single line, the line cannot be parsed and a warning message appears. Then, the line is ignored and subsequent lines are loaded.
- You can omit the specification of class names, by specifying *package_name*`.*`. Unlike specifying `*` in the Java language import declaration, if you specify *package_name*`.*`, sub-package classes also become targets.
- Enclose the line in one or more consecutive linefeed characters (`\n` or 0x0A) or carriage return characters (`\r` or 0x0D).
- Single-byte space characters (0x20) and tab characters (`\t` or 0x09) will be treated as null characters. Note that all null characters in the configuration file are ignored.
- Prefix each comment with `#`. All characters from `#` to end of the line will be treated as the comment.

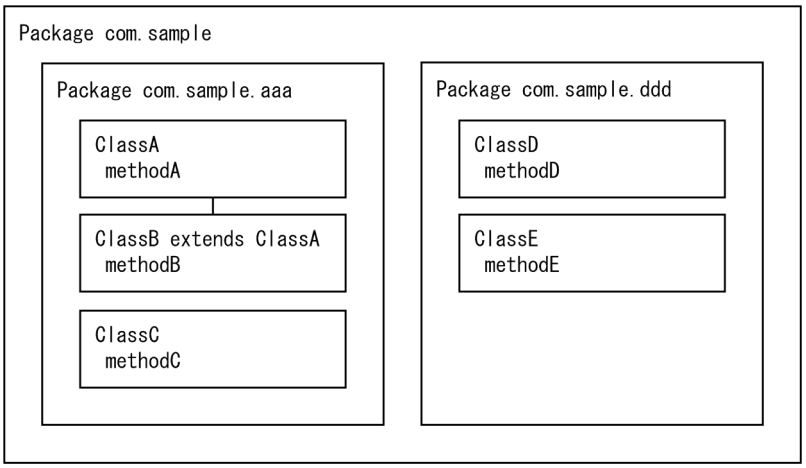
## Storage location

*installation_directory_for_JDK*`/usrconf/exmemexcludeclass.cfg`

## Examples

This specification example assumes that the package name is "com.sample" and the class structure is configured as shown in the figure below.

Figure 8-1: Class structure example




When fully qualified class names are used:

The following is a specification example of the explicit memory management functionality exclusion configuration file when fully qualified class names are used.

```
com.sample.aaa.ClassA
com.sample.aaa.ClassC
com.sample.ddd.ClassD
```

In this example, the objects of ClassA, ClassC, and ClassD are to be moved to the Tenured area.

If the class names are omitted:

The following are specification examples of the explicit memory management functionality exclusion configuration file and the configuration file that disables exclusions from the explicit memory management functionality, when class names are omitted.

Specification example of the explicit memory management functionality exclusion configuration file

```
com.sample.*
```

Specification example of the configuration file that disables exclusions from the explicit memory management functionality

```
com.sample.aaa.ClassB
com.sample.ddd.ClassE
```

In this example, according to the specification in the explicit memory management functionality exclusion configuration file, all classes (including the classes in the same package and those in sub-packages) are to be moved to the Tenured area. However, according to the specification in the configuration file that disables exclusions from the explicit memory management functionality, the objects of ClassB and ClassE are to be moved to Explicit memory blocks. As a result, the objects of ClassA, ClassC, and ClassD are moved to the Tenured area.

Regarding whether to specify fully-qualified class names or to omit class names, we recommend that you use the method that allows you to specify fewer items. The two specification examples above have the same results (the objects of ClassA, ClassC, and ClassD are moved to the Tenured area). In such cases, we recommend that you omit class names.

# 8.3 exmemnotexcludeclass.cfg

`exmemnotexcludeclass.cfg` is the configuration file for specifying the classes that are specified in the explicit memory management functionality exclusion configuration file but for which exclusion is to be disabled. This configuration file is referred to as the configuration file that disables exclusions from the explicit memory management functionality.

## Description

`exmemnotexcludeclass.cfg` specifies the classes that are specified in the explicit memory management functionality exclusion configuration file but for which exclusion is to be disabled. When GC occurs, objects of the classes specified in this file are moved to the Explicit heap.

If you want to disable exclusion for the classes that are excluded from the explicit memory management functionality, update the configuration file that is stored in the file path below or create a new configuration file. Exclusion can be also disabled for classes that are specified in the explicit memory management functionality exclusion configuration file (`sysexmemexcludeclass.cfg`) that is provided by the system. If you create a new configuration file, specify the file path for the `-XX:ExplicitMemoryNotExcludeClassListFile` option.

Specifications in this configuration file have priority over those in the explicit memory management functionality exclusion configuration file.

The following explains the specification of each configuration file and the scope of the explicit memory management functionality, by using the package "com.sample" as an example. The package "com.sample" includes the following two classes: ClassA and ClassB. The following are specification examples of the configuration files.

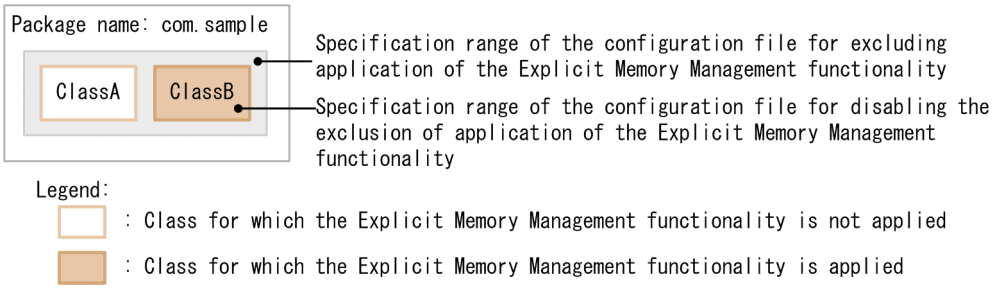
Specification example of the explicit memory management functionality exclusion configuration file

```
com.sample.*
```

Specification example of the configuration file that disables exclusions from the explicit memory management functionality

```
com.sample.ClassB
```

The specification in the explicit memory management functionality exclusion configuration file includes both ClassA and ClassB. However, because the specification in the configuration file that disables exclusions from the explicit memory management functionality has priority, as shown in the figure below, the explicit memory management functionality is applied to ClassB. Only ClassA is excluded from the explicit memory management functionality.



## Syntax

For types other than the array type:

```
fully_qualified_class_name_of_the_specified_class#comment
...
fully_qualified_class_name_of_the_specified_class
```

For the array type:

```
"["_repeated_by_the_number_of_dimensions_of_the_array#Lfully_qualified_class_name_of_the_specified_class;
```

#

For multidimensional arrays, specify [ the same number of times as the number of the dimensions. For example, for a three-dimensional array, specify [[[.

Example for a one-dimensional array of the class aaa.bbb.Myclass:

[Laaa.bbb.Myclass;

The following are the specification rules for this configuration file:

- Specify one class name per line.
- Specify no more than 1,024 characters (including null characters and comments) per line. If 1,025 or more characters are specified in a single line, the line cannot be parsed and a warning message appears. Then, the line is ignored and subsequent lines are loaded.
- You can omit the specification of class names, by specifying *package_name*.*. Unlike specifying * in the Java language import declaration, if you specify *package_name*.*, sub-package classes also become targets.
- Enclose the line in one or more consecutive linefeed characters (\n or 0x0A) or carriage return characters (\r or 0x0D).
- Single-byte space characters (0x20) and tab characters (\t or 0x09) will be treated as null characters. Note that all null characters in the configuration file are ignored.
- Prefix each comment with #. All characters from # to end of the line will be treated as the comment.

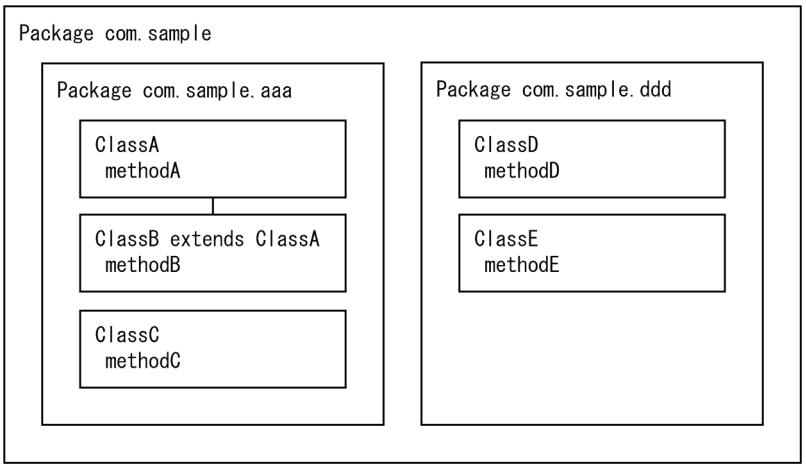
## Storage location

*installation_directory_for_JDK*/usrconf/exmemnotexcludeclass.cfg

## Examples

This specification example assumes that the package name is "com.sample" and the class structure is configured as shown in the figure below. In addition, class names are omitted in the explicit memory management functionality exclusion configuration file.

Figure 8-2: Class structure example




Specification example of the explicit memory management functionality exclusion configuration file

```
com.sample.*
```

Specification example of the configuration file that disables exclusions from the explicit memory management functionality

```
com.sample.aaa.ClassB
com.sample.ddd.ClassE
```

In this example, according to the specification in the explicit memory management functionality exclusion configuration file, all classes (including the classes in the same package and those in sub-packages) are to be moved to the Tenured area. However, according to the specification in the configuration file that disables exclusions from the explicit memory management functionality, the objects of ClassB and ClassE are to be moved to Explicit memory blocks. As a result, the objects of ClassA, ClassC, and ClassD are moved to the Tenured area.

## Notes

This configuration file is for specifying the classes that are specified in the explicit memory management functionality exclusion configuration file but for which the explicit memory management functionality exclusion setting is to be disabled. Do not use this configuration file to specify classes to be moved to Explicit memory blocks.

# 8.4 userprf.cfg

`userprf.cfg` is a configuration file for specifying the settings for performance-based trace analysis.

## Description

The configuration file `userprf.cfg` is used to specify information about the methods to be traced by the performance-based trace analysis function.

## Syntax

```
specification_format,ID,subclass_flag[,[event_ID][,[trace_collection_level]]]
[#comment]
```

Note

To set, as the trace targets, all methods whose class name and package name match the specified conditions, specify `true` for the value of the `jvm.userprf.ExtendedSetting` property.

The items to be specified in the performance-based trace analysis configuration file are as follows:

| Items to be specified | Description |
|---|---|
| *specification_format* | Specifies the methods to be traced.<br>Specify one of the following formats for *specification_format*:<br>• To trace methods whose method name and argument type match<br>*package_name*.*class_name*.*method_name*(*argument_type_of_the_method*)<br>• To trace methods whose name matches the specified method<br>*package_name*.*class_name*.*method_name*(*)<br>• To trace all methods whose class name matches the specified class<br>*package_name*.*class_name*<br>• To trace all methods whose package name matches the specified package<br>*package_name*.*<br>The items to be specified in the specification format are as follows:<br>*package_name*<br>Specify the package name of the class or interface of the method to be traced.<br>*class_name*<br>Specify the class name or interface name of the method to be traced. If you specify an interface name instead of a class name and `true` is specified for the subclass flag, the methods that implement the specified interface will be traced.<br>*method_name*<br>Specify the name of the method to be traced.<br>*argument_type_of_the_method*<br>Specify the argument type of the method to be traced by using the fully qualified name. |
| *ID* | Specify the character string for identifying the method to be traced (hereinafter referred to as the ID).<br>The specifiable characters are ASCII characters from 0x21 (!) to 0x7e (~). However, you cannot specify 0x22 ("), 0x23 (#), or 0x2c (,).<br>The ID is output to the PRF trace file. Note that a maximum of 32 characters can be output to the PRF trace file. The 33rd and subsequent characters will be omitted, and an asterisk (*) will be output as the 33rd character.<br>If a subclass exists in the class for which the method to be traced is defined and the method to be traced is not overridden in the subclass, the ID specified for the method to be traced in the superclass is output. |

| Items to be specified | Description |
|---|---|
| *subclass_flag* | Specify `true` or `false` to indicate whether the methods of the classes that have an inheritance relationship with the classes or interfaces of the specified method are to be included as trace targets.<br>• If you specify `true`, the specified method and the methods overriding the specified method will be traced.<br>• If you specify `false`, only the specified method will be traced, and the methods overriding the specified method will not be traced. |
| *event_ID* | Specify the point for which trace information is to be collected (trace collection point) by using a hexadecimal value from 0xae02 to 0xae7e, or from 0xc000 to 0xcffe. The default value is 0xae00.<br>This value is output in the trace information that is output at the method entry. The value that is added 1 to this value is output in the trace information that is output at the method exit. |
| *comment* | A comment begins with a number sign (#). The character string from the number sign (#) to the end of the line is regarded as a comment. |

The specification rules for the performance-based trace analysis configuration file are as follows:

- You can specify only single-byte characters.
- Single-byte space characters (0x20) and tab characters (`\t` or 0x09) will be treated as space characters. Note that space characters are ignored when the performance-based trace analysis configuration file is read.
- Specify one trace target method per line.
- You can specify a maximum of 2,048 characters in one line. This character count includes space characters and comments.
- The end of the line is indicated by one or more consecutive linefeed characters (`\n` or 0x0A) or carriage return characters (`\r` or 0x0D).
- If the specification in the performance-based trace analysis configuration file is incorrect, a message indicating the error details is output. In addition, if an invalid value is specified for an item, a message indicating the error details is output, and the specification in that line is not applied.

  The following table lists the logs that are output when the performance-based trace analysis configuration file is read during performance-based trace analysis:

| Format of output | Output content | Description |
|---|---|---|
| `[UPR`[#1]`]<`*DATE*`>Setting file not found.<file=`*FILEPATH*`>` | • *DATE*[#2]<br>Date and time when an attempt to read the performance-based trace analysis configuration file failed.<br>• *FILEPATH*<br>Absolute path of the performance-based trace analysis configuration file that could not be read. | The default performance-based trace analysis configuration file or the file specified in the `jvm.userprf.File` property does not exist. |
| `[UPR`[#1]`]<`*DATE*`>Failed to open setting file.<file=`*FILEPATH*`>` | • *DATE*[#2]<br>Date and time when an attempt to read the performance-based trace analysis configuration file failed.<br>• *FILEPATH*<br>Absolute path of the performance-based trace analysis configuration file that could not be read. | The performance-based trace analysis configuration file could not be opened or read. |
| `[UPR`[#1]`]<`*DATE*`>Failed to parse setting file.<file=`*FILEPATH*`><line=`*LINE*`>` | • *DATE*[#2]<br>Date and time when an error was detected in the performance-based trace analysis configuration file. | There is a specification format error in the performance-based trace analysis configuration file. |

| Format of output | Output content | Description |
|---|---|---|
| | • *FILEPATH*<br>Absolute path of the performance-based trace analysis configuration file.<br>• *LINE*<br>Number of the line in the absolute path of the performance-based trace analysis configuration file. | |
| [UPR[#1]]<*DATE*>Event ID is invalid value.<file=*FILEPATH*><eventID=*EventID*> | • *DATE*[#2]<br>Date and time when an error was detected in the performance-based trace analysis configuration file.<br>• *FILEPATH*<br>Absolute path of the performance-based trace analysis configuration file.<br>• *EventID*<br>Event ID specified in the performance-based trace analysis configuration file. | The event ID of the performance-based trace analysis configuration file is outside the range of valid values. |
| [UPR[#1]]<*DATE*>No valid settings in setting file.<file=*FILEPATH*> | • *DATE*[#2]<br>Date and time when it was detected that the performance-based trace analysis configuration file contained no valid settings.<br>• *FILEPATH*<br>Absolute path of the performance-based trace analysis configuration file. | The settings in the performance-based trace analysis configuration file are invalid. |
| [UPR[#1]]<*DATE*>User Extended PRF started successfully.<file=*FILEPATH*> | • *DATE*[#2]<br>Date and time when the performance-based trace analysis configuration file was successfully read.<br>• *FILEPATH*<br>Absolute path of the performance-based trace analysis configuration file that was successfully read. | The performance-based trace analysis configuration file was read normally and performance-based trace analysis is now enabled. |

#1:

This is an identifier indicating that the log was output by the performance-based trace analysis function.

#2:

This is output in the same format as the extended verbosegc information.

- You cannot specify classes in Java VM and Application Server as the methods to be traced by the performance-based trace analysis function. The following packages are applicable:
  - Classes under java
  - Classes under javax
  - Classes under com.hitachi
  - Classes under JP.co.Hitachi

  Thus, to specify a package name by using the `jvm.userprf.ExtendedSetting` property, specify the package name so that only application classes are included.
- You cannot specify the following methods as the trace target methods:
  - Names of non-existent packages, classes, or methods
  - native method

- abstract method
- Classes in Java VM and the methods of those classes

  Example: Classes of packages beginning with `java` or `javax`
- Classes specified in `-Xbootclasspath` and the methods of those classes
- Classes in products

- If you specify the methods in the way as follows, the methods can be specified as trace target methods.
  - To specify a constructor, specify the same value for the method name and for the class name. Alternatively, specify <init>.

    Example: Specifying the constructor of the MyMain class

    MyMain.MyMain() or MyMain.<init>()
  - If a method that has the same name as a non-constructor class name is specified, it cannot be determined whether the specified name is that of a constructor or a method. As a result, both the constructor and the method will be traced.
  - To specify a method that has arguments of variable length, specify such arguments as an array.

    Example: Specifying a method with arguments of variable length

    Correct specification: com.sample.Test.method(java.lang.String[])

    Incorrect specification: com.sample.Test.method(java.lang.String...)
  - To specify a nested class, delimit the class name by using a dollar sign (`$`) instead of a dot (`.`).

    Example: Specifying a nested class

    Correct specification: com.sample.Test$NestClass

    Incorrect specification: com.sample.Test.NestClass
  - You can specify a non-generics and non-parameter classes (raw type).

    Example: Specification of a non-generics class

    Correct specification: com.sample.Test.method()

    Incorrect specification: com.sample.Test<java.lang.String,java.lang.Object>.method()
- The methods that are set as the trace target methods vary depending on whether a class name or an interface name is specified for the value of *class_name* in *specification_format*.

  The following table describes the trace target methods that are set depending on whether a class name or an interface name is specified:

| Class or interface | Trace target methods | |
|---|---|---|
| | **When `false` is specified for the subclass flag** | **When `true` is specified for the subclass flag** |
| Class | Methods of the specified class | Methods of the specified class and the methods overriding those methods |
| Interface | None | Methods of the classes that directly#1 or indirectly#2 implement the specified interface, and the methods overriding those methods |

#1:

This refers to classes that implement the specified interface by using `implements` in the class declaration.

#2:

This refers to subclasses of a class that directly implements the specified interface and to classes that directly implement an interface that inherits the specified interface.

The following is an example of the specification format of the performance-based trace analysis configuration file:

```
com.sample.Test.method(),TEST1,false,0xae02,A
com.sample.Test.method(),TEST1,false,0xae02
com.sample.Test.method(),TEST1,false,0xae02,
com.sample.Test.method(),TEST1,false,,A
com.sample.Test.method(),TEST1,false
com.sample.Test.method(),TEST1,false,
com.sample.Test.method(),TEST1,false,,
```

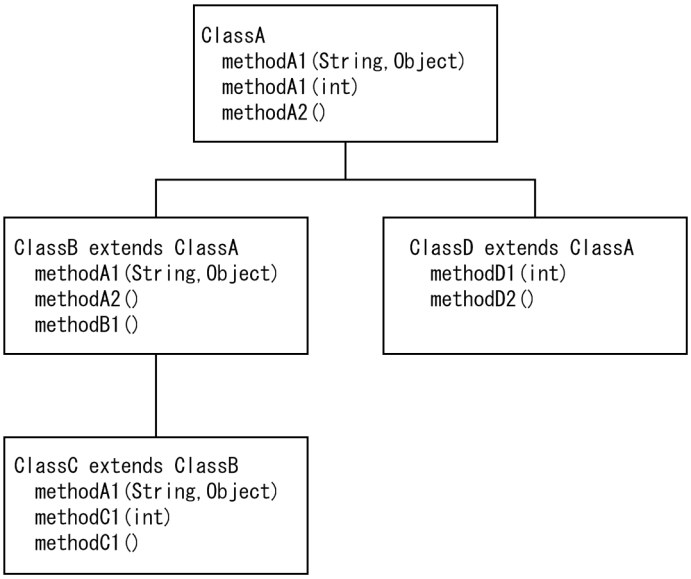
## Storage location

*installation_directory_for_JDK*/usrconf/userprf.cfg

## Examples

Note that this specification example is for an application whose package name is "com.sample" and whose class structure is as shown in the following figure:

Figure 8-3: Example of the class structure of an application




The following is a specification example of a performance-based trace analysis configuration file that sets the methods whose method name and argument type match, as the trace target methods.

If the subclass flag is `false`:

```
com.sample.ClassA.methodA1(java.lang.String,java.lang.Object),1000,false
```

If the subclass flag is `false`, the method whose name and argument type match the specified method is set as the trace target method.

The following method is to be traced:

- methodA1(String,Object) of ClassA

No event ID is set for the trace target methods. As a result, when you invoke a trace target method, the default value 0xae00 is output as the event ID at the method entry, and 0xae01 is output at the method exit. In addition, 1000 is set for the ID, and thus 1000 is output as the ID.

If the subclass flag is `true`:

```
com.sample.ClassA.methodA2(),2000,true
```

If the subclass flag is `true`, in addition to the method whose name and argument type match the specified method, the methods overriding the specified method are set as the trace target methods.

The following methods are to be traced:

- methodA2() of ClassA
- methodA2() of ClassB that overrides methodA2() of ClassA

No event ID is set for the trace target methods. As a result, when you invoke a trace target method, the default value 0xae00 is output as the event ID at the method entry, and 0xae01 is output at the method exit. In addition, 2000 is set for the ID, and thus 2000 is output as the ID for all methods to be traced.

The following is a specification example of a performance-based trace analysis configuration file that sets the methods whose name matches the specified method, as the trace target methods.

If the subclass flag is `false`:

```
com.sample.ClassA.methodA1(*),methodA1,false,0xae30
```

If the subclass flag is `false`, all methods whose name matches the specified method are set as the trace target methods.

The following methods are to be traced:

- methodA1(String,Object) of ClassA
- methodA1(int) of ClassA

When you invoke a trace target method, 0xae30 is output as the event ID at the method entry, and 0xae31 is output at the method exit. In addition, methodA1 is output as the ID for all methods to be traced.

If the subclass flag is `true`:

```
com.sample.ClassA.methodA1(*),methodA1,true,0xae30
```

If the subclass flag is `true`, all methods whose name matches the specified method are set as the trace target methods. In addition to the specified method, the methods overriding the specified method are also traced.

The following methods are to be traced:

- methodA1(String,Object) and methodA1(int) of ClassA
- methodA1(String,Object) of ClassB that overrides methodA1(String,Object) of ClassA
- methodA1(String,Object) of ClassC that overrides methodA1(String,Object) of ClassB

When you invoke a trace target method, 0xae30 is output as the event ID at the method entry, and 0xae31 is output at the method exit. In addition, methodA1 is output as the ID for all methods to be traced.

The following is a specification example of a performance-based trace analysis configuration file that sets all methods whose class name matches the specified class as the trace target methods, when no method or argument is specified.

If the subclass flag is `false`:

```
com.sample.ClassA,TEST01,false
```

If the subclass flag is `false`, all methods of the specified class name (ClassA class) are set as the trace target methods.

The following methods are to be traced:

- methodA1(String,Object), methodA1(int), and methodA2() of ClassA

No event ID is set for the trace target methods. As a result, when you invoke a trace target method, when you invoke a trace target method, 0xae00 is output at the method entry and 0xae01 is output at the method exit. In addition, TEST01 is output as the ID for all methods to be traced.

If the subclass flag is `true`:

```
com.sample.ClassB,TEST02,true
```

If the subclass flag is `true`, all methods of the specified class name (ClassB class) and all methods overriding those methods are set as the trace target methods.

The following methods are to be traced:

- methodA1(String,Object) of ClassB
- methodA2() of ClassB
- methodB1() of ClassB
- methodA1(String,Object) of ClassC that overrides methodA1(String,Object) of ClassB

No event ID is set for the trace target methods. As a result, when you invoke a trace target method, when you invoke a trace target method, 0xae00 is output at the method entry and 0xae01 is output at the method exit. In addition, TEST02 is output as the ID for all methods to be traced.

The following is a specification example of a performance-based trace analysis configuration file that sets all methods of all classes whose package name matches the specified package as the trace target methods, when no class name, method name, or argument is specified.

**Important note**

This specification also sets subpackages as trace targets. When a subpackage is set as a trace target, the trace is output when the trace target method is invoked.

If the com.sample package has a subpackage, all methods of all classes of that subpackage are also set as trace targets.

If the subclass flag is `false`:

```
com.sample.*,6000,false
```

If the subclass flag is `false`, all methods of all classes in the specified package (com.sample) are set as the trace target methods.

The following methods are to be traced:

- All methods of ClassA, ClassB, ClassC, and ClassD

No event ID is set for the trace target methods. As a result, when you invoke a trace target method, when you invoke a trace target method, 0xae00 is output at the method entry and 0xae01 is output at the method exit. In addition, 6000 is output as the ID for all methods to be traced.

If the subclass flag is `true`:

```
com.sample.*,6000,true
```

If the subclass flag is `true`, all methods of all classes in the specified package (com.sample) and all methods overriding those methods are set as the trace target methods.

The following methods are to be traced:

- All methods of ClassA, ClassB, ClassC, and ClassD, and all methods overriding those methods

No event ID is set for the trace target methods. As a result, when you invoke a trace target method, when you invoke a trace target method, 0xae00 is output at the method entry and 0xae01 is output at the method exit. In addition, 6000 is output as the ID for all methods to be traced.

## Notes

- In the performance-based trace analysis configuration file, if you specify different IDs or event IDs for the same trace target method on multiple lines, the settings specified first will have priority.
- If you specify settings for multiple trace target methods in the performance-based trace analysis configuration file, all methods will be output with the same ID or event ID. In such cases, if the output method names exceed the maximum number of characters that can be output, you might not be able to distinguish the methods. For this reason, specify the settings in the way that each method can be identified.
- To set an interface as a trace target, specify `true` for the subclass flag. If you specify `false` for the subclass flag, trace information will not be output, because methods to be traced do not exist in interfaces.
- Set multiple methods as targets of the performance-based trace analysis function only when you want to understand the behavior of applications. In the performance-based trace analysis configuration file, if `true` is specified for the subclass flag or the methods whose name matches the specified method are set as the trace target methods, many methods might be incorrectly set as the targets of the performance-based trace analysis function, and identifying the cause of performance deterioration might become difficult. For the purposes of identifying the cause of performance deterioration, we recommend that you limit the targets of the performance-based trace analysis function by specifying `false` for the subclass flag in the performance-based trace analysis configuration file, by setting the methods whose method name and argument type match the specified values as the trace target methods, or by other means.

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