

**MasterScope Service  
Governor3.26.0  
Installation Guide  
(Linux)**

---

# Disclaimer

The copyrighted information noted in this document shall belong to NEC Corporation.

Copying or revising this document, in whole or in part, is strictly prohibited without the permission of NEC Corporation.

This document may be changed without prior notice.

NEC Corporation shall not be liable for any technical or editing errors or omissions in this document.

NEC Corporation shall not be liable for the accuracy, usability, or certainty of information noted in this document.

# Trademarks

- Adobe, the Adobe logo, and Acrobat are trademarks or registered trademarks of Adobe Systems Incorporated in the United States of America and other countries.
- Microsoft and Windows are registered trademarks of Microsoft Corporation in the United States of America and other countries.
- Other Microsoft products mentioned in this guide are also registered trademarks of Microsoft Corporation in the United States of America and other countries.
- Intel and Itanium are trademarks or registered trademarks of Intel Corporation in the United States of America and other countries.
- Introscope is a registered trademark of CA Technologies.
- UNIX is a registered trademark of the Open Group in the United States of America and other countries.
- HP-UX and PA-RISC are registered trademarks of Hewlett-Packard Company in the United States of America and other countries.
- Other Hewlett-Packard Company products mentioned in this guide are registered trademarks of Hewlett-Packard Company in the United States of America and other countries.
- Oracle, Exadata, and Solaris are registered trademarks of Oracle Corporation and its subsidiaries and affiliates in the United States of America and other countries.
- Linux is a trademark or registered trademark of Linus Torvalds in the United States of America and other countries.
- Red Hat is a trademark or registered trademark of Red Hat, Inc. in the United States and other countries.
- SUSE is a registered trademark of Novell, Inc. in Japan.
- AIX is a registered trademark of the International Business Machines Corp. in the United States of America.
- PATLITE are registered trademarks of PATLITE Corporation.

All the other system names, company names, and product names in this document are trademarks or registered trademarks of their respective companies.

Note that the ® or ™ mark are not indicated in this document.

---

## Notes on exporting this product

This product (including software) may be applicable to the controlled cargo (or services) regulated by the Foreign Exchange and Foreign Trade Law. To export the product to outside of Japan, an export permit from the Japanese government is required. When information materials, etc. are required for the export permit application process, contact your distributor or the nearest sales office.

---

# Preface

## Notation Rules of This Document

This document describes the precautions and related information as follows:

### Note

---

A functional, operational, or configurational notice, warning, or complement is described.

---

### Tip

---

Indicates the location of additional information or reference destination information

---

### Notation list

The following notation rules are applied in this document.

Notation	How to use	Example
[ ] square brackets	Placed before and after an item (such as a text box, check box, or tab) on the screen	Enter the machine name in the [Machine Name] text box. The [All] check box
"" double quotes	Placed before and after a screen name (such as a dialog box window), or the name of a manual other than this one.	<i>"Setting" window</i> <i>"Installation Guide"</i>
[ ] square brackets in the command line	Indicates that the specification of the value in [ ] can be omitted.	add [/a] Gr1
Monospace font	Output from the command-line system (such as a message prompt)	Execute the following command: <code>replace Gr1</code>
Italicized monospace font	An item that should be replaced by users with a valid value  If the value contains a space, surround it with " " (double quotes).	add <i>GroupName</i> <code>InstallPath= "Install Path"</code>
Json example	Json examples are shown with breaks and indents added in order to improve the readability.	<pre>{   "ID": [     "45ed3512"   ],   "Manager": {     "ErrorMessage": "",     "Name": "localhost",     "Status": 200,     "StatusCode": 200   } }</pre>

## Glossary

This document uses the terms below.

---

---

Term	Description
Service Governor	Name of this product Official name is MasterScope Service Governor
Installation directory	Refers to the destination to which MasterScope Service Governor is installed. The default value is /opt/UMF/Operations
Tomcat installation directory	Refers to the destination (included in the ServiceGovernor WebAPI Base Option package) to which Tomcat is installed. The default value is C:\Program Files (x86)\NEC\UMF\Operations\Tomcat
Manager	A server that runs the services of "MasterScope UMF Operations Manager_n".
EXPRESSCLUSTER X	An NEC product that can be used to switch running processes between nodes in a duplicated system. In this document, a host system included in a cluster is referred to as a node.

---

# Contents

<b>Chapter 1. Operating Environments/System Requirements .....</b>	<b>1</b>
1.1 System Requirements.....	2
1.1.1 Hardware Requirements.....	2
1.1.2 Software Requirements.....	2
1.1.2.1 List of Supported Platforms.....	2
1.1.2.2 Bundled Applications.....	2
<b>Chapter 2. Installing ServiceGovernor .....</b>	<b>3</b>
2.1 Installing ServiceGovernor.....	4
2.1.1 Installing ServiceGovernor from the Installer.....	4
<b>Chapter 3. Setting Up ServiceGovernor .....</b>	<b>10</b>
3.1 API Authentication Key.....	11
3.2 Setting up SSL/TLS for the manager.....	13
3.2.1 Setting a Manager.....	13
3.2.2 Setting Up ServiceGovernor.....	14
3.3 Settings for Adding a Manager.....	14
3.3.1 Preparation.....	14
3.3.2 Setting Up the ServiceGovernor Property File.....	15
3.4 Settings for Deleting a Manager.....	17
3.4.1 Settings for Deleting a Manager.....	17
3.5 Setting up SSL/TLS for Tomcat.....	18
3.5.1 Importing the Certificate.....	19
3.5.2 Modifying the Tomcat Settings.....	19
3.5.3 Changing env.sh.....	20
3.5.4 Restarting the Service.....	20
3.6 After the Tomcat Settings Are Monitored.....	21
3.7 About the Port Numbers Used.....	22
3.8 Verifying Operation of ServiceGovernor.....	22
3.8.1 Enabling/Disabling the API Verification Screen.....	22
3.8.2 Operation Verification.....	23
<b>Chapter 4. Constructing a ServiceGovernor Cluster .....</b>	<b>24</b>
4.1 Preface.....	25
4.1.1 Supplemental Information.....	25
4.1.2 Target Products.....	25
4.2 Creating a New Failover Group.....	25
4.3 Setting Up Shared Resources (Floating IP).....	26
4.4 Setting Up ServiceGovernor.....	27
4.4.1 [Active] Installing ServiceGovernor.....	28
4.4.2 [Active] Setting Up ServiceGovernor.....	28
4.4.3 [Active] Setting Up the Tomcat Service.....	28

---

4.4.4	Moving to the Standby System.....	28
4.4.5	[Standby] Installing ServiceGovernor .....	28
4.4.6	[Standby] Setting Up ServiceGovernor .....	28
4.4.7	[Standby] Setting Up the Tomcat Service.....	29
4.4.8	Moving to the Active System .....	29
4.5	Editing the Startup/Stop Script.....	29
4.6	Setting the Shared Resources (Process Name Monitor Resources).....	33
<b>Chapter 5.</b>	<b>Uninstalling ServiceGovernor .....</b>	<b>35</b>
5.1	Uninstalling ServiceGovernor.....	36
5.1.1	Uninstalling ServiceGovernor from the installer.....	36
<b>Chapter 6.</b>	<b>Upgrading.....</b>	<b>39</b>
6.1	Upgrading ServiceGovernor.....	40
6.1.1	Upgrading ServiceGovernor from the Installer.....	40
6.1.2	Reversion after Upgrade of ServiceGovernor.....	44
6.2	Upgrading the Application Server.....	45
6.2.1	Upgrading the application server from the installer.....	46
6.2.2	Reversion after Upgrade of the Application Server.....	50
<b>Chapter 7.</b>	<b>Backing Up the Files.....</b>	<b>52</b>
<b>Chapter 8.</b>	<b>Restoring the Backed Up Files.....</b>	<b>53</b>
<b>Chapter 9.</b>	<b>Precautions .....</b>	<b>54</b>
9.1	Precautions on Products .....	55
9.2	Precautions on Operation .....	55
9.2.1	About Bloating of Tomcat Log.....	55
9.2.2	Starting ServiceGovernor as a User with Non-Root Privileges.....	62
9.2.3	About Tomcat Shutdown Port .....	63
<b>Chapter 10.</b>	<b>Appendix.....</b>	<b>64</b>
10.1	About the Certificate for SSL/TLS Setting.....	65
10.1.1	Status Certificate Created Using a Public Certificate Authority.....	65
10.1.2	Self-Issued, Self-Signed Certificate.....	66
10.2	Upgrading Java used by ServiceGovernor.....	67
10.3	Upgrading Tomcat used by ServiceGovernor.....	68
10.4	Recovering an Application Server.....	69
<b>Chapter 11.</b>	<b>Open Source Software License .....</b>	<b>72</b>
11.1	About commons-codec-1.7.....	73
11.2	About commons-logging-1.1.1 .....	77
11.3	About log4j-1.2.14 .....	81
11.4	About jackson-all-1.8.5 .....	85
11.5	About Apache Tomcat 8.5.....	89

---



# Chapter 1.

# Operating Environments/System Requirements

---

## Contents

1.1 System Requirements.....	2
------------------------------	---

---

This section describes the operating environment.

## 1.1 System Requirements

### 1.1.1 Hardware Requirements

Type	Hardware Requirements
CPU	At least Intel Compatible 2GHz 4 Core
Memory capacity	At least 4GB
Disk capacity	At least 4GB

### 1.1.2 Software Requirements

#### 1.1.2.1 List of Supported Platforms

This package runs on the following software:

OS
Red Hat Enterprise Linux 5.6 to 5.11 (x86, x64)
Red Hat Enterprise Linux 6.1 to 6.9 (x86, x64)
Red Hat Enterprise Linux 7 to 7.4 (x64)
Oracle Linux 6.2, 6.4 (UEK) (x86, x64)

#### 1.1.2.2 Bundled Applications

This product is bundled with the applications shown below.

Application	Supported version
Java	Java Runtime Environment 1.8.0_162
Tomcat	Apache Tomcat Version 8.5.24

#### **Caution**

For the verified latest versions, contact the NEC Customer Support Center.

# Chapter 2. Installing ServiceGovernor

---

## Contents

2.1 Installing ServiceGovernor.....	4
-------------------------------------	---

---

**⚠ Caution**

When constructing a cluster environment, refer to "[Chapter 4. Constructing a ServiceGovernor Cluster \(page 24\)](#)" before performing this procedure.

## 2.1 Installing ServiceGovernor

The following and subsequent pages describe the procedure for installing ServiceGovernor.

### 2.1.1 Installing ServiceGovernor from the Installer

1. Log in to the system with the root account.
2. Insert the installation DVD into the DVD drive.
3. Mount the DVD.  
In this example, the mount point is "/mnt/dvd".
4. Change the current directory.

```
# cd /mnt/dvd/Linux
```

5. Execute Setup.

```
# ./Setup
```

6. The installer starts up and the following screen is displayed.

**⚠ Caution**

If the installation dialog box is not displayed stably, set the environment variable TERM to vt100 and restart the installer. Increase the display size of the terminal, as necessary.

```
*****
Welcome to MasterScope Media !!
*****

This program will install/uninstall products.

1. Install

Please select the operation.
(1:install q:quit program):
```

```
Enter 1[Enter].
```

```
(1:install 2:uninstall q:quit program): 1
```

7. A list of components that can be installed is displayed.

```
-----
Products
-----
```

```

|16 [ ] MasterScope NetvisorPro V MessageConsole Linker Manager 3.0.0.
4 |
|17 [ ] MasterScope Invariant Analyzer RelayManager 1.6.0.4
|
|18 [ ] MasterScope Invariant Analyzer Manager 1.6.0.4
|
|19 [ ] MasterScope Framework Agent 3.24.0.0
|
|20 [ ] MasterScope Framework Manager 3.24.0.0
|
|21 [ ] Application Server Any 8.5.24.0
|
|22 [ ] MasterScope Service Governor Any 3.26.0.0
|
|_____
|_____
|_____

```

-----

Please select product(s) by entering numbers separated by commas.  
[Example: 1, 3, 4]  
(b:back q:quit program):

Select Application Server and MasterScope Service Governor as follows.  
The component list can be scrolled up and down using the Up (↑) and Down (↓) keys.  
(b:back q:quit program):21, 22

### **Caution**

The value displayed for each component may vary depending on the media used.

- The confirmation screen of the components to be installed is displayed.

```

-----
Confirmation
-----

```

```

|16 [ ] MasterScope NetvisorPro V MessageConsole Linker Manager 3.0.0.
4 |
|17 [ ] MasterScope Invariant Analyzer RelayManager 1.6.0.4
|
|18 [ ] MasterScope Invariant Analyzer Manager 1.6.0.4
|
|19 [ ] MasterScope Framework Agent 3.24.0.0
|
|20 [ ] MasterScope Framework Manager 3.24.0.0
|
|21 [*] Application Server Any 8.5.24.0
|
|22 [*] MasterScope Service Governor Any 3.26.0.0

```



**⚠ Caution**

The value displayed for each component may vary depending on the media used and the installation status of other components.

10. You are asked to enter for each setting item. Perform the following settings.

The details of parameters are as follows.

Field name	Setting value
Install directory path	Specify the installation destination folder. The default value is defined in " <a href="#">Glossary (page iii)</a> ". Specify the folder path, by using up to 128 characters.
Application Server	Specify "2". If 2 is specified, Tomcat will be installed.
HTTP port	Specify the HTTP port number of ServiceGovernor . The default value is "12080".
HTTPS port	Specify the HTTPS port number of ServiceGovernor . The default value is "12443".
Tomcat management port	Specify the Tomcat management port number. The default value is "12005".
Tomcat APJ/1.3 port	Specify the Tomcat AJP/1.3 port number. The default value is "12009".

**⚠ Caution**

For the port number, specify a number that differs from those of the other products.  
Otherwise, the Tomcat service cannot be started up.

**⚠ Caution**

The following characters cannot be used for an installation destination folder.  
 \ / : \* ? " > < | ; ' &

11. When all the setting items have been input, the settings are displayed.

```

-----
Confirmation
-----
Install directory path: /opt/UMF/Operations
Application Server: Tomcat
HTTP port: 12080
HTTPS port: 12443
Tomcat management port: 12005
Tomcat APJ/1.3 port: 12009

```



```
2)
MasterScope Service Governor Any 3.26.0.0 was successfully installed (
2/2)

-----
Installation result
-----
1 Application Server Any 8.5.24.0 (Success)
2 MasterScope Service Governor Any 3.26.0.0 (Success)
-----
Success:2, Failure:0
```

---

** Caution**

When an installation error occurs, "Installation of <Product Name> was failure. [Error Number]" is displayed in a message during installation. Check that this message is not displayed.

---

# Chapter 3. Setting Up ServiceGovernor

---

## Contents

3.1 API Authentication Key .....	11
3.2 Setting up SSL/TLS for the manager.....	13
3.3 Settings for Adding a Manager.....	14
3.4 Settings for Deleting a Manager .....	17
3.5 Setting up SSL/TLS for Tomcat .....	18
3.6 After the Tomcat Settings Are Monitored.....	21
3.7 About the Port Numbers Used.....	22
3.8 Verifying Operation of ServiceGovernor .....	22

---

## 3.1 API Authentication Key

Create the authentication key for ServiceGovernor

1. Log into the manager under the root privileges.
2. Open the Tools folder within the installation destination folder of the manager component.
3. Perform the following WebApiTool.sh command to create the access key.

```
> cd <Installation directory>/Tools
> ./WebApiTool.sh createkey <UserName> -description "<Description>"
```

\* Specify any value for <UserName> and <Description>.

### Caution

- An ASCII character or numeric value can be specified for <UserName>.
- The character string specified for <UserName> will be displayed as the user name of the [Audit Log] view on the manager's monitoring terminal.

Confirm that the following is displayed as a standard output.

```
NORMAL END.

command exit code:0
COMMAND SUCCEEDED.
```

4. Confirm the created access key.

Perform the following command to display the created access key.

```
> cd <Installation directory>/Tools
> ./WebApiTool.sh showkey <UserName>
```

Confirm that the following is displayed in a standard output.

```
-----
UserName : <UserName>
Description : <Description>
AccessKeyId : /TZfHsSFsdfsL3ghfE9hKyRYLW2ufSbcnYWf1m4RBVrw=
SecretAccessKey : rSQ2z2Yn/OgSHhL3R7j6IWuiErtM11CBMJQWtWpE5rXuU=
-----

NORMAL END.

command exit code:0
COMMAND SUCCEEDED.
```

5. Specify the displayed AccessKeyId and SecretAccessKey as the portal products.

Write down the values of the authentication access key (AccessKeyId) and authentication secret key (SecretAccessKey) and specify them to the portal products.

To use WebAPI of ServiceGovernor , it is necessary to include the assigned access key in the Http request header required to use WebAPI.

6. When the portal products use WebAPI, create the Http request header as follows.

Use the following Http request header for authentication.

HTTP header	Description
Date	Specifies in the WebAPI request date (RFC1123 format).
Authorization	Specifies the created access key and signature described later. Specify "SharedKeyLite" as the authentication method.

Use the following algorithm to create the Authorization header.

- Read the access key generated with the WebApiTool.sh command on the manager.

```
AccessKeyId : /TZfHsSFsdfsL3ghfE9hKyRYLW2ufSbcnYWf1m4RBVrw=
SecretAccessKey : rSQ2z2Yn/OgSHhL3R7j6IWuiErtM11CBMJQWtWpE5rXuU=
```

- Determine the request date.

```
Date = "Wed, 19 Dec 2012 08:01:10 GMT"
```

- Acquire the WebAPI path with the query character string ("?" or after) excluded.

```
CanonicalizedResource = "/umf/categories"
```

### Caution

If you need URLEncode, generate the target character string using the WebAPI path that results after encoding.

- Concatenate the request date and path by using a line feed character (CRLF) and create the character strings to be authenticated.

```
CRLF = "¥x0D¥x0A"
StringToSign = Date + CRLF + CanonicalizedResource
```

- Create the HMAC (SHA256) from the character strings to be authenticated and SecretAccessKey and encode it in Base64.

```
Signature = Base64(HmacSHA256(SecretAccessKey, StringToSign))
#=> "dSvqioC9hIUjnnDk7dhHcQ6oRCxJN1hc0Wdev393ZYc="
```

- Create the HTTP request header.

Example of Http request header:

```
Date: Wed, 19 Dec 2012 08:01:10 GMT
Authorization: SharedKeyLite /TZfHsSFsdfsL3ghfE9hKyRYLW2ufSbcnYWf1
m4RBVrw=:dSvqioC9hIUjnnDk7dhHcQ6oRCxJN1hc0Wdev393ZYc=
```

### Caution

This procedure is required to perform setup on the portal product that uses WebAPI of ServiceGovernor . If no signature is specified or the specified signature has a wrong value, WebAPI will fail to be executed.

7. To operate ServiceGovernor in a cluster configuration, copy the following files from the active server to the standby server.

```
<Installation directory>/Tomcat/vDCApiKey.jks
```

## 3.2 Setting up SSL/TLS for the manager

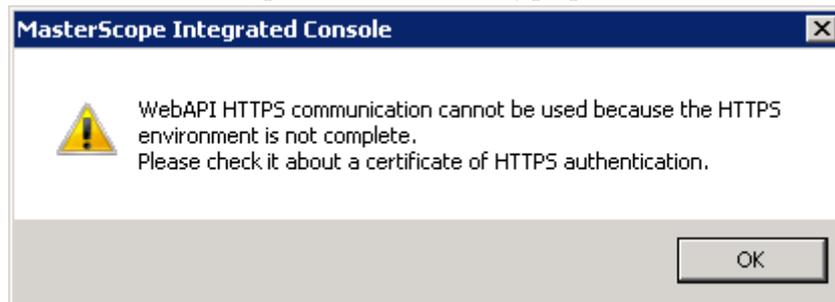
To connect ServiceGovernor and the manager via SSL/TLS, perform this procedure.

If an SSL/TLS connection is not used, this procedure is not necessary.

### 3.2.1 Setting a Manager

Check the [Use HTTPS cryptogram] box on the [Web Monitoring View] tab by referring to Setting up internal communication with ServiceGovernor.

If a warning as shown in the following figure was output during option setting or you want to modify the server certificate, perform the following preparation.



1. Stop the manager.
2. Check the file name settings of the server certificate and private key.  
If any of the files does not exist, create an empty file and add the setting.  
File name  
Windows:  
<installation destination folder>\Manager\sg\HttpServerMgr.ini  
  
Linux:  
<installation destination directory>/Manager/sg/HttpServerMgr.ini  
  
Contents specified

```
[ApiServer]
CertificateFile=server.crt
PrivateKeyFile=server.key
```

Parameter name	Description
CertificateFile	Specifies the server certificate file name. When the file name is omitted, server.crt is used as the default setting value.
PrivateKeyFile	Specify the private key file name. When the file name is omitted, server.key is used as the default setting value.

\* If you want to specify other parameters other than the default server certificate or private key, specify a file name that differs from the default file name.

3. Store the server certificate and private key to be used.  
Store in the following the server certificate and private key file names that have been set in "2. (page 13)".

Windows:

```
<installation destination folder>\Manager\sg\HttpServer\conf
```

Linux:

```
<installation destination directory>/Manager/sg/HttpServer/conf
```

4. Start the manager.

### Attention

- Only Windows or Linux manager supports the WebAPI function. No manager other than a Windows or Linux manager can use the WebAPI function.
- If you create a server certificate or private key, specify a file name that differs from the default file name.
- If you create a server certificate or private key, create the private key in RSA format without encryption or the server certificate in x509 format.

## 3.2.2 Setting Up ServiceGovernor

Change the {URL} protocol to https by reference to ["3.3.2 Setting Up the ServiceGovernor Property File \(page 15\)"](#).

### Caution

To operate ServiceGovernor in a cluster configuration, make a change on both the active and the standby servers.

## 3.3 Settings for Adding a Manager

The "manager" refers to a server that runs the service of "MasterScope UMF Operations Manager\_n".

When a manager having access to ServiceGovernor is added, perform the preparation using the following procedure and edit the ServiceGovernor configuration file.

### Caution

To operate ServiceGovernor in a cluster configuration, set the following ServiceGovernor settings on both the active and the standby servers.

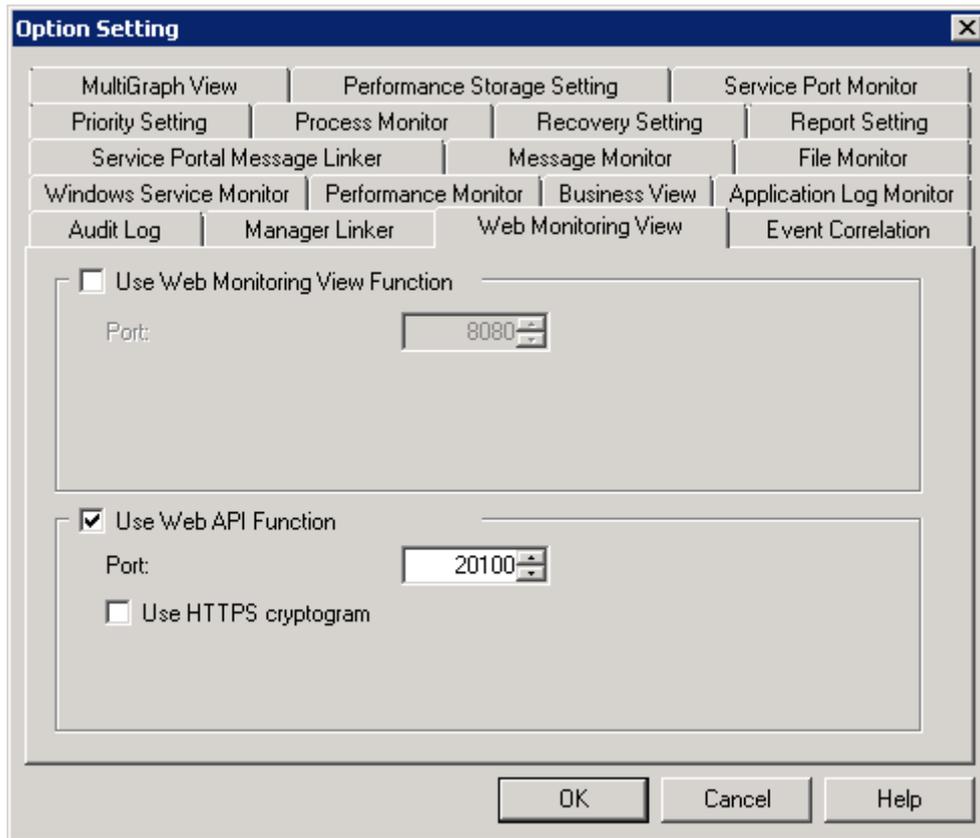
### 3.3.1 Preparation

1. Setting up internal communication with ServiceGovernor

Set up internal communication with ServiceGovernor for the manager.

For this setting, use the monitoring screen connected to the manager.

After changing to the definition mode, open the "Option Setting" screen by using [Option] in the [Setting] menu, and then select the [Web Monitoring View] tab.



Check the [Use Web API Function] box, and set [Port]. This port number will be used for the internal communication port specified in {URL} of "[3.3.2 Setting Up the ServiceGovernor Property File \(page 15\)](#)".

### 3.3.2 Setting Up the ServiceGovernor Property File

Set the properties for ServiceGovernor.

The configuration file of the properties is

Tomcat/conf/fwapi.properties in the installation folder.

A description of each parameter and a setting example are shown below.

#### ◆Parameter description

Parameter name	Description
fw.manager{n}.host	Specify the URL and port number of the manager. This parameter must be specified. In addition, name resolution must be possible with this parameter. The format of the parameter is as follows. fw.manager{n}.host={URL},{SelfHost},{Manager Type} The default value of port number is 20100.

#### ◆Format of the fw.manager{n}.host parameter

Enter a serial number starting with 1 in {n} of the fw.manager{n}.host key character string. When two managers are used, set the following.

```
fw.manager1.host={URL},{SelfHost},{Manager Type}
fw.manager2.host={URL},{SelfHost},{Manager Type}
```

Set the following elements to the setting values. Use a comma (,) as a separator.

Setting element	Setting value
{URL}	http://<manamer name>:<port number> In addition, name resolution must be possible with this parameter. The default value of port number is 20100.
{SelfHost}	Specify <manager name>. The manager name specified here must be the same as the HostName property in the [SelfNode] section set in the following file under the installation destination folder of the management server. In addition, name resolution must be possible with this parameter. Windows: <installation destination folder>\Manager\sg\SysMonMgr.ini  Linux: <installation destination directory>/Manager/sg/SysMonMgr.ini  [SelfNode] HostName=MOM01
{Manager Type}	If two or more managers are linked hierarchically, specify "MoM" for the entry of the high-level manager. Specify "RM" for the entry of the low-level manager. Omit this parameter unless two or more managers are linked.

#### ◆Setting example

Adding managers "mom03" and "mom04"

The following is a setting example where the original host name is registered for SysMonMgr.ini and the default value is set for a port number.

```
#fw.manager{n}.host={URL},{SelfHost},{Manager Type}
fw.manager1.host=http://mom03:20100,mom03
fw.manager2.host=http://mom04:20100,mom04
```

#### Caution

If you performed "3.2 Setting up SSL/TLS for the manager (page 13)", change protocol in {URL} to https.

On the machine on which ServiceGovernor has been installed, execute the following command to reflect the modified properties. After logging in with root rights, execute the following WebApiTool.sh command to reflect the changed properties.

```
> cd <Installation directory>/Tools
> ./WebApiTool.sh properties reload fwapi
```

Confirm that the following is displayed as a standard output.

```
Normal End. PropertyFile(fwapi.properties) was reload.
-----
HTTP STATUS: 200
SUCCEEDED.
```

```
command exit code:0
COMMAND SUCCEEDED.
```

### **Caution**

If [ ServiceGovernor –HTTP Port] was changed in the procedure for installing ServiceGovernor , the following error message is output.

```
Abort Connection Error :IO error has happened. http response cord can't be received.
```

The specified port number must be identical to the port number within <installation directory>/Tools/env.sh.  
If the value has been changed from the default value (12080), change the following parameters in the env.sh file.  
For the SSL/TLS port, change [MANAGER\_PROTOCOL] to [https].

Setting example

```
export MANAGER_PROTOCOL=https
export MANAGER_PORT=12443
```

Execute the following command to check the loaded property values.

```
> cd <Installation directory>/Tools
> ./WebApiTool.sh properties show fwapi
```

Confirm that the following is displayed as a standard output.

```
fw.manager1.host=http://mom03:20100,mom03
fw.manager2.host=http://mom04:20100,mom04
```

## 3.4 Settings for Deleting a Manager

When a manager having access to ServiceGovernor is deleted, perform the preparation using the following procedure and edit the ServiceGovernor WebAPI configuration file.

### **Caution**

To operate ServiceGovernor in a cluster configuration, perform the following procedure on both the active and the standby servers.

### 3.4.1 Settings for Deleting a Manager

From the following files, delete the "fw.manager1.host=..." line, which specifies the target server to be deleted.

Tomcat/conf/fwapi.properties

On the machine on which ServiceGovernor has been installed, execute the following command to reflect the modified properties. After logging in with root rights, execute the following WebApiTool.sh command to reflect the changed properties.

```
> cd <Installation directory>/Tools
> ./WebApiTool.sh properties reload fwapi
```

Confirm that the following is displayed as a standard output.

```
Normal End. PropertyFile(fwapi.properties) was reload.
```

```
-----
HTTP STATUS: 200
SUCCEEDED.
```

```
command exit code:0
COMMAND SUCCEEDED.
```

### Caution

If [ ServiceGovernor –HTTP Port] was changed in the procedure for installing ServiceGovernor , the following error message is output.

```
Abort Connection Error :IO error has happened. http response cord can't be received.
```

The specified port number must be identical to the port number within <installation directory>/Tools/env.sh.  
If the value has been changed from the default value (12080), change the following parameters in the env.sh file.

For the SSL/TLS port, change [MANAGER\_PROTOCOL] to [https].

Setting example

```
export MANAGER_PROTOCOL=https
export MANAGER_PORT=12443
```

Execute the following command to check the loaded property values.

```
> cd <Installation directory>/Tools
> ./WebApiTool.sh properties show fwapi
```

Confirm that the following is displayed as a standard output.

```
fw.manager1.host=http://mom03:20100,mom03
fw.manager2.host=http://mom04:20100,mom04
```

## 3.5 Setting up SSL/TLS for Tomcat

To use ServiceGovernor over an SSL/TLS connection, perform this procedure.

The SSL/TLS connection of ServiceGovernor is established between [Application Server] and [Client System].

If an SSL/TLS connection is not used, this procedure is not necessary.

**⚠ Caution**

To operate ServiceGovernor in a cluster configuration, perform the following procedure for both active and standby nodes.

**⚠ Caution**

This procedure assumes the use of Tomcat and Java bundled with ServiceGovernor.

### 3.5.1 Importing the Certificate

Before performing this procedure, prepare the server certificate and import it to the key store file.

For how to set the server certificate, see ["10.1 About the Certificate for SSL/TLS Setting \(page 65\)"](#).

**⚠ Caution**

When ServiceGovernor is upgraded, the installation folder is replaced by the new directory.

If <key store file name> is created under

<installation destination folder>/Tomcat, it is recommended that it be placed under

<installation destination folder>/Tomcat/conf.

### 3.5.2 Modifying the Tomcat Settings

Modify the following file with a text editor.

```
<Installation directory>/Tomcat/conf/server.xml
```

\* <Installation folder> is the destination in which ServiceGovernor is installed.

Change the settings as follows if they are currently set to the default values.

```
<!-- ←1.Delete
  <Connector port="12443" protocol="org.apache.coyote.http11.Http11NioProtocol"
    maxThreads="150" SSLEnabled="true">
    <SSLHostConfig>
      2.Update if necessary → <Certificate certificateKeystoreFile="<Keystore File Name>"
      2.Update→          certificateKeystorePassword="<Keystore Password
>"
                                type="RSA" />
    </SSLHostConfig>
  </Connector>
--> ←3.Delete
```

\* For <Keystore File Name> and <Keystore Password>, specify the <Keystore File Name> and <Keystore Password>, which you specified in ["3.5.1 Importing the Certificate \(page 19\)"](#).

Setting example (for Tomcat 8.5)

```
<Connector port="12443" protocol="org.apache.coyote.http11.Http11NioProtoco
l"
    maxThreads="150" SSLEnabled="true">
  <SSLHostConfig>
    Certificate certificateKeystoreFile="conf/localhost-rsa.jks"
    certificateKeystorePassword="changeit"
    type="RSA" />
  </SSLHostConfig>
</Connector>
```

### 3.5.3 Changing env.sh

When SSL/TLS for ServiceGovernor has been enabled, modify env.sh by referring to ["3.6 After the Tomcat Settings Are Monitored \(page 21\)"](#).

### 3.5.4 Restarting the Service

Use the following procedure to restart the ServiceGovernor service.

1. Stop the ServiceGovernor service.

For Red Hat Enterprise Linux Server release 6

```
/etc/init.d/ServiceGovernor stop
Shutting down ServiceGovernor
```

[ OK ]

For Red Hat Enterprise Linux Server release 7

```
systemctl stop ServiceGovernor
```

2. Check that the service has stopped normally.

For Red Hat Enterprise Linux Server release 6

```
/etc/init.d/ServiceGovernor status
ServiceGovernor is not running
```

```
Using CATALINA_BASE:   /opt/UMF/Operations/Tomcat
Using CATALINA_HOME:   /opt/UMF/Operations/Tomcat
Using CATALINA_TMPDIR: /opt/UMF/Operations/Tomcat/temp
Using JRE_HOME:        /opt/UMF/Operations/Tomcat/JDK/JavaHome/jre
Using CLASSPATH:       /opt/UMF/Operations/Tomcat/bin/bootstrap.jar:/o
pt/UMF/Operations/Tomcat/bin/tomcat-juli.jar
Server version: Apache Tomcat/8.5.24
Server built:   Mar 18 2016 20:31:49 UTC
Server number:  8.5.24.0
OS Name:        Linux
OS Version:     2.6.32-504.el6.x86_64
Architecture:  i386
JVM Version:    1.8.0_162
JVM Vendor:     Oracle Corporation
```

For Red Hat Enterprise Linux Server release 7

```
systemctl status ServiceGovernor
```

- ServiceGovernor.service - Startup script for the ServiceGovernor application server.

```
Loaded: loaded (/etc/systemd/system/ServiceGovernor.service; enable
d; vendor preset: disabled)
Active: inactive (dead)
:
:
```

Check that the message indicating that the service has stopped is displayed.

If it has not stopped, check the status again after a moment.

### 3. Start the ServiceGovernor service.

For Red Hat Enterprise Linux Server release 6

```
/etc/init.d/ServiceGovernor start
Starting ServiceGovernor
[ OK ]
```

For Red Hat Enterprise Linux Server release 7

```
systemctl start ServiceGovernor
```

## 3.6 After the Tomcat Settings Are Monitored

### Caution

To operate ServiceGovernor in a cluster configuration, perform the following procedure on both the active and the standby servers.

If any of the following Tomcat server.xml settings was modified manually, you also need to modify the environment configuration file for ServiceGovernor tools.

- Enable/disable SSL/TLS
- HTTP port number

Target file:

<installation destination folder>/Tools/env.sh

The specified port number must be identical to the port number within <installation directory>/Tools/env.sh.

If the value has been changed from the default value (12080), change the following parameters in the env.sh file.

For the SSL/TLS port, change [MANAGER\_PROTOCOL] to [https].

Setting example

```
export MANAGER_PROTOCOL=https
export MANAGER_PORT=12443
```

## 3.7 About the Port Numbers Used

ServiceGovernor uses the following network port numbers by default.

If a firewall such as Windows Firewall is enabled in the system environment, open the following port.

For functions that are not used, set so that they will be closed.

Component	Item	Program name	Protocol	Connection destination port number	Connection source target	Connection source port number	Whether the port number can be changed or not
Application Server	* Apache Tomcat	<installation directory>Tomcat/ JDK/ JavaHome/jre/bin/ java  (The path varies according to the OS environment.)	TCP	12080	RESTFul API client * If http communication is used * If SSL/TLS is used, close the port.	Automatic	Yes
			TCP	12443	RESTFul API client * If https communication is used	Automatic	Yes
			TCP	12005	Tomcat management port number * Close the port.	Automatic	Yes
			TCP	12009	Tomcat AJP/1.3 port number * Close the port.	Automatic	Yes

## 3.8 Verifying Operation of ServiceGovernor

Verify that the installation and setup of ServiceGovernor have been completed successfully.

### 3.8.1 Enabling/Disabling the API Verification Screen

Enable or disable the API verification screen.

Change the setting for `fw.restconsole.check.enable` in the following file

Tomcat/conf/fwapi.properties  
within the installation destination folder.

■When enabling:

Set `fw.restconsole.check.enable` to true.

Setting example:



# Chapter 4.

# Constructing a ServiceGovernor Cluster

---

## Contents

4.1 Preface .....	25
4.2 Creating a New Failover Group.....	25
4.3 Setting Up Shared Resources (Floating IP) .....	26
4.4 Setting Up ServiceGovernor.....	27
4.5 Editing the Startup/Stop Script.....	29
4.6 Setting the Shared Resources (Process Name Monitor Resources).....	33

---

These procedures are available to operate ServiceGovernor in a cluster environment.

These procedures are unnecessary if you want to operate ServiceGovernor in a single configuration.

The procedures in this chapter assume that those in the subsequent sections must be performed in the order as described.

[Active] and [Standby] represent the systems in which to perform the procedures described in this section.

---

**⚠ Caution**

If you operate ServiceGovernor in a cluster configuration, the configuration file of ServiceGovernor and the log output by ServiceGovernor are managed separately on the active and standby servers.

Note that, for this reason, if the configuration file of ServiceGovernor is modified or the log is viewed, you need to perform the same process on both the active and the standby servers.

---

## 4.1 Preface

This document provides an example procedure for using EXPRESSCLUSTER X to set up a cluster configuration that has two nodes (for duplication). EXPRESSCLUSTER X is an NEC product that can be used to switch running processes between nodes in a duplicated system.

In this document, a host system included in a cluster is referred to as a node.

### 4.1.1 Supplemental Information

If the incorrect procedure is used to upgrade the OS on a cluster server, failovers might occur at unexpected times.

In the worst case, this might damage the system.

Be sure to upgrade the OS in accordance with the procedure on the setup card.

### 4.1.2 Target Products

This document covers the following products.

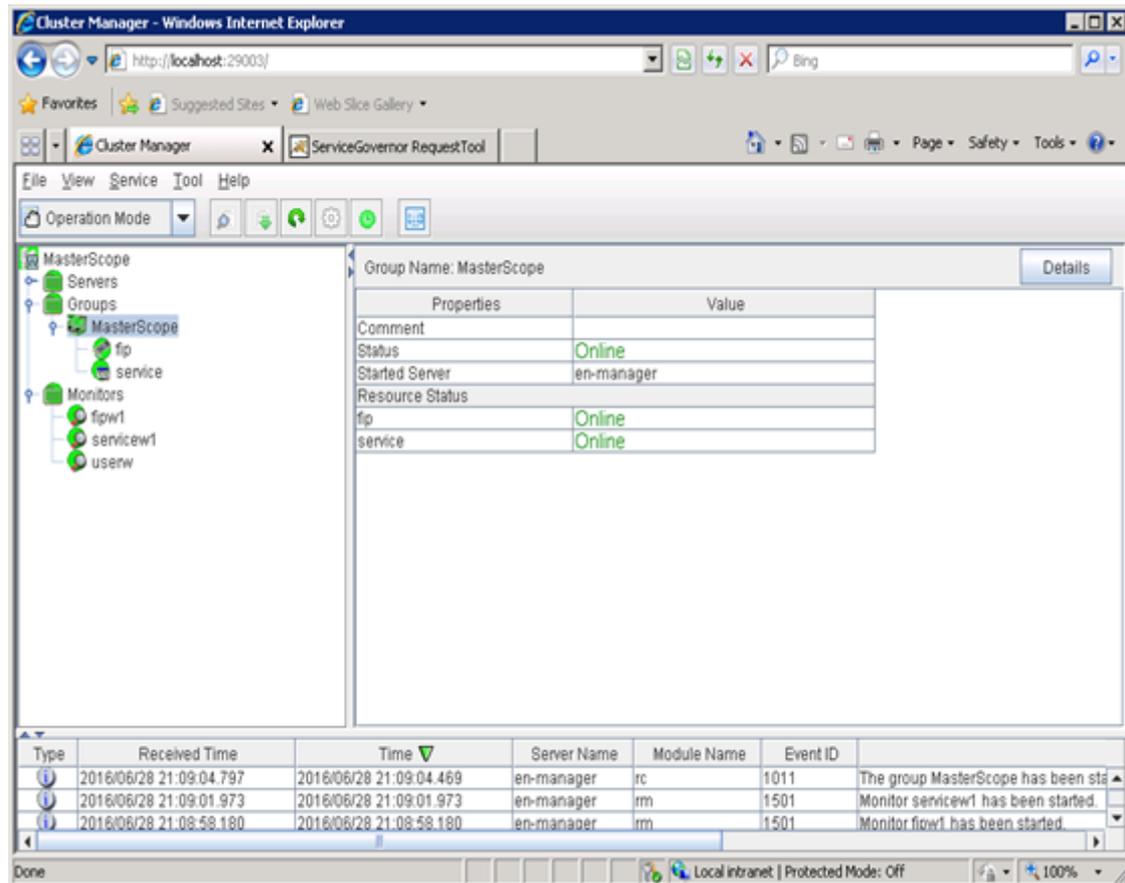
- EXPRESSCLUSTER X 3.1 for Linux
- EXPRESSCLUSTER X 3.2 for Linux
- EXPRESSCLUSTER X 3.3 for Linux

## 4.2 Creating a New Failover Group

For EXPRESSCLUSTERX, nodes connected to the cluster are managed using units called failover groups (hereinafter "groups").

For details of how to create groups, refer to Chapter 5 in the EXPRESSCLUSTER X document, "Installation and Creation Guide".

If another product supported by the MasterScope framework has been installed, the same group is available.



## 4.3 Setting Up Shared Resources (Floating IP)

Set up the following shared resources for a failover group. Here, the following shared resources are assumed:

- Floating IP address: 192.168.1.10

Right click the group, and then select [Add Resource] from the displayed pop-up menu. The [Resource Definition] dialog box is displayed.

Set up the floating IP address. Right click the group, select [Add Resource] from the displayed pop-up menu, select [floating ip resource] for [Type], and then enter the group name in the [Name] text box.

Resource Definition of Group(MasterScope)

Steps

- Info
- Dependency
- Recovery Operation
- Details

Group Resource Definitions

Type: floating ip resource

Name: fip

Comment:

Get Licence Info

Description

Select the type of group resource and enter its name.

< Back Next > Cancel

Specify the floating IP address in the [IP Address] text box.

Resource Definition of Group(MasterScope)

Steps

- Info
- Dependency
- Recovery Operation
- Details

Common en-manager en-manager2

IP Address: 192.168.1.10

Tuning

< Back Finish Cancel

## 4.4 Setting Up ServiceGovernor

### ⚠ Caution

- Perform the installation on the active server first and then on the standby server.

### 4.4.1 [Active] Installing ServiceGovernor

Install ServiceGovernor on the active server according to the procedure in "[Chapter 2. Installing ServiceGovernor \(page 3\)](#)".

### 4.4.2 [Active] Setting Up ServiceGovernor

Set up ServiceGovernor according to the procedure in "[Chapter 3. Setting Up ServiceGovernor \(page 10\)](#)".

### 4.4.3 [Active] Setting Up the Tomcat Service

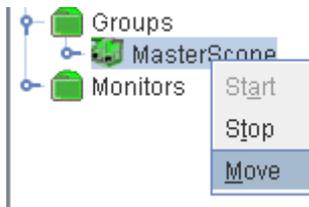
Change the setting so that the service will not start up automatically during the system boot.

Use the following procedure to change the setting for automatic startup of the manager process.

```
> service ServiceGovernor stop
> chkconfig --del ServiceGovernor
```

### 4.4.4 Moving to the Standby System

In the EXPRESSCLUSTER WebManager window, right-click the MasterScope group and select [Move] to move to the standby system.



### 4.4.5 [Standby] Installing ServiceGovernor

Install ServiceGovernor on the standby server according to the procedure in "[Chapter 2. Installing ServiceGovernor \(page 3\)](#)".

#### Caution

All the input items, including the installation path and port number, must be identical to those of the active server.

### 4.4.6 [Standby] Setting Up ServiceGovernor

Set up ServiceGovernor according to the procedure in "[Chapter 3. Setting Up ServiceGovernor \(page 10\)](#)".

#### Caution

For "[3.1 API Authentication Key \(page 11\)](#)", execute only step "[7. \(page 12\)](#)".

## 4.4.7 [Standby] Setting Up the Tomcat Service

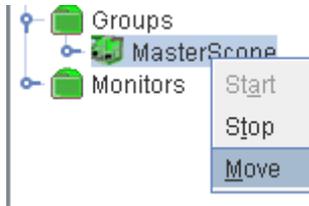
Change the setting so that the service will not start up automatically during the system boot.

Use the following procedure to change the setting for automatic startup of the manager process.

```
> service ServiceGovernor stop
> chkconfig --del ServiceGovernor
```

## 4.4.8 Moving to the Active System

In the EXPRESSCLUSTER WebManager window, right-click the MasterScope group and select [Move] to move to the active system.



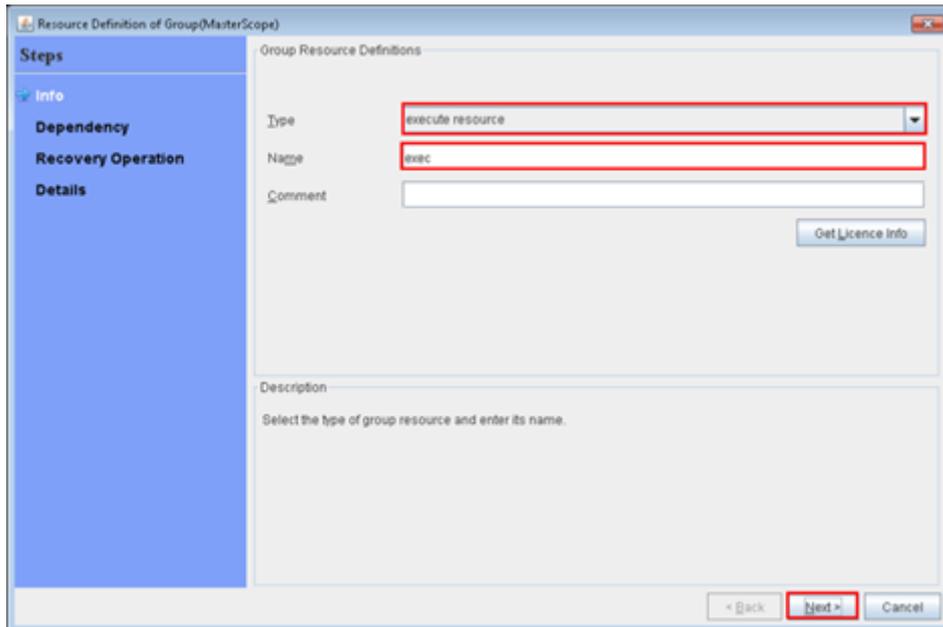
## 4.5 Editing the Startup/Stop Script

Set up the following shared resources for a failover group. Here, the following shared resources are assumed:

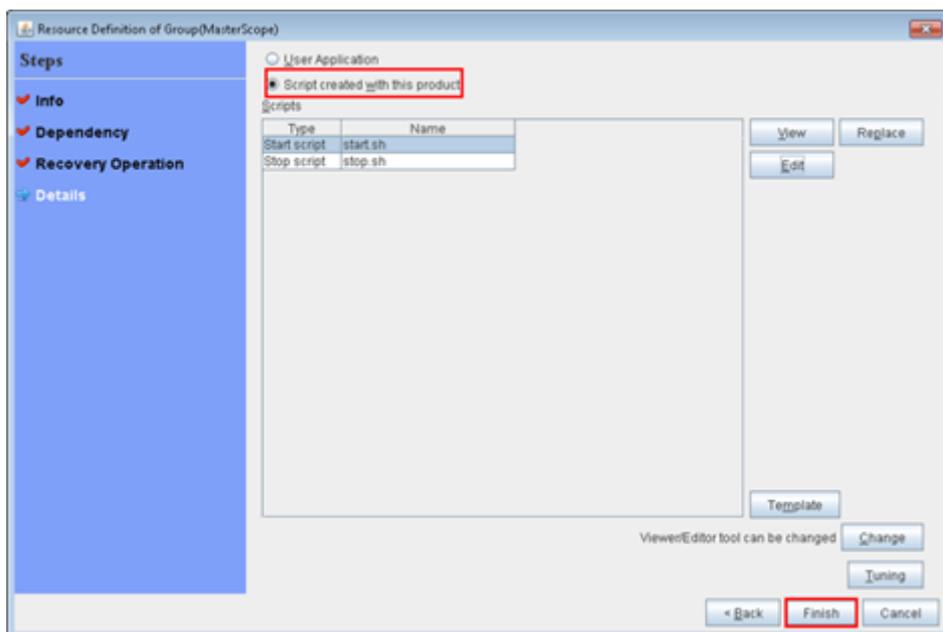
- Startup script: Manager start.sh
- Stop script: Manager stop.sh

Start up WebManager, and select a failover group (select [MasterScope] in this example).

Right click the group, select [Add Resource] from the displayed pop-up menu, select [execute resource] for [Type], and then enter the group name in the [Name] text box.



Select [Script create with this product] on the [Details] tab.



Edit start.sh and stop.sh as follows.

start.sh

```
! /bin/sh
#*****
#* start.sh *
#*****
if [ "$CLP_EVENT" = "START" ]
then
  if [ "$CLP_DISK" = "SUCCESS" ]
  then
    echo "NORMAL1"
```

```

    if [ "$CLP_SERVER" = "HOME" ]
    then
        echo "NORMAL2"
    else
        echo "ON_OTHER1"
    fi
    /etc/init.d/UMFOperationsManager_1 start
    /etc/init.d/ServiceGovernor start
else
    echo "ERROR_DISK from START"
fi
elif [ "$CLP_EVENT" = "FAILOVER" ]
then
    if [ "$CLP_DISK" = "SUCCESS" ]
    then
        echo "FAILOVER1"
        if [ "$CLP_SERVER" = "HOME" ]
        then
            echo "FAILOVER2"
        else
            echo "ON_OTHER2"
        fi
        /etc/init.d/UMFOperationsManager_1 start
        /etc/init.d/ServiceGovernor start
    else
        echo "ERROR_DISK from FAILOVER"
    fi
else
    echo "NO_CLP"
fi
echo "EXIT"
exit 0

```

\* Insert the underlined fields.

### Note

"/etc/init.d/UMFOperationsManager\_1 start" may exist depending on the environment.  
If it exists, append the setting of the ServiceGovernor startup process to the end.

### stop.sh

```

#!/bin/sh
#*****
#* stop.sh *
#*****
if [ "$CLP_EVENT" = "START" ]
then
    if [ "$CLP_DISK" = "SUCCESS" ]
    then

```

```

    echo "NORMAL1"
    if [ "$CLP_SERVER" = "HOME" ]
    then
        echo "NORMAL2"
    else
        echo "ON_OTHER1"
    fi
    /etc/init.d/ServiceGovernor stop
    /etc/init.d/UMFOperationsManager_1 stop
else
    echo "ERROR_DISK from START"
fi
elif [ "$CLP_EVENT" = "FAILOVER" ]
then
    if [ "$CLP_DISK" = "SUCCESS" ]
    then
        echo "FAILOVER1"
        if [ "$CLP_SERVER" = "HOME" ]
        then
            echo "FAILOVER2"
        else
            echo "ON_OTHER2"
        fi
        /etc/init.d/ServiceGovernor stop
        /etc/init.d/UMFOperationsManager_1 stop
    else
        echo "ERROR_DISK from FAILOVER"
    fi
else
    echo "NO_CLP"
fi
echo "EXIT"
exit 0

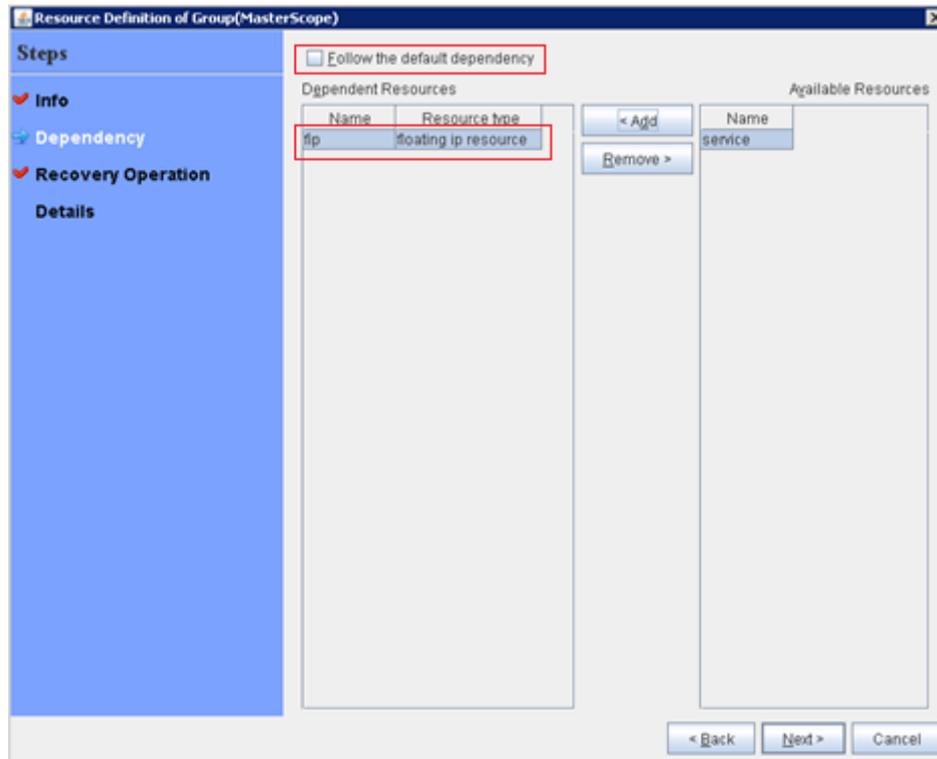
```

\* Insert the underlined fields.

### Note

"/etc/init.d/UMFOperationsManager\_1 stop" may exist depending on the environment. If it exists, append the setting of the ServiceGovernor stop process to the beginning.

To set up the dependencies, clear the [Follow the default dependence] check box, and then add the floating IP address to the resources that are depended on.



After specifying the settings, return to the failover group properties and then confirm that the settings have been applied.

## 4.6 Setting the Shared Resources (Process Name Monitor Resources)

Add the process name monitor resources setting to check that ServiceGovernor process has started up normally after the failover. Use the following procedure to add the setting

1. Start up Cluster Manager of EXPRESSCLUSTER.
2. Right-click [Monitors] in the tree view, and select [Add Monitor Resource] to display [Monitor Resource Definition].
3. Select [process name monitor] in the [Type] box.
4. By reference to the following parameter specification example, set the configuration parameters to add the process name monitor resources.

\* For details of the process name monitor resources, refer to Chapter 5, "Monitor resource details" in "EXPRESSCLUSTER X for Linux Reference Guide".

An example of parameter setting is shown below.

Parameter	Setting value
Monitor resource name	psw-ServiceGovernor
Interval	60 seconds
Time out	60 seconds

Parameter	Setting value
Number of retries	1
Wait time until start of monitoring:	0 seconds
Monitoring timing	At activation
Monitored resource	exec
Monitoring process name (*1)	/opt/UMF/Operations/Tomcat/JDK/JavaHome/jre/bin/java - Djava.util.logging.config.file=/opt/UMF/Operations/Tomcat/conf/logging.properties - Djava.util.logging.manager=org.apache.juli.ClassLoaderLogManager - Djava.endorsed.dirs=/opt/UMF/Operations/Tomcat/endorsed -classpath /opt/UMF/ Operations/Tomcat/bin/bootstrap.jar:/opt/UMF/Operations/Tomcat/bin/tomcat-juli.jar - Dcatalina.base=/opt/UMF/Operations/Tomcat -Dcatalina.home=/opt/UMF/Operations/Tomcat -Djava.io.tmpdir=/opt/UMF/Operations/Tomcat/temp org.apache.catalina.startup.Bootstrap start
Recovery operation	Execute failover on the recovery target
Recovery target	MasterScope * Failover group name

(\*1) The target to be monitored by ServiceGovernor varies depending on the installation destination folder. Using the `ps(1)` command or the like, confirm the name of the process that is actually running, and then set the parameters.

#### Example of command result

```
# ps -eaf | grep java
root      4142      1  0 15:44 ?                00:00:28 /opt/UMF/Operations/Tomcat/
JDK/J
avaHome/jre/bin/java -Djava.util.logging.config.file=/opt/UMF/Operations/To
mcat/
conf/logging.properties -Djava.util.logging.manager=org.apache.juli.ClassLo
aderL
ogManager -Djava.endorsed.dirs=/opt/UMF/Operations/Tomcat/endorsed -classpa
th /o
pt/UMF/Operations/Tomcat/bin/bootstrap.jar:/opt/UMF/Operations/Tomcat/bin/t
omcat
-juli.jar -Dcatalina.base=/opt/UMF/Operations/Tomcat -Dcatalina.home=/opt/U
MF/Op
erations/Tomcat -Djava.io.tmpdir=/opt/UMF/Operations/Tomcat/temp org.apache
.cata
lina.startup.Bootstrap start
```

Specify the process name displayed in the above command result as the name of the process to be monitored.

# Chapter 5. Uninstalling ServiceGovernor

---

## Contents

5.1 Uninstalling ServiceGovernor .....36

---

## 5.1 Uninstalling ServiceGovernor

The following and subsequent sections describe the procedure for uninstalling the ServiceGovernor.

### Caution

If ServiceGovernor is operating in a cluster environment, perform this procedure on both the active and the standby servers.

### 5.1.1 Uninstalling ServiceGovernor from the installer

#### Caution

For the upgraded environment, uninstall ServiceGovernor by using the installation media of the version after upgrading.

1. Log in to the system with the root account.
2. Insert the installation DVD into the DVD drive.
3. Mount the DVD.  
In this example, the mount point is "/mnt/dvd".
4. Change the current directory.

```
# cd /mnt/dvd/Linux
```

5. Execute Setup.

```
# ./Setup
```

6. The installer starts up and the following screen is displayed.

#### Caution

If the installation dialog box is not displayed stably, set the environment variable TERM to vt100 and restart the installer. Increase the display size of the terminal, as necessary.

```
*****
Welcome to MasterScope Media !!
*****

This program will install/uninstall products.

1. Install
2. Uninstall

Please select the operation.
(1:install 2:uninstall q:quit program):
```

Enter 2[Enter].

```
(1:install 2:uninstall q:quit program): 2
```

7. A list of installed components is displayed.

```
-----
Installed products
```



```
MasterScope ServiceGovernor Any 3.26.0.0 Uninstallation in progress (1
/2)
MasterScope ServiceGovernor Any 3.26.0.0 was successfully uninstalled
(1/2)
Application Server Any 8.5.24.0 Preparing for Uninstallation (2/2)
Application Server Any 8.5.24.0 Uninstallation in progress (2/2)
Application Server Any 8.5.24.0 was successfully uninstalled (2/2)
```

```
-----
Uninstallation result
```

```
-----
1 MasterScope ServiceGovernor Any 3.26.0.0 (Success)
2 Application Server Any 8.5.24.0 (Success)
-----
```

```
Success:2, Failure:0
```

# Chapter 6. Upgrading

---

## Contents

6.1 Upgrading ServiceGovernor.....	40
6.2 Upgrading the Application Server .....	45

---

You can individually upgrade ServiceGovernor itself and the application server on which ServiceGovernor operates.

The individual installation is described in the procedures below. However, like the installation procedure in "2.1.1 Installing ServiceGovernor from the Installer (page 4)", you can simultaneously upgrade the body of ServiceGovernor and the application server on which its ServiceGovernor operates.

## 6.1 Upgrading ServiceGovernor

Subsequent sections describe the procedure for upgrading ServiceGovernor.

### Caution

If ServiceGovernor is operating in a cluster environment, perform this procedure on both the active and the standby servers.

### 6.1.1 Upgrading ServiceGovernor from the Installer

1. Log in to the system with the root account.
2. Insert the installation DVD into the DVD drive.
3. Mount the DVD.  
In this example, the mount point is "/mnt/dvd".
4. Change the current directory.

```
# cd /mnt/dvd/Linux
```

5. Execute Setup.

```
# ./Setup
```

6. The installer starts up and the following screen is displayed.

### Caution

If the installation dialog box is not displayed stably, set the environment variable TERM to vt100 and restart the installer. Increase the display size of the terminal, as necessary.

```
*****
Welcome to MasterScope Media !!
*****

This program will install/uninstall products.

1. Install
2. Uninstall

Please select the operation.
(1:install 2:uninstall q:quit program):
```

```
Enter 1[Enter].
```

```
(1:install 2:uninstall q:quit program): 1
```

7. A list of components that can be installed is displayed.

```

-----
Products
-----

```

```

-----
|14 [ ] MasterScope NetvisorPro Manager 8.0.0.11
|
|15 [ ] MasterScope NetvisorPro V MessageConsole Manager 3.0.0.4
|
|16 [ ] MasterScope NetvisorPro V MessageConsole Linker Manager 3.0.0.
4 |
|17 [ ] MasterScope Invariant Analyzer RelayManager 1.6.0.4
|
|18 [ ] MasterScope Invariant Analyzer Manager 1.6.0.4
|
|19 [ ] MasterScope Framework Agent 3.24.0.1
|
|20 [ ] MasterScope Framework Manager 3.24.0.1
|
|21 [ ] Application Server Any 8.5.24.0 [ 8.0.33.0 ]
|
|22 [ ] MasterScope Service Governor Any 3.26.0.0 [ 3.22.0.1 ]
|
|
-----

```

```

Please select product(s) by entering numbers separated by commas.
[Example: 1, 3, 4]
(b:back q:quit program):

```

```

Select MasterScope Service Governor as follows. The component list
can be scrolled up and down using the Up (↑) and Down (↓) key.
(b:back q:quit program):22

```

**⚠ Caution**

The value displayed for each component may vary depending on the media used.

8. The confirmation screen of the components to be installed is displayed.

```

-----
Confirmation
-----

```

```

-----
|14 [ ] MasterScope NetvisorPro Manager 8.0.0.11
|
|15 [ ] MasterScope NetvisorPro V MessageConsole Manager 3.0.0.4
|
|16 [ ] MasterScope NetvisorPro V MessageConsole Linker Manager 3.0.0.
4 |

```

```

|17 [ ] MasterScope Invariant Analyzer RelayManager 1.6.0.4
|
|18 [ ] MasterScope Invariant Analyzer Manager 1.6.0.4
|
|19 [ ] MasterScope Framework Agent 3.24.0.1
|
|20 [ ] MasterScope Framework Manager 3.24.0.1
|
|21 [ ] Application Server Any 8.5.24.0 [ 8.0.33.0 ]
|
|22 [*] MasterScope Service Governor Any 3.26.0.0 [ 3.22.0.1 ]
|
|_____
|_____

```

```

-----

These product(s) will be installed, OK to continue?
(default:y y:yes n:no q:quit program):

```

```

Enter y[Enter] to continue the process.
(default:y y:yes n:no q:quit program):y

```

9. The configuration setting screen of the components to be installed is displayed.

```

-----
Installation settings
-----

```

```

|_____
|
| Other( Not Framework )
|
|     1 Application Server Any 8.0.33.0
|
|     2 MasterScope Service Governor Any 3.26.0.0 [ 3.22.0.1 ]
|
|     3 New Product
|
|
|
|
|
|
|
|
|
|
|_____
|_____

```

```

-----
(*) marked products or services require specific settings before installation.
-----

```



```

MasterScope Service Governor Any 3.26.0.0 was successfully installed (
1/1)

-----
Installation result
-----
1 MasterScope Service Governor Any 3.26.0.0 (Success)
-----
Success:1, Failure:0

```

### **Caution**

When an installation error occurs, "Installation of <Product Name> was failure. [Error Number]" is displayed in a message during installation. Check that this message is not displayed.

## 6.1.2 Reversion after Upgrade of ServiceGovernor

If a problem occurs after upgrade of ServiceGovernor, you can restore it to the previous version by using the backup acquired before the installation. The backup is saved automatically.

The backup contains the following files. The file settings can be restored by the restoring procedure.

- <installation directory>/Tools/env.bat  
Tomcat port number, protocol (http/https), JDK version used, etc.
- Jar files including the plug-ins operating on ServiceGovernor  
Restore the plug-ins used to implement the API The plug-ins for the old version are restored.

### **Caution**

Delete unnecessary backup files manually. For the backup directory folder, see the following procedure.

Perform the following procedure.

1. Using the following command, stop the ServiceGovernor service.

```
/etc/init.d/ServiceGovernor stop
```

2. Copy backup files from the following backup folder to the folder storing the ServiceGovernor plug-in (jar file).

ServiceGovernor plug-in storage folder

```
<Installation directory>/Tomcat/FrameworkPlugins
```

ServiceGovernor plug-in backup folder

```
<Installation directory>/Tomcat_BackUp/FrameworkPlugins_BackUp/FrameworkPlugins_<Date>
```

<Date> indicates the date when ServiceGovernor was upgraded.

3. Copy backup files from the following backup folder to the folder storing the ServiceGovernor tools.

ServiceGovernor tool storage folder

```
<Installation directory>/Tools
```

ServiceGovernor tool backup folder

```
<Installation directory>Tomcat_BackUp/Tools_BackUp/Tools_<Date>
```

<Date> is the date when ServiceGovernor was upgraded.

4. Delete the application file of ServiceGovernor and the folder to which they are deployed.

File path of the ServiceGovernor application to be deleted

```
<Installation directory>/Tomcat/webapps/umf.war
```

Folder to which the ServiceGovernor application file to be deleted is deployed

```
<Installation directory>/Tomcat/webapps/umf
```

5. Copy the application file of ServiceGovernor from the following backup folder to the storage folder. Then, rename the file to "umf.war".

File path of ServiceGovernor application

```
<Installation directory>/Tomcat/webapps/umf.war
```

Backup file path of ServiceGovernor application

```
<Installation directory>Tomcat_BackUp/umfwar/umf.war.<Date>
```

<Date> is the date when ServiceGovernor was upgraded.

6. Using the following command, start the ServiceGovernor WebAPI service.

```
/etc/init.d/ServiceGovernor start
```

The reverting procedure is now complete.

### **Caution**

- The setting files under the following folder are not upgraded automatically. If the settings have been changed after upgrading, restore them to the settings preceding the upgrade.

ServiceGovernor setting file storage folder

```
<Installation directory>/Tomcat/conf
```

## 6.2 Upgrading the Application Server

The following sections describe the procedure for upgrading the application server.

### **Caution**

- When you are operating the application server in a cluster environment, perform this procedure for both active and standby servers.
- When you are operating the application server in a cluster environment, reconfigure the service settings as instructed in "4.4.3 [Active] Setting Up the Tomcat Service (page 28)" and

"4.4.7 [Standby] Setting Up the Tomcat Service (page 29)" after performing "6.2.1 Upgrading the application server from the installer (page 46)".

- When you install the upgraded version, you cannot change the port number and other parameters that you set when initially installing the server.
- The files under <installation directory>/Tomcat/conf are not upgraded. The items that you need to set when upgrading Tomcat, such as server.xml, should be changed after the upgrade. In case you upgrade the files under conf individually, Tomcat is stored in the following file path of the installation media: DVD mount destination\Linux\Product\CloudProviderAPI\Tomcat. Uncompress Tomcat in a desired folder and refer to the conf folder.
- The upgrade changes the Tomcat startup user to root. If you have changed the Tomcat startup user after the installation, set the startup user again as instructed in "9.2.2 Starting ServiceGovernor as a User with Non-Root Privileges (page 62)".
- Upgrading the application server may fail. If the upgrade fails, recover the application server as described in "10.4 Recovering an Application Server (page 69)".

## 6.2.1 Upgrading the application server from the installer

1. Log in to the system with the root account.
2. Insert the installation DVD into the DVD drive.
3. Mount the DVD.  
In this example, the mount point is "/mnt/dvd".
4. Change the current directory.

```
# cd /mnt/dvd/Linux
```

5. Execute Setup.

```
# ./Setup
```

6. The installer starts up and the following screen is displayed.

### Caution

If the installation dialog box is not displayed stably, set the environment variable TERM to vt100 and restart the installer. Increase the display size of the terminal, as necessary.

```
*****
Welcome to MasterScope Media !!
*****

This program will install/uninstall products.

1. Install
2. Uninstall

Please select the operation.
(1:install 2:uninstall q:quit program):
```

Enter 1[Enter].

```
(1:install 2:uninstall q:quit program): 1
```

7. A list of components that can be installed is displayed.

```

-----
Products
-----

-----
|14 [ ] MasterScope NetvisorPro Manager 8.0.0.11
|
|15 [ ] MasterScope NetvisorPro V MessageConsole Manager 3.0.0.4
|
|16 [ ] MasterScope NetvisorPro V MessageConsole Linker Manager 3.0.0.
4 |
|17 [ ] MasterScope Invariant Analyzer RelayManager 1.6.0.4
|
|18 [ ] MasterScope Invariant Analyzer Manager 1.6.0.4
|
|19 [ ] MasterScope Framework Agent 3.24.0.0
|
|20 [ ] MasterScope Framework Manager 3.24.0.0
|
|21 [ ] Application Server Any 8.5.24.0 [ 8.0.33.0 ]
|
|22 [ ] MasterScope Service Governor Any 3.26.0.0 [ 3.22.0.1 ]
|
|
-----
Please select product(s) by entering numbers separated by commas.
[Example: 1, 3, 4]
(b:back q:quit program):

```

Select Application Server as follows. The component list can be scrolled up and down using the Up (↑) and Down (↓) key.  
(b:back q:quit program):21

### **Caution**

The value displayed for each component may vary depending on the media used.

8. The confirmation screen of the components to be installed is displayed.

```

-----
Confirmation
-----

-----
|14 [ ] MasterScope NetvisorPro Manager 8.0.0.11
|
|15 [ ] MasterScope NetvisorPro V MessageConsole Manager 3.0.0.4
|

```

```

|16 [ ] MasterScope NetvisorPro V MessageConsole Linker Manager 3.0.0.
4 |
|17 [ ] MasterScope Invariant Analyzer RelayManager 1.6.0.4
|
|18 [ ] MasterScope Invariant Analyzer Manager 1.6.0.4
|
|19 [ ] MasterScope Framework Agent 3.24.0.0
|
|20 [ ] MasterScope Framework Manager 3.24.0.0
|
|21 [*] Application Server Any 8.5.24.0 [ 8.0.33.0 ]
|
|22 [ ] MasterScope Service Governor Any 3.26.0.0 [ 3.22.0.1 ]
|
|_____
___|

-----

These product(s) will be installed, OK to continue?
(default:y y:yes n:no q:quit program):

```

Enter y[Enter] to continue the process.  
(default:y y:yes n:no q:quit program):y

9. The configuration setting screen of the components to be installed is displayed.

```

-----
Installation settings
-----

_____

| Other( Not Framework )
|
|     1 MasterScope Service Governor Any 3.22.0.1
|
|     2 Application Server Any 8.5.24.0 [ 8.0.33.0 ]
|
|     3 New Product
|
|
|
|
|
|
|
|
|
|
|_____
___|

-----

(*) marked products or services require specific settings before insta

```



## 6.2.2 Reversion after Upgrade of the Application Server

If a problem occurs after upgrade of the application server, you can restore it to the previous version by using the backup acquired before the installation. The backup is saved automatically.

The backup contains the following files. The file settings can be restored by the restoring procedure.

- `<installation directory>/Tomcat/conf/server.xml`  
Tomcat port number, SSL/TLS settings, etc.
- `<installation directory>/Tomcat/conf/fwapi.properties`  
Manager settings, connection timeout value, and other settings managed by ServiceGovernor
- `<installation directory>/Tomcat/vDCApiKey.jks`  
User settings for user authentication that is performed during access to ServiceGovernor, as well as access key settings
- Other user-specified files stored under Tomcat (e.g., SSL/TLS certificate)

### Caution

Delete unnecessary backup files manually. For the backup directory folder, see the following procedure.

Perform the following procedure.

1. Using the following command, stop the ServiceGovernor service.

```
/etc/init.d/ServiceGovernor stop
```

2. Copy the backup files from the following backup folder to the application server installation folder.

Application server installation folder

```
<Installation directory>/Tomcat
```

Application server backup folder

```
<Installation directory>/Tomcat_BackUp/Tomcat_<Date>
```

The date is the date when the application server was upgraded.

3. Using the following command, start the ServiceGovernor service.

```
/etc/init.d/ServiceGovernor start
```

The reverting procedure is now complete.

### Caution

- The setting files under the following folder are not upgraded automatically. If the settings have been changed after upgrading, restore them to the settings preceding the upgrade.

ServiceGovernor setting file storage folder

```
<Installation directory>/Tomcat/conf
```



# Chapter 7.

## Backing Up the Files

The following describes the procedure to follow to back up ServiceGovernor and its application server settings. <installation directory> in the procedure below is defined in "[Glossary \(page iii\)](#)". \* Replace it according to your environment.

1. Back up the following files in the desired directory.
  - <installation directory>/Tomcat/conf/fwapi.properties
  - <installation directory>/Tomcat/conf/fwbaselog.properties
  - <installation directory>/Tomcat/conf/responseheader.properties
  - <installation directory>/Tomcat/conf/server.xml
  - <installation directory>/Tomcat/conf/logging.properties
  - All files under <installation directory>/Tomcat/conf/FrameworkPlugins
  - Other user-specified files stored under the <installation directory>/Tomcat/conf (e.g., SSL/TLS certificate)
  - <installation directory>/Tomcat/vDCApiKey.jks
  - <installation directory>/Tools/env.sh
  - <installation directory>/Tools/WebApiTool.sh
  - <installation directory>/Tools/evidence/conf/apikeylog.properties

# Chapter 8.

## Restoring the Backed Up Files

The following describes the procedure to follow to restore the ServiceGovernor settings and its application server settings. The default value of <installation directory> in the procedure below is defined in "[Glossary \(page iii\)](#)". \* Replace it in accordance with your environment.

1. Using the following command, stop the ServiceGovernor service.

```
/etc/init.d/ServiceGovernor stop
```

2. Overwrite the following files, which were backed up with the backup procedure.

- <installation directory>/Tomcat/conf/fwapi.properties
- <installation directory>/Tomcat/conf/fwbaseolog.properties
- <installation directory>/Tomcat/conf/responseheader.properties
- <installation directory>/Tomcat/conf/server.xml
- <installation directory>/Tomcat/conf/logging.properties
- Other user-specified files stored under the <installation directory>/Tomcat/conf (e.g., SSL/TLS certificate)
- <installation directory>/Tomcat/vDCApiKey.jks
- <installation directory>/Tools/env.sh
- <installation directory>/Tools/WebApiTool.sh
- <installation directory>/Tools/evidence/conf/apkeylog.properties

For the following directory, delete all the files once from the directory before overwrite saving.

- All files under <installation directory>/Tomcat/conf/FrameworkPlugins

3. Start the ServiceGovernor WebAPI service by using the following command.

```
/etc/init.d/ServiceGovernor start
```

# Chapter 9.

## Precautions

---

### Contents

9.1 Precautions on Products .....	55
9.2 Precautions on Operation .....	55

---

## 9.1 Precautions on Products

- The port number specified for installation of ServiceGovernor must differ from those for the other services.
- In order to modify any of the files under <installation folder>/Tomcat/conf in an environment where ServiceGovernor is operated in a cluster configuration, be sure to make the same modifications to both the active and the standby servers.
- To perform the Tomcat SSL/TLS setting procedure, you need to use the Tomcat and Java software included in the ServiceGovernor package.
- To use ServiceGovernor, you need to perform the procedure shown in "[3.1 API Authentication Key \(page 11\)](#)". If no signature is specified or the specified signature is invalid, WebAPI will fail to be executed.
- Then the application server is upgraded, the startup user returns to root. If "[9.2.2 Starting ServiceGovernor as a User with Non-Root Privileges \(page 62\)](#)" has been executed, perform the procedure again after the upgrade.

## 9.2 Precautions on Operation

### 9.2.1 About Bloating of Tomcat Log

Unless the Tomcat log data is deleted periodically, the Tomcat log folder will bloat because of file accumulation.

The following description details the procedure with which to delete the log folder periodically.

If you follow the setting of this procedure, the default value for deleting the log is as follows.

Retention period	If the last date of update is newer than the specified period, the log data is retained; all the files before that date are deleted. Default value: 7
Files to be deleted	Defaults catalina.*.log commons-daemon.*.log host-manager.*.log localhost.*.log localhost_access_log.*.txt manager.*.log servicegovernor-stderr.*.log servicegovernor-stdout.*.log

#### Caution

If ServiceGovernor is operating in a cluster environment, perform this procedure on both the active and standby servers.

1. Setting of conf/logging.properties  
The conf/logging.properties location to be edited is described below. Change it to the setting as shown by the underline.

```
# Licensed to the Apache Software Foundation (ASF) under one or more
# contributor license agreements. See the NOTICE file distributed with
# this file for more details. You should have received a copy of the
# Apache License, Version 2.0 along with this software; if not, write to the
# Apache Software Foundation, 500 California Avenue, San Francisco, CA
# 94114, USA.
#
# A copy of the license is available at http://www.apache.org/licenses/LICENSE-2.0
# or http://www.apache.org/licenses/LICENSE-2.0.txt
#
# Unless required by applicable law or agreed to in writing, software
# distributed under the License is distributed on an "AS IS" BASIS,
# WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
# See the License for the specific language governing permissions and
# limitations under the License.
```

```

# this work for additional information regarding copyright ownership.
# The ASF licenses this file to You under the Apache License, Version
2.0
# (the "License"); you may not use this file except in compliance with
# the License. You may obtain a copy of the License at
#
#   http://www.apache.org/licenses/LICENSE-2.0
#
# Unless required by applicable law or agreed to in writing, software
# distributed under the License is distributed on an "AS IS" BASIS,
# WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or impl
ied.
# See the License for the specific language governing permissions and
# limitations under the License.

handlers = 1catalina.org.apache.juli.AsyncFileHandler, 2localhost.org.
apache.juli.AsyncFileHandler, 3manager.org.apache.juli.AsyncFileHandle
r, 4host-manager.org.apache.juli.AsyncFileHandler, java.util.logging.C
onsoleHandler

.handlers = 1catalina.org.apache.juli.AsyncFileHandler, java.util.logg
ing.ConsoleHandler

#####
# Handler specific properties.
# Describes specific configuration info for Handlers.
#####

1catalina.org.apache.juli.AsyncFileHandler.level = OFF
1catalina.org.apache.juli.AsyncFileHandler.directory = ${catalina.base
}/logs
1catalina.org.apache.juli.AsyncFileHandler.prefix = catalina.

2localhost.org.apache.juli.AsyncFileHandler.level = FINE
2localhost.org.apache.juli.AsyncFileHandler.directory = ${catalina.bas
e}/logs
#2localhost.org.apache.juli.AsyncFileHandler.prefix = localhost.

2localhost.org.apache.juli.AsyncFileHandler.prefix = localhost
2localhost.org.apache.juli.AsyncFileHandler.rotatable = false

3manager.org.apache.juli.AsyncFileHandler.level = OFF
3manager.org.apache.juli.AsyncFileHandler.directory = ${catalina.base}
/logs
3manager.org.apache.juli.AsyncFileHandler.prefix = manager.

4host-manager.org.apache.juli.AsyncFileHandler.level = OFF
4host-manager.org.apache.juli.AsyncFileHandler.directory = ${catalina.
base}/logs
4host-manager.org.apache.juli.AsyncFileHandler.prefix = host-manager.

java.util.logging.ConsoleHandler.level = FINE
java.util.logging.ConsoleHandler.formatter = org.apache.juli.OneLineFo
rmatter

#####

```

```

# Facility specific properties.
# Provides extra control for each logger.
#####

org.apache.catalina.core.ContainerBase.[Catalina].[localhost].level =
INFO
org.apache.catalina.core.ContainerBase.[Catalina].[localhost].handlers
= 2localhost.org.apache.juli.AsyncFileHandler

org.apache.catalina.core.ContainerBase.[Catalina].[localhost].[/manage
r].level = INFO
org.apache.catalina.core.ContainerBase.[Catalina].[localhost].[/manage
r].handlers = 3manager.org.apache.juli.AsyncFileHandler

org.apache.catalina.core.ContainerBase.[Catalina].[localhost].[/host-m
anager].level = INFO
org.apache.catalina.core.ContainerBase.[Catalina].[localhost].[/host-m
anager].handlers = 4host-manager.org.apache.juli.AsyncFileHandler

# For example, set the org.apache.catalina.util.LifecycleBase logger t
o log
# each component that extends LifecycleBase changing state:
#org.apache.catalina.util.LifecycleBase.level = FINE

# To see debug messages in TldLocationsCache, uncomment the following
line:
#org.apache.jasper.compiler.TldLocationsCache.level = FINE

```

## 2. Setting of conf/server.xml

The conf/server.xml location to be edited is described below. Change it to the setting as shown by the underline.

```

<?xml version='1.0' encoding='utf-8'?>
<!--
  Licensed to the Apache Software Foundation (ASF) under one or more
  contributor license agreements.  See the NOTICE file distributed wit
  h
  this work for additional information regarding copyright ownership.
  The ASF licenses this file to You under the Apache License, Version
  2.0
  (the "License"); you may not use this file except in compliance with
  the License.  You may obtain a copy of the License at

      http://www.apache.org/licenses/LICENSE-2.0

  Unless required by applicable law or agreed to in writing, software
  distributed under the License is distributed on an "AS IS" BASIS,
  WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or impl
  ied.
  See the License for the specific language governing permissions and
  limitations under the License.
-->
<!-- Note: A "Server" is not itself a "Container", so you may not
  define subcomponents such as "Valves" at this level.
  Documentation at /docs/config/server.html
-->
<Server port="8005" shutdown="SHUTDOWN">

```

```

    <Listener className="org.apache.catalina.startup.VersionLoggerListen
er" />
    <!-- Security listener. Documentation at /docs/config/listeners.html
    <Listener className="org.apache.catalina.security.SecurityListener"
    />
    -->
    <!--APR library loader. Documentation at /docs/apr.html -->
    <Listener className="org.apache.catalina.core.AprLifecycleListener"
    SSLEngine="on" />
    <!-- Prevent memory leaks due to use of particular java/javax APIs--
    >
    <Listener className="org.apache.catalina.core.JreMemoryLeakPreventio
nListener" />
    <Listener className="org.apache.catalina.mbeans.GlobalResourcesLifec
ycleListener" />
    <Listener className="org.apache.catalina.core.ThreadLocalLeakPrevent
ionListener" />

    <!-- Global JNDI resources
        Documentation at /docs/jndi-resources-howto.html
    -->
    <GlobalNamingResources>
        <!-- Editable user database that can also be used by
            UserDatabaseRealm to authenticate users
        -->
        <Resource name="UserDatabase" auth="Container"
            type="org.apache.catalina.UserDatabase"
            description="User database that can be updated and saved
"
            factory="org.apache.catalina.users.MemoryUserDatabaseFac
tory"
            pathname="conf/tomcat-users.xml" />
    </GlobalNamingResources>

    <!-- A "Service" is a collection of one or more "Connectors" that sh
are
    a single "Container" Note: A "Service" is not itself a "Contai
ner",
    so you may not define subcomponents such as "Valves" at this le
vel.
        Documentation at /docs/config/service.html
    -->
    <Service name="Catalina">

        <!--The connectors can use a shared executor, you can define one o
r more named thread pools-->
        <!--
        <Executor name="tomcatThreadPool" namePrefix="catalina-exec-"
            maxThreads="150" minSpareThreads="4"/>
        -->

        <!-- A "Connector" represents an endpoint by which requests are re
ceived
        and responses are returned. Documentation at :
        Java HTTP Connector: /docs/config/http.html (blocking & non-b
locking)
        Java AJP Connector: /docs/config/ajp.html

```

```

    APR (HTTP/AJP) Connector: /docs/apr.html
    Define a non-SSL/TLS HTTP/1.1 Connector on port 8080
-->
<Connector port="8080" protocol="HTTP/1.1"
    connectionTimeout="20000"
    redirectPort="8443" />
<!-- A "Connector" using the shared thread pool-->
<!--
<Connector executor="tomcatThreadPool"
    port="8080" protocol="HTTP/1.1"
    connectionTimeout="20000"
    redirectPort="8443" />
-->
<!-- Define a SSL/TLS HTTP/1.1 Connector on port 8443
    This connector uses the NIO implementation that requires the
JSSE
    style configuration. When using the APR/native implementation
, the
    OpenSSL style configuration is required as described in the A
PR/native
    documentation -->
<!--
<Connector port="8443" protocol="org.apache.coyote.http11.Http11Ni
oProtocol"
    maxThreads="150" SSLEnabled="true" scheme="https" secur
e="true"
    clientAuth="false" sslProtocol="TLS" />
-->

<!-- Define an AJP 1.3 Connector on port 8009 -->
<Connector port="8009" protocol="AJP/1.3" redirectPort="8443" />

<!-- An Engine represents the entry point (within Catalina) that p
rocesses
    every request. The Engine implementation for Tomcat stand al
one
    analyzes the HTTP headers included with the request, and pass
es them
    on to the appropriate Host (virtual host).
    Documentation at /docs/config/engine.html -->

<!-- You should set jvmRoute to support load-balancing via AJP ie
:
<Engine name="Catalina" defaultHost="localhost" jvmRoute="jvm1">
-->
<Engine name="Catalina" defaultHost="localhost">

    <!--For clustering, please take a look at documentation at:
        /docs/cluster-howto.html (simple how to)
        /docs/config/cluster.html (reference documentation) -->
    <!--
<Cluster className="org.apache.catalina.ha.tcp.SimpleTcpCluster"
/>
-->

<!-- Use the LockOutRealm to prevent attempts to guess user pass
words

```

```

        via a brute-force attack -->
        <Realm className="org.apache.catalina.realm.LockOutRealm">
          <!-- This Realm uses the UserDatabase configured in the global
JNDI
          resources under the key "UserDatabase". Any edits
          that are performed against this UserDatabase are immediat
ely
          available for use by the Realm. -->
          <Realm className="org.apache.catalina.realm.UserDatabaseRealm"
            resourceName="UserDatabase"/>
        </Realm>

        <Host name="localhost" appBase="webapps"
          unpackWARs="true" autoDeploy="true">

          <!-- SingleSignOn valve, share authentication between web appl
ications
          Documentation at: /docs/config/valve.html -->
          <!--
On" />
          <Valve className="org.apache.catalina.authenticator.SingleSign
          -->

          <!-- Access log processes all example.
          Documentation at: /docs/config/valve.html
          Note: The pattern used is equivalent to using pattern="co
mmon" -->
          <Valve className="org.apache.catalina.valves.AccessLogValve" d
irectory="logs"
            prefix="localhost_access_log" suffix=".txt" rotatable="
false"
            pattern="%h %l %u %t \"%r\" %s %b" />

          </Host>
        </Engine>
      </Service>
    </Server>

```

### 3. Setting of logrotate

The following is a sample configuration file that can be used when Tomcat is installed in the default installation folder (/opt/UMF/Operations).

Modify the sample as necessary for your operating environment.

For the sample file, see "DVD¥Linux/Product/CloudProviderAPI/etc/logrotate.d/ServiceGovernorLog".

```

/opt/UMF/Operations/Tomcat/logs/catalina.out
/opt/UMF/Operations/Tomcat/logs/localhost.log
/opt/UMF/Operations/Tomcat/logs/localhost_access_log.txt
{
  copytruncate
  daily
  rotate 7
  compress
  missingok
  notifempty
  dateext
}

```

```
size 100k
}
```

The setting values are described below. For details, see "man logrotate"

Parameter	Setting value
copytruncate	Specifies that the size of the existing log be changed to 0 bytes after the log is copied. The log is lost if it is output before the size is changed to 0 bytes after copy.
{ daily   weekly   monthly }	Log rotation takes place { daily   weekly   monthly }. Log rotation interval. The sample specifies daily log rotation.
rotate	Specifies the number of generations that should remain. The sample specifies 7 generations and "daily".
compress	Compresses the rotated log. All log data other than that about the latest generation is compressed.
missingok	Even if the log file does not exist, this is not processed as an error.
notifempty	If the log file does not exist, the rotation does not take place.
dateext	Appends the date (YYYYMMDD) to the end of the log file.
Size	Maximum log file size. The sample specifies 100 K for the size.

- The privileges of the created logrotate configuration file are changed to 0644.

```
# chmod 0644 /etc/logrotate.d/ServiceGovernorLog
```

- Verify logrotate operation

By using the following command, the logrotate command can be executed with the specified configuration file.

```
logrotate -fv /etc/logrotate.d/ServiceGovernorLog
```

Check that the "log needs rotating" message is output and the rotated log file has been output under /opt/UMF/Operations/Tomcat/logs/ after execution.

```
# logrotate -fv /etc/logrotate.d/ServiceGovernorLog
reading config file /etc/logrotate.d/ServiceGovernorLog
reading config info for /opt/UMF/Operations/Tomcat/logs/catalina.out
/opt/UMF/Operations/Tomcat/logs/localhost.log
/opt/UMF/Operations/Tomcat/logs/localhost_access_log.txt
```

```
Handling 1 logs
```

```
rotating pattern: /opt/UMF/Operations/Tomcat/logs/catalina.out
/opt/UMF/Operations/Tomcat/logs/localhost.log
/opt/UMF/Operations/Tomcat/logs/localhost_access_log.txt
forced from command line (7 rotations)
empty log files are not rotated, old logs are removed
considering log /opt/UMF/Operations/Tomcat/logs/catalina.out
log needs rotating
considering log /opt/UMF/Operations/Tomcat/logs/localhost.log
log needs rotating
considering log /opt/UMF/Operations/Tomcat/logs/localhost_access_log.t
xt
```

```

log needs rotating
rotating log /opt/UMF/Operations/Tomcat/logs/catalina.out, log->rotate
Count is 7
dateext suffix '-20150708'
glob pattern '-[0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9]'
glob finding old rotated logs failed
copying /opt/UMF/Operations/Tomcat/logs/catalina.out to /opt/UMF/Operations/Tomcat/logs/catalina.out-20150708
set default create context
truncating /opt/UMF/Operations/Tomcat/logs/catalina.out
compressing log with: /bin/gzip
rotating log /opt/UMF/Operations/Tomcat/logs/localhost.log, log->rotate
Count is 7
dateext suffix '-20150708'
glob pattern '-[0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9]'
glob finding old rotated logs failed
copying /opt/UMF/Operations/Tomcat/logs/localhost.log to /opt/UMF/Operations/Tomcat/logs/localhost.log-20150708
set default create context
truncating /opt/UMF/Operations/Tomcat/logs/localhost.log
compressing log with: /bin/gzip
rotating log /opt/UMF/Operations/Tomcat/logs/localhost_access_log.txt,
log->rotateCount is 7
dateext suffix '-20150708'
glob pattern '-[0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9]'
glob finding old rotated logs failed
copying /opt/UMF/Operations/Tomcat/logs/localhost_access_log.txt to /opt/UMF/Operations/Tomcat/logs/localhost_access_log.txt-20150708
set default create context
truncating /opt/UMF/Operations/Tomcat/logs/localhost_access_log.txt
compressing log with: /bin/gzip

```

### Caution

- The selinux setting must be changed to the following because writing logrotate to catalina.out is rejected.
- Since the sample uses copytruncate, the original file is copied and the content of the original file is cleared. Any log data being output during this process is lost.

## 9.2.2 Starting ServiceGovernor as a User with Non-Root Privileges

The Tomcat installed during installation of ServiceGovernor can be started under root privileges.

If there is a buffer overflow in the application server or the like when Tomcat is executed under root privileges, an arbitrary application could be executed under root privileges.

Consider starting Tomcat under non-root privileges, if necessary, by using the following procedure, for example.

### Caution

When the application server has been upgraded, execute this procedure again.

1. Creating a user

Create the user used to start Tomcat.  
Use any values to create the user name, password, home directory, and others.

Example:

```
useradd -d /opt/UMF/Operations/Tomcat -s /bin/sh mco
```

## 2. Changing the privileges of the Tomcat installation directory

Change the owner of the file in Tomcat installation directory to the created user.

Example:

```
chown -R mco /opt/UMF/Operations/Tomcat
chgrp -R mco /opt/UMF/Operations/Tomcat
```

## 3. Changing the user who starts Tomcat

Edit the startup script to change the user who starts Tomcat.

Modify the following file in a text editor.  
/etc/init.d/ServiceGovernor

Change the TOMCAT\_USER value to the user who created the file.

```
#
# set Environmental Variables.
#
RETVAL=0
PROG=ServiceGovernor
SERVICEGOVERNOR_HOME=/opt/UMF/Operations
TOMCAT_USER=mco
```

## 9.2.3 About Tomcat Shutdown Port

Immediately after installation of ApplicationServer, the shutdown port is running.

Consider the following measures for vulnerability.

- Change the shutdown character string.

Modify the following file with a text editor.

server.xml

```
<Server port="8005" shutdown="SHUTDOWN">
```

- Restrict access to the shutdown port.  
Limit access to the shutdown port (8005) by installing firewall equipment, setting iptables or software such as Windows Firewall.

# Chapter 10. Appendix

---

## Contents

10.1 About the Certificate for SSL/TLS Setting .....	65
10.2 Upgrading Java used by ServiceGovernor .....	67
10.3 Upgrading Tomcat used by ServiceGovernor .....	68
10.4 Recovering an Application Server .....	69

---

## 10.1 About the Certificate for SSL/TLS Setting

### Introduction

There are two ways of creating a server certificate.

One is to create a server certificate using a public certificate authority.

The other is to create a self-issued, self-signed certificate.

The latter should generally be used when access from many unspecified users is not permitted.

The way of setting the SSL/TLS setting varies according to the type of certificate you want to use; an example for each of both procedures is shown below.

#### Caution

Note that the procedures, extensions, and other information in this document are shown just as examples for reference purposes and we do not guarantee their contents.

#### Caution

Tomcat accepts key store files of JKS (default) or PKCS #12 format. In this document, the key store file format is JKS (default of Tomcat) unless otherwise noted.

### 10.1.1 Status Certificate Created Using a Public Certificate Authority

1. Create a secret key in the key store.

```
> keytool.exe -genkey -alias <Alias> -keyalg RSA -keystore <Keystore File Name> -storepass changeit
```

Set any value for each item to be input after execution of a command. For the password of the key, specify changeit.

#### Caution

If you want to change the password of the key from changeit, set the same password as that of the key store.

#### Caution

For CN, specify the host name or IP address that is used for access from the client.

2. Create a request to issue the server certificate.

```
> keytool.exe -certreq -alias <Alias> -keystore <Keystore File Name> -file <certreq_file>.csr -storepass changeit
```

3. Have a public certificate authority issue the server certificate.

Contact your provider for how to request the authority to issue the server certificate.

4. Install the certificate of the intermediate certificate authority (CA).

```
> keytool.exe -import -noprompt -trustcacerts -alias <Alias> -file <Intermediate certificate authority (CA)>.pem -keystore <Keystore File Name> -storepass changeit
```

5. Import the server certificate.

```
> keytool.exe -import -v -trustcacerts -alias <Alias> -file <Server certificate>.crt -keystore <Keystore File Name> -storepass changeit
```

## 10.1.2 Self-Issued, Self-Signed Certificate

The following illustrates the way of creating a self-issued, self-signed certificate using openssl.

1. Create a secret key.

```
> openssl genrsa -aes128 1024 > <Secret key>.key
```

2. Create a request to issue the server certificate.

```
> openssl req -new -key <Secret key>.key > <Request Certificate>.csr
```

### Caution

If you want to change the password of the key from changeit, set the same password as that of the key store.

### Caution

For Common Name, specify the host name or IP address that is used for access from the client.

3. Create the server certificate.

```
> openssl x509 -in <Request Certificate>.csr -days 365 -req -signkey <Secret key>.key > <Certificate>.crt
```

### Caution

This example assumes that the validity period of the certificate is 365 days.  
To change the validity period, change the value following the ?days option.

4. Convert the certificate to pkcs12 format.

```
> openssl pkcs12 -export -in <Certificate>.crt -inkey <Secret key>.key -out <Certificate>.p12 -name <Alias>
```

5. Import the server certificate.

```
> keytool -importkeystore -srckeystore <Certificate>.p12 -destkeystore <Keystore File Name> -srcstoretype pkcs12 -deststoretype JKS
```

## 10.2 Upgrading Java used by ServiceGovernor

Java used by ServiceGovernor may need to be upgraded individually due to its vulnerabilities or for some other reason.

In that case, upgrade Java by performing the procedure described below.

### Caution

- In a cluster environment, perform the procedure for both active and standby systems.
- For the verified latest versions, contact the NEC Customer Support Center.

1. From the Java download website, download the latest or other desired version of Java.  
When downloading Java, make sure that the extension of the file you download is tar.gz.
2. Stop the ServiceGovernor service by using the following command.

```
For Redhat 6.x
> /etc/init.d/ServiceGovernor stop

For Redhat 7.x
> systemctl -q stop ServiceGovernor.service
```

3. To save the folder that stores Java used by ServiceGovernor, change the name of the following folder to a desired one.

```
<installation directory>/Tomcat/JRE/JavaHome
```

4. Create the following folder to store the new Java software.

```
<installation directory>/Tomcat/JRE/JavaHome
```

5. Uncompress the downloaded Java file in the following folder.

```
<installation directory>/Tomcat/JRE/JavaHome
```

### Caution

Uncompress the file so that you have the following configuration after uncompressing.

```
<installation directory>/Tomcat/JRE/JavaHome/bin
<installation directory>/Tomcat/JRE/JavaHome/lib
```

6. Start the ServiceGovernor service by using the following command.

```
For Redhat 6.x
> /etc/init.d/ServiceGovernor start

For Redhat 7.x
> systemctl -q start ServiceGovernor.service
```

7. Delete the Java storage folder you saved.

This completes the Java upgrading procedure.

## 10.3 Upgrading Tomcat used by ServiceGovernor

Tomcat used by ServiceGovernor may need to be upgraded individually due to its vulnerabilities or for some other reason.

In that case, upgrade Tomcat by performing the procedure described below.

### Caution

- In a cluster environment, perform the procedure for both active and standby systems.
- For the verified latest versions, contact the NEC Customer Support Center.

1. From the Tomcat download website, download a desired version of Tomcat.

When downloading Tomcat, make sure that the extension of the file you download is tar.gz.

2. Uncompress the downloaded Tomcat file in a desired folder. Then, compress the bin and other folders under apache-tomcat-x.x.x in the uncompressed folder into tar.gz format.

Example: When you have a configuration shown below after uncompressing the downloaded file, compress the bin, conf, and all other folders under apache-tomcat-x.x.x into a single file.

```
<uncompressed folder>/apache-tomcat-x.x.x/bin
<uncompressed folder>/apache-tomcat-x.x.x/conf<uncompressed folder>/
apache-tomcat-x.x.x/lib
<uncompressed folder>/apache-tomcat-x.x.x/logs
<uncompressed folder>/apache-tomcat-x.x.x/temp
<uncompressed folder>/apache-tomcat-x.x.x/webapps
<uncompressed folder>/apache-tomcat-x.x.x/work
<uncompressed folder>/apache-tomcat-x.x.x/LICENSE
<uncompressed folder>/apache-tomcat-x.x.x/NOTICE
<uncompressed folder>/apache-tomcat-x.x.x/RELEASE-NOTES
<uncompressed folder>/apache-tomcat-x.x.x/RUNNING.txt
```

3. Stop the ServiceGovernor service by using the following command:

```
For Redhat 6.x
> /etc/init.d/ServiceGovernor stop

For Redhat 7.x
> systemctl -q stop ServiceGovernor.service
```

4. From the installation media, copy the files for installing ServiceGovernor to the Temporary folder. From the installation media, copy the following files to a desired folder.
  - <installation DVD>/Linux
  - <installation DVD>/tools
5. Change the name of the downloaded Tomcat file to apache-tomcat-linux.tar.gz, and save it to the following folder.
  - <copy destination folder>/Linux/Product/CloudProviderAPI/APServer/Tomcat
6. The points to note when upgrading Tomcat are the same as those for the ordinary upgrading procedure. See the following procedure.

["6.2 Upgrading the Application Server \(page 45\)"](#)

For upgrading, replace <installation DVD> with <copy destination folder> in the following procedure.

["6.2.1 Upgrading the application server from the installer \(page 46\)"](#)

7. Start the ServiceGovernor service by using the following command.

```
For Redhat 6.x
> /etc/init.d/ServiceGovernor start

For Redhat 7.x
> systemctl -q start ServiceGovernor.service
```

8. Delete the copy destination folder in Temporary to which you copied the installation media files.

This completes the Tomcat upgrading procedure.

## 10.4 Recovering an Application Server

Upgrading an application server may fail.

If the upgrade fails, recover the application server by performing the procedure described below.

1. Move the following backup directory of the application server to <Installation directory>, respectively.

```
<Installation directory>/Tomcat_BackUp/Tomcat_<Date>
```

The <date> refers to the date on which the upgrade was performed on the application server.

After moving the backup directory, rename them as follows.

```
<Installation directory>/Tomcat
```

2. When the registration of the ServiceGovernor service has been canceled, register the ServiceGovernor service by executing the following command.

Mount the DVD.

In this example, the mount point is "/mnt/dvd".

For Red Hat Enterprise Linux Server release 6

```
> cp -f /mnt/dvd/Linux/Product/CloudProviderAPI/etc/rc.d/init.d/ServiceGovernor /etc/rc.d/init.d/ServiceGovernor
> cd /etc/rc.d/init.d
```

For Red Hat Enterprise Linux Server release 7

```
> cp -f /mnt/dvd/Linux/Product/CloudProviderAPI/etc/systemd/system/ServiceGovernor.service /etc/systemd/system/ServiceGovernor.service
> cd /etc/systemd/system
```

Edit the ServiceGovernor file as follows:

For Red Hat Enterprise Linux Server release 6

```
#!/bin/bash
#
# ServiceGovernor: Startup script for the ServiceGovernor server.
#
# chkconfig: 2345 91 09
```

```

#
# description: ServiceGovernor server.
#
# processname: ServiceGovernor
#
#
# Source function library.
if [ -f /etc/rc.d/init.d/functions ] ; then
    . /etc/rc.d/init.d/functions
fi

#
# set Environmental Variables.
#
RETVAL=0
PROG=ServiceGovernor
SERVICEGOVERNOR_HOME=@SERVICEGOVERNOR_HOME@
TOMCAT_USER=root
export CATALINA_HOME=${SERVICEGOVERNOR_HOME}/Tomcat
export CATALINA_BASE=${SERVICEGOVERNOR_HOME}/Tomcat
export CATALINA_TMPDIR=${CATALINA_HOME}/temp
export JRE_HOME=${CATALINA_HOME}/JRE/JavaHome
SYSLOCK=/var/lock/subsys/${PROG}
PID_FILE=/var/run/${PROG}.pid
SHUTDOWN_TIMEOUT=5
. . .

```

#### For Red Hat Enterprise Linux Server release 7

```

# Systemd unit file for ServiceGovernor
# Systemd unit file for ServiceGovernor
#

[Unit]
Description=Startup script for the ServiceGovernor application server.
After=syslog.target network.target

[Service]
Type=forking
PIDFile=/var/run/ServiceGovernor.pid
Environment=CATALINA_PID=/var/run/ServiceGovernor.pid
Environment=SERVICEGOVERNOR_HOME=@SERVICEGOVERNOR_HOME@
Environment=CATALINA_HOME=@SERVICEGOVERNOR_HOME@/Tomcat
Environment=CATALINA_BASE=@SERVICEGOVERNOR_HOME@/Tomcat
Environment=CATALINA_OPTS=
Environment=JRE_HOME=@SERVICEGOVERNOR_HOME@/Tomcat/JRE/JavaHome

ExecStart=@SERVICEGOVERNOR_HOME@/Tomcat/bin/startup.sh
ExecStop=@SERVICEGOVERNOR_HOME@/Tomcat/bin/shutdown.sh
User=root
Group=root

[Install]
WantedBy=multi-user.target

```

\* Replace the **underlined** portions with <installation directory>.

\* Example: When <Installation directory> is /opt/UMF/Operations on Red Hat Enterprise Linux Server release 6

```
SERVICEGOVERNOR_HOME=/opt/UMF/Operations
```

Register the service.

For Red Hat Enterprise Linux Server release 6

```
> chmod +x ServiceGovernor
> chkconfig --add ServiceGovernor
> chkconfig ServiceGovernor on
```

For Red Hat Enterprise Linux Server release 7

```
> chmod 755 ServiceGovernor.service
> systemctl -q --system daemon-reload
> systemctl -q enable ServiceGovernor
```

3. Start the ServiceGovernor service by using the following command.

For Red Hat Enterprise Linux Server release 6

```
> /etc/init.d/ServiceGovernor start
```

For Red Hat Enterprise Linux Server release 7

```
> systemctl -q start ServiceGovernor.service
```

The recovery of the application server is now complete.

# Chapter 11.

## Open Source Software License

---

### Contents

11.1 About commons-codec-1.7.....	73
11.2 About commons-logging-1.1.1 .....	77
11.3 About log4j-1.2.14 .....	81
11.4 About jackson-all-1.8.5 .....	85
11.5 About Apache Tomcat 8.5 .....	89

---

## 11.1 About commons-codec-1.7

NEC uses open software "commons-codec-1.7" for this product according to the terms and conditions that are presented by the copyright holder (hereinafter "Apache License, Version 2.0").

### ■Target file

commons-codec-1.7.jar

### ■Copyright information

Apache Commons Codec  
Copyright 2002-2012 The Apache Software Foundation

This product includes software developed by  
The Apache Software Foundation (<http://www.apache.org/>).

-----  
-----  
src/test/org/apache/commons/codec/language/DoubleMetaphoneTest.java  
contains  
test data from <http://aspell.sourceforge.net/test/batch0.tab>.

Copyright (C) 2002 Kevin Atkinson (kevin@gnu.org). Verbatim copying  
and distribution of this entire article is permitted in any medium,  
provided this notice is preserved.

### ■License information

The following terms and conditions apply to the software licensed under  
the Apache License, Version 2.0.

Apache License  
Version 2.0, January 2004  
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

#### 1. Definitions.

"License" shall mean the terms and conditions for use, reproduction,  
and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by  
the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all  
other entities that control, are controlled by, or are under common  
control with that entity. For the purposes of this definition,

"control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the

Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.
4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:
  - (a) You must give any other recipients of the Work or Derivative Works a copy of this License; and
  - (b) You must cause any modified files to carry prominent notices stating that You changed the files; and
  - (c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and
  - (d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.
6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.
7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.
8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.
9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[ ]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the

same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

## 11.2 About commons-logging-1.1.1

NEC uses open software "commons-logging-1.1.1" for this product according to the terms and conditions that are presented by the copyright holder (hereinafter "Apache License, Version 2.0").

### ■Target file

commons-logging-1.1.1.jar

### ■Copyright information

```
// -----
// NOTICE file corresponding to the section 4d of The Apache License,
// Version 2.0, in this case for Commons Logging
// -----
```

Commons Logging

Copyright 2001-2007 The Apache Software Foundation

This product includes/uses software(s) developed by 'an unknown organization'

- Unnamed - avalon-framework:avalon-framework:jar:4.1.3
- Unnamed - log4j:log4j:jar:1.2.12
- Unnamed - logkit:logkit:jar:1.0.1

### ■License information

The following terms and conditions apply to the software licensed under the Apache License, Version 2.0.

Apache License

Version 2.0, January 2004  
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to

---

communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.
3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.
4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:
  - (a) You must give any other recipients of the Work or Derivative Works a copy of this License; and
  - (b) You must cause any modified files to carry prominent notices stating that You changed the files; and
  - (c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and
  - (d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or

documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.
6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.
7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.
8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.
9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only

on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[ ]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");  
you may not use this file except in compliance with the License.  
You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

## 11.3 About log4j-1.2.14

NEC uses open software "log4j-1.2.14" for this product according to the terms and conditions that are presented by the copyright holder (hereinafter "Apache License, Version 2.0").

### ■Target file

log4j-1.2.14.jar

### ■Copyright information

This product includes software developed by  
The Apache Software Foundation (<http://www.apache.org/>).

### ■License information

The following terms and conditions apply to the software licensed under the Apache License, Version 2.0.

Apache License  
Version 2.0, January 2004  
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally

submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.
3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.
4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:
  - (a) You must give any other recipients of the Work or Derivative Works a copy of this License; and
  - (b) You must cause any modified files to carry prominent notices stating that You changed the files; and
  - (c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and
  - (d) If the Work includes a "NOTICE" text file as part of its

distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.
6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.
7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.
8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[ ]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");  
you may not use this file except in compliance with the License.  
You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

## 11.4 About jackson-all-1.8.5

NEC uses open software "jackson-all-1.8.5" for this product according to the terms and conditions that are presented by the copyright holder (hereinafter "Apache License, Version 2.0").

■Target file

□ jackson-all-1.8.5.jar

■Copyright information

This product currently only contains code developed by authors of specific components, as identified by the source code files; if such notes are missing files have been created by Tatu Saloranta.

For additional credits (generally to people who reported problems) see CREDITS file.

#### ■ License information

The following terms and conditions apply to the software licensed under the Apache License, Version 2.0 .

Apache License  
Version 2.0, January 2004  
<http://www.apache.org/licenses/>

#### TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

##### 1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications

represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.
3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.
4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:
  - (a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

- (b) You must cause any modified files to carry prominent notices stating that You changed the files; and
- (c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and
- (d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.
6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.
7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.
8. Limitation of Liability. In no event and under no legal theory,

whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. **Accepting Warranty or Additional Liability.** While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[ ]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

```
Copyright [yyyy] [name of copyright owner]
```

```
Licensed under the Apache License, Version 2.0 (the "License");  
you may not use this file except in compliance with the License.  
You may obtain a copy of the License at
```

```
http://www.apache.org/licenses/LICENSE-2.0
```

```
Unless required by applicable law or agreed to in writing, software  
distributed under the License is distributed on an "AS IS" BASIS,  
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.  
See the License for the specific language governing permissions and  
limitations under the License.
```

## 11.5 About Apache Tomcat 8.5

NEC uses open software "Apache Tomcat" for this product according to the terms and conditions that are presented by the copyright holder (hereinafter "Apache License, Version 2.0").

**■Copyright information**

Apache Tomcat  
Copyright 1999-2014 The Apache Software Foundation

This product includes software developed at  
The Apache Software Foundation (<http://www.apache.org/>).

The Windows Installer is built with the Nullsoft  
Scriptable Install System (NSIS), which is  
open source software. The original software and  
related information is available at  
<http://nsis.sourceforge.net>.

Java compilation software for JSP pages is provided by Eclipse,  
which is open source software. The original software and  
related information is available at  
<http://www.eclipse.org>.

For the bayeux implementation  
The org.apache.cometd.bayeux API is derivative work originating at the  
Dojo Foundation

- \* Copyright 2007-2008 Guy Molinari
- \* Copyright 2007-2008 Filip Hanik
- \* Copyright 2007 Dojo Foundation
- \* Copyright 2007 Mort Bay Consulting Pty. Ltd.

The original XML Schemas for Java EE Deployment Descriptors:

- javaee\_5.xsd
- javaee\_web\_services\_1\_2.xsd
- javaee\_web\_services\_client\_1\_2.xsd
- javaee\_6.xsd
- javaee\_web\_services\_1\_3.xsd
- javaee\_web\_services\_client\_1\_3.xsd
- jsp\_2\_2.xsd
- web-app\_3\_0.xsd
- web-common\_3\_0.xsd
- web-fragment\_3\_0.xsd

may be obtained from <http://java.sun.com/xml/ns/javaee/>

**■License information**

The following terms and conditions apply to the software licensed under  
the Apache License, Version 2.0.

Apache License  
Version 2.0, January 2004  
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

---

## 1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise

designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.
3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.
4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:
  - (a) You must give any other recipients of the Work or Derivative Works a copy of this License; and
  - (b) You must cause any modified files to carry prominent notices stating that You changed the files; and
  - (c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and
  - (d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution

notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. **Submission of Contributions.** Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.
6. **Trademarks.** This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.
7. **Disclaimer of Warranty.** Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.
8. **Limitation of Liability.** In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.
9. **Accepting Warranty or Additional Liability.** While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX:How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[ ]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");  
you may not use this file except in compliance with the License.  
You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

---

**MasterScope Service Governor3.26.0  
Installation Guide  
(Linux)**

**March, 2018 1st Edition**

**NEC Corporation**

---

**©NEC Corporation 2012-2018**