

Server Installation Guide

Operations Center 5.5

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www.netiq.com/documentation

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About This Guide

The *Server Installation Guide* provides instructions for installing the Operations Center server and console, upgrading to a new version, applying patches and architecting a high availability solution.

- Chapter 1, "Installation Requirements," on page 7
- Chapter 2, "Operations Center Server Installation," on page 11
- Chapter 3, "Operations Center Console Deployment," on page 25
- Chapter 4, "Upgrading to Operations Center v5.5 from Previous Versions," on page 31
- Chapter 5, "Patching Operations Center Server Software," on page 35
- Chapter 6, "Implementing a High Availability Solution," on page 41
- Appendix A, "Running a Console or Unattended Installation," on page 61

Audience

This guide is intended for the Operations Center administrator who will install the product.

Feedback

We want to hear your comments and suggestions about this manual and the other documentation included with this product. Please use the *User Comments* feature at the bottom of each page of the online documentation.

Additional Documentation & Documentation Updates

This guide is part of the Operations Center documentation set. For the most recent version of the *Server Installation Guide* and a complete list of publications supporting Operations Center, visit our Online Documentation Web Site at Operations Center 5.5 online documentation.

The Operations Center documentation set is also available as PDF files on the installation CD or ISO; and is delivered as part of the online help accessible from multiple locations in Operations Center depending on the product component.

Additional Resources

We encourage you to use the following additional resources on the Web:

- NetIQ User Community (https://www.netiq.com/communities/): A Web-based community with a variety of discussion topics.
- NetIQ Support Knowledgebase (https://www.netiq.com/support/kb/product.php?id=SG_XOPERATIONSCENTER_1_2): A collection of in-depth technical articles.
- NetIQ Support Forums (https://forums.netiq.com/forumdisplay.php?26-Operations-Center): A Web location where product users can discuss NetIQ product functionality and advice with other product users.

Technical Support

You can learn more about the policies and procedures of NetIQ Technical Support by accessing its Technical Support Guide (https://www.netiq.com/Support/process.asp#_Maintenance_Programs_and).

Use these resources for support specific to Operations Center:

- Telephone in Canada and the United States: 1-800-858-4000
- Telephone outside the United States: 1-801-861-4000
- E-mail: support@netiq.com (support@netiq.com)
- Submit a Service Request: http://support.novell.com/contact/ (http://support.novell.com/contact/)

Documentation Conventions

A greater-than symbol (>) is used to separate actions within a step and items in a cross-reference path. The > symbol is also used to connect consecutive links in an element tree structure where you can either click a plus symbol (+) or double-click the elements to expand them.

When a single pathname can be written with a backslash for some platforms or a forward slash for other platforms, the pathname is presented with a forward slash to preserve case considerations in the UNIX* or Linux* operating systems.

A trademark symbol (®, ™, etc.) denotes a NetIQ or Novell trademark. An asterisk (*) denotes a third-party trademark.

1 Installation Requirements

The NetIQ Operations Center server and console are the main components of the Operations Center solution and should be installed before other Operations Center clients and products.

Operations Center has many components and products because it is an enterprise-level product that integrates data from many sources to provide a comprehensive view of the performance of your IT resources in terms of your businesses services. Prior to installing the Operations Center server, you should first read the *Operations Center 5.5 Getting Started Guide*. This guide provides guidance in deciding which Operations Center products and components to install and how they can best fit into your existing environment.

If you are planning on using Operations Center in a clustered environment, there are important configuration considerations. For more information, see Chapter 6, "Implementing a High Availability Solution," on page 41.

Operations Center requires specific hardware and software for some components. For these requirements, see the *Operations Center 5.5 Getting Started Guide*.

The following sections provide requirements for installing the Operations Center server software:

- Section 1.1, "Upgrade Considerations," on page 7
- Section 1.2, "General Installation Requirements," on page 7
- Section 1.3, "UNIX Installation Requirements," on page 8

1.1 Upgrade Considerations

If you are replacing an older version of Operations Center that is still installed on the target server, follow the instructions in Chapter 4, "Upgrading to Operations Center v5.5 from Previous Versions," on page 31 before installing the newer version.

1.2 General Installation Requirements

Before installing Operations Center server and console, do the following:

- Obtain a license file from NetIQ for the Operations Center software.

  You should have received a license file from Operations Center that permits you to run Operations Center software. Contact Support (https://www.netiq.com/support/) if you do not have a license file.

  For upgrades, a new license file for Operations Center software must be manually saved to the `/OperationsCenter_install_path/config` directory.
- Verify that all hardware and software meets the recommended requirements. For more information, see "Supported Versions and Hardware Requirements" in the *Operations Center 5.5 Getting Started Guide*.

- Confirm that file level security limits access to Operations Center software to authorized users only.
- Verify that the host machine's operating system has the latest patch and apply the patch, if necessary.

  Patch information for the supported operating systems can be found at the following URLs:

Windows	http://update.microsoft.com/windowsupdate/v6/default.aspx?ln=en-us
Sun Solaris	http://sunsolve.sun.com/show.do?target=patchpage

- If you have an existing installation of Operations Center server, back up all `.ini` properties files in the `config` and `template` directories.
- Make sure you have the following information available:
  - Operations Center server's IP address in dotted decimal format
  - Operations Center server's TCP/IP hostname
  - Web server port number
  - Web server port number for secure socket layer (SSL)
  - Operations Center license key file location
  - Account information to log in to the host machine as root (UNIX) or administrator (Windows)

NOTE: Access our award-winning Support Web site (https://www.netiq.com/support/) for a number of self-help resources and to register and check on service requests. For critical issues, we recommend that you call Support directly. Visit https://www.netiq.com/ContactsOffices/contacts_offices.jsp (https://www.netiq.com/ContactsOffices/contacts_offices.jsp)to find the phone numbers for your region.

1.3 UNIX Installation Requirements

If installing on a UNIX system, also do the following:

- Verify that you have a minimum of 500 MB of free disk space in the `/tmp` directory on the host machine.
- Verify that X Windows services are installed and configured correctly.
- Verify that the correct version of the JRE is installed in the path. For the correct version, see the *Operations Center 5.5 Getting Started Guide*.

In UNIX, users are granted a subset of the root superuser's capabilities. To prevent accidental alteration of important files or system resources, NetIQ recommends that you run the Operations Center software as a user other than root. We suggest logging in as root and creating a user ID called `formula` to use during the installation.

Do the following that are applicable:

- Section 1.3.1, "X Windows Configuration for UNIX," on page 9
- Section 1.3.2, "Verifying the JRE Version," on page 9

1.3.1 X Windows Configuration for UNIX

When running Operations Center software on a UNIX server, X Window services are required, even though the server does not have a graphical user interface. Operations Center uses X Window services for internal image handling.

The Operations Center installation program requires the X Window system to be set to display graphical (X client) applications on the local X server display. If X Windows is set to display on a nonlocal display, the installation program stalls, unable to display on the local machine.

In most cases, the environment variables are set so that programs that require the X Window system, including the Operations Center installation program, run on the local console.

Before starting the installation, verify that the X server access control is disabled and the DISPLAY environment variable is set to display on the local X server.

To verify proper X Windows configuration before installing Operations Center software:

1. Log in as the root user to the server where you will be installing Operations Center.
2. Create a user ID called `formula`.
3. Type `xhost +` at the command prompt to verify that the X server access control is disabled.

   If disabled, the following message displays:

   ```
   access control disabled, clients can connect from any host
   ```
4. As the user `formula`, verify that your DISPLAY environment variable is set to display on the local X server.

   If it is not, issue the following command:

   bsh or ksh: `export DISPLAY=`*`ip_address`*`:0.0`

   csh: `setenv DISPLAY=`*`ip_address`*`:0.0`

   Where *ip_address* is the IP Address of the server to run the display.

1.3.2 Verifying the JRE Version

Installation of Operations Center requires that correct version of the JRE is already loaded in the path. For the correct version of the JRE, see "Java Runtime Environment" in the *Operations Center 5.5 Getting Started Guide*.

To determine which version of JRE is currently installed:

1. Do one of the following:
   - **Windows:** Type `java -version` from the location at which it is installed.
   - **Unix:** Type `./java -version` from the *`Java_JRE_installation_path`*`/bin` directory.
2. If the correct version or higher is:
   - **Returned:** You are ready to install Operations Center. Continue with Chapter 2, "Operations Center Server Installation," on page 11.
   - **Not Returned:** Change the PATH to point to a valid JRE. On Windows, update the `path` Environment variable.

     For example, on UNIX:

```
export PATH=/opt/java1.7/jre/bin:$PATH
```

where `1.7` is the JRE version.

2 Operations Center Server Installation

NetIQ Operations Center provides a single CD for installing software for the Operations Center server, console and most Operations Center products. The dashboard and Configuration Management System (CMS) are installed from separate CDs, see the *Operations Center 5.5 Dashboard Guide* or the *Operations Center 5.5 Configuration Management System (CMS) Guide* for more information.

Do the first three of the following items in the order listed to install Operations Center on a server:

- Section 2.1, “Preparing to Install to a UNIX Machine,” on page 11
- Section 2.2, “Installing the Server Software,” on page 12
- Section 2.3, “Post Installation Tasks,” on page 14
- Section 2.4, “Uninstalling Operations Center from a Server,” on page 23
- Section 2.5, “Reinstalling Operations Center to a Server,” on page 23

2.1 Preparing to Install to a UNIX Machine

To prepare a UNIX machine:

1. Create a home directory to contain the Operations Center installation files if installing.

   Each flavor of UNIX provides its own administration tools for creating users. Refer to your UNIX documentation.

2. Assign the home directory that is at least 1 to 5 gigabytes in size when specifying the user profile.

   Operations Center software, its related components, and the log files they generate can easily require this much space.

3. Insert the Operations Center Installation CD into the CD drive of the server on which to install Operations Center software.

4. To mount the Operations Center Installation CD on Solaris, type (as root) the following commands where device path name is the directory path on which Operations Center software is to be installed:

   ```
   mkdir /cdrom
   mount /device path name/cdrom
   ```

5. Type `CD mount point/install command` at the command prompt for Solaris to run the installation program where the CD mount point is the drive in which the installation CD is inserted and the install command is the command for the specific type of installation method.

2.2 Installing the Server Software

Operations Center is installed by using an Installation Wizard. As an alternative, you can run a console installation or unattended (or silent) installation. See Appendix A, "Running a Console or Unattended Installation," on page 61.

To install the Operations Center Server software:

1. (Recommended) Stop all programs before continuing especially those any programs that might interfere with the Operations Center installation.
2. If installing on Windows 2012 and using a DVD/CD, mounted ISO or mounted network install, do the following:
   - **2a** Locate the installation .exe file:

     mount_location`\NOC\Disk1\InstData\Windows\VM\install.exe`
   - **2b** Right-click the file and select *Properties*.
   - **2c** Open the Compatibility tab, mark the *Run this program in compatibility mode for* option and select `Windows 7`.
3. Do one of the following:
   - **Windows:** Insert the Operations Center Installation CD.

     The installation wizard opens automatically after the CD is inserted into the machine. If not, type `install.bat` at a command prompt.

     If User Access Control (UAC) is enabled, you must run the installation as the Administrator.
   - **UNIX** Create a home directory for the installation and mount the Operations Center Installation CD. For more information see Section 2.1, "Preparing to Install to a UNIX Machine," on page 11.

     Type `install.sh` at a command prompt.
4. Review the contents of *License Agreement* and select the *I accept the terms of the License Agreement* radio button if you agree with the terms.
5. On the *Choose Java Virtual Machine* page, do the following to select the Java VM:
   - Select the *Install a Java VM specifically for this application* radio button to install the Java VM.
   - Select the *Choose a Java VM already installed on this application* radio button and select the desired Java VM from the list.
   - Select *Search for Others* to list additional installed VMs.
   - Select *Choose Another* to navigate to the location of the Java VM you want to use.

   If installing Operations Center on top of an existing installation (such as upgrading), see Chapter 4, "Upgrading to Operations Center v5.5 from Previous Versions," on page 31 before making a selection.

6 On the *Choose Install Set* page, select one of the following options:



Typical: Installs the most common application features including the Operations Center server (which includes Data Integrator, Service Level Manager, Service Configuration Manager, SQL Views, and adapter integrations) as well as Event Manager and Event Manager agent. To use this option:

1. Select the Typical icon.
2. Click *Next*.



Custom: Displays a modified *Choose Install Set* page, to select the components to install. Select this option if you wish to install the Experience Manager, ORB software, or Remote Containers. To use this option:

1. Select the Custom icon.
2. Click *Next* to display the modified page:
3. Select the check boxes for the features that you want to install.
4. Click *Next*.

7 On the *Choose Install Folder* page, click *Next* to accept the default installation directory. If necessary, click *Choose* to browse for a different location.

IMPORTANT: Do not install Operations Center software into a directory created with spaces as there are known technical issues. If this is unavoidable and you are installing on a Windows 64-bit platform, after completing the Operations Center software installation, copy the `bin\win64\launcher.exe` file into the `\OperationsCenter_install_path\bin` directory and rename it to replace the existing `mosformula.exe` file.

8 On the continuation of the *Operations Center Configuration* page, do the following:

8a Click *Choose* to select a different license file.

8b Specify a unsecured TCP/IP port number of the Web server in the *Web Server Port (HTTP)* field. If the default port is already in use, change the port number. For more information, see the Operations Center 5.5 Server Configuration Guide.

8c Specify a secure TCP/IP port for the Operations Center Web server in the *Web Server Port (HTTPS)* field. See the *Operations Center 5.5 Server Configuration Guide* for more information.

8d Deselect the *Automatically start Windows services* option to not start the server automatically when mosdaemon starts.

8e Select the *Run Configuration Manager after install* option to open the Configuration Manager immediately after installation.

9 If you selected *Custom* for the installation in Step 6 on page 13, depending on the features you are installing, you might be prompted to specify installation directory for the following:

- Experience Manager
- TecORB
- OvORB

To install in a directory other than the default directory, click *Choose* and click *Next*; otherwise, just click *Next* to install in the default directory.

For information on ORBs, see*ORB Installation* in the *Operations Center 5.5 Adapter and Integration Guide*.

10 If you selected *Custom* for the installation in Step 6 on page 13 and selected to install Experience Manager, on the *Experience Manager Configuration* page, specify the following as necessary:

Monitor Name: The fully qualified name of the server on which Experience Manager Monitor is installed.

IMPORTANT: When Experience Manager Monitors are added to the Experience Manager adapter later (from the Add Monitor dialog in the Operations Center console), it is important to use the same Experience Manager Monitor name as specified in this installation dialog.

Monitor Port: The port that the monitor listens to for information from Operations Center. The default is 6789.

WARNING: If another program uses the specified port, the Experience Manager Monitor does not successfully start or run.

Monitor Web Port: The port used by the Experience Manager Monitor's Web server to gather end user support data. The default is 8080.

WARNING: If another program uses the specified port, the Experience Manager Monitor cannot successfully start or run. Be sure to take into consideration ports used by other Web servers on the monitor host.

Monitor Daemon Thread Port: The port on which the BEM daemon listens for the BEM Monitor start, stop, and recycle commands issued from the Operations Center BEM adapter. The default is 7777.

Monitor Password: (Optional) Password to access the BEM monitor. If defining a password, note that when managing the BEM Monitor from Operations Center, the password is required.

Monitor Native Windows Event Port: Specify a port for the Native Windows Event Recorder/ Playback Engine to use to send events to the BEM Monitor. The default port is 6777.

Select *Install BEM as a Windows Service* to register the BEM Monitor with Windows and start it automatically every time Windows is started. For non-Windows installations, do not select this option. It is necessary to have administrative privileges on the machine in order to install the monitor as a Windows Service.

For more information on installing BEM, see the *Operations Center 5.5 Experience Manager Guide*.

11 On the *Pre-Installation Summary* page, verify the installation options listed and click *Install* to install Operations Center.

12 When the installation nears completion, the Configuration Manager launches if the option to do so was selected on the Operations Center server Configuration page (Step 8). Customize configuration settings as required for components of Operations Center including the server, Web server, Image server, and databases. Click *Close* to exit the Configuration Manager when finished.

See the *Operations Center 5.5 Server Configuration Guide* for information on the Configuration Manager.

13 When the installation is complete, continue with Post Installation Tasks.

2.3 Post Installation Tasks

Perform the following tasks in the order listed:

- Section 2.3.1, "Setting the Environment Path Variable," on page 15
- Section 2.3.2, "Configuring Display for Images on UNIX," on page 17

- Section 2.3.3, “Starting and Stopping the Server,” on page 18
- Section 2.3.4, “Verifying the Installation,” on page 21
- Section 2.3.5, “Configure the Installation,” on page 22

2.3.1 Setting the Environment Path Variable

After installation, if you want to run Operations Center startup and shutdown commands from any location, set the proper environment path variable.For UNIX, add the Operations Center `/bin` directory to the path variable so that the system can locate the command line utilities. For Windows, the patch can be set as a system variable or a user variable.

To set the environment path variable, do the following as necessary:

- “Setting the Path Variable in UNIX” on page 15
- “Setting the Path Variable for Microsoft Windows” on page 15

Setting the Path Variable in UNIX

To set the PATH variable:

1. Log in as the user named `formula`, or other root user that you created earlier.
2. To edit the profile or `cshrc` file (depending on which command shell you are using), perform one of the following steps:
   - If there is already a line containing `PATH=` or `setenv PATH`, append `:/`*`OperationsCenter_install_path`*`/bin` to that line.
   - If there is no line containing `PATH=` or `setenv PATH`, add the following lines and save to the file:

     bsh or ksh: export PATH=$PATH:/*OperationsCenter_install_path*/bin

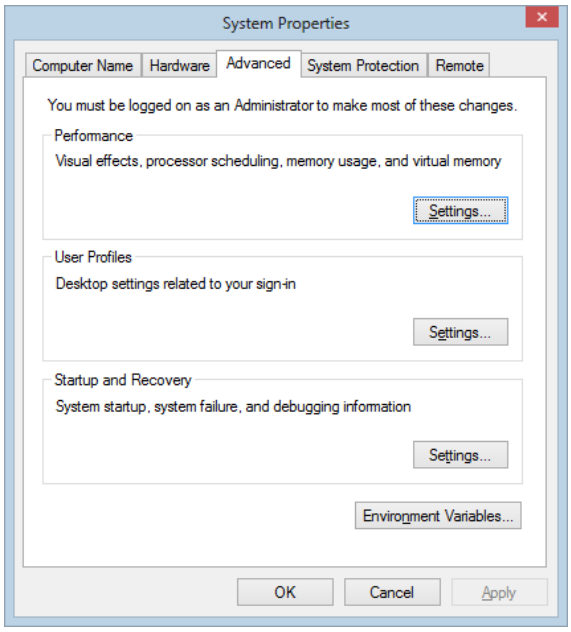
     csh: setenv PATH 'echo $PATH':/*OperationsCenter_install_path*/bin
3. Log out as the user named `formula`, then log back in so that the path changes can take effect.

Setting the Path Variable for Microsoft Windows

To set the path as a system variable:

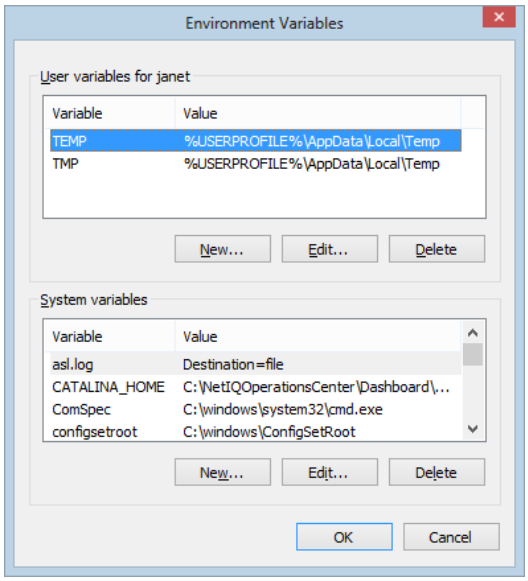
1. Open the Windows Control Panel, and edit the environment variables.

   For Windows 2008 and 2012 you can search on `environment variables` and find the link under *Settings*.



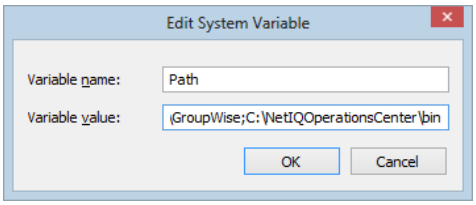
2 In the *Advanced* tab, click the *Environment Variables* button.

3 The Environment Variables dialog box is displayed:



4 Do one of the following:

- If the *Path* System variable exists:
  1. Select the *Path* item under *Environment Variables*, and click *Edit*.



2. Append the *Variable Value* declaration with `C:\OperationsCenter_install_path\bin` or the name of the drive and installation directory you specified on installation.

- If the *Path* variable hasn't been defined:
  1. Click *New* for the user's *User variables*.
  2. Specify `Path` for *Variable Name* and type `%Path%;drive:\OperationsCenter_install_path\bin` for the *Variable Value*.

2.3.2 Configuring Display for Images on UNIX

If you plan to use an HP OpenView adapter, NetView adapter or the Dashboard; and Operations Center is installed on a UNIX system, it is necessary that images be sent through Java over X11 protocol so they can be rendered in the Operations Center console or dashboard. This requires the installation of a virtual framebuffer from your operating system vendor.

To configure the display:

1 Download and install a virtual framebuffer from your operating system vendor:

- **Linux:** Install an X11 package containing Xsun or Xvfb.
- **Solaris:** Install an X11 package containing Xvfb.

2 Perform the following system configurations:

2a Edit the user profile for the `formula` user to set the DISPLAY environment variable to reference the display configured for virtual framebuffer.

2b Configure the virtual framebuffer to start automatically at system start or is part of the Operations Center startup process.

3 Start the virtual framebuffer.

4 Issue the following command to verify that the virtual framebuffer is running:

```
ps -ef |grep vfb
```

The output will vary depending on your system but shows you the location of the virtual framebuffer, as well as the display and screen name. For example:

- **On Solaris:** `/application_install_path/Xsun :display_name +nkeyboard +nmouse -dev vfb screen screen_name screen_resolution`
- **On Linux:** `/application_install_path/Xvfb :display_name -screen screen_name screen_resolution`

5 Do the following to specify the *X11 Display Name* property in the Configuration Managers to where the server listens for connection with the virtual framebuffer:

5a Do the following for the Operations Center server:

5a1 Open the Operations Center server's Configuration Manager.

5a2 Open the *Host* pane.

For more information see *Host Pane* in the *Operations Center 5.5 Server Configuration Guide*.

5a3 Specify the *x11 Display Name*.

For example, if the output in Step 4 is `/usr/X11/bin/Xvfb :1 -screen 0 1024x768x8`, set the x11 Display Name to `:1` or `:1.0`.

5b Do the following for the Operations Center Dashboard:

5b1 Open the Operations Center Dashboard's Configuration Manager.

For more information see *Verifying Configuration Settings* in the *Operations Center 5.5 Dashboard Guide*.

5b2 Open the *Host* pane.

5b3 Specify the *X11 Display Name*.

For example, if the output in Step 4 is `/usr/X11/bin/Xvfb :1 -screen 0 1024x768x8`, set the x11 Display Name to `:1` or `:1.0`.

2.3.3 Starting and Stopping the Server

You can start the Operations Center server either manually or automatically during start up. The server can take a few minutes to start. Check the `daemon.trc` file for an … `Address is in use`… message, which indicates that the Operations Center server is running. Or, check the status using the `mosstatus` command. Do not start the Operations Center console until the Operations Center server starts.

If there are any problems with starting the server, review the trace log files in the `/OperationsCenter_install_path/logs` directory. The daemon creates a trace log, as does the server. The trace logs store various error messages, such as `The license key could not be found.` Use any text editor to view the trace logs.

You can also stop the Operations Center server. If a message displays a message when shutting down Operations Center from Windows, adjust the Windows service timeout parameter, which is stored in the Windows registry. The timeout parameter is specified in milliseconds. The registry key is:

HKEY_LOCAL_MACHINE/SYSTEM/CurrentControlSet/Control/WaitToKillServiceTimeout

To start or stop Operations Center services:

- "Manually Starting the Operations Center Server" on page 19
- "Automatically Starting the Operations Center Server in Windows" on page 19
- "Starting the Operations Center Server in UNIX" on page 20
- "Stopping the Operations Center server in Windows" on page 20
- "Shutting Down the Operations Center server and mosdaemon service from Windows" on page 21
- "Stopping the Server and the mosdaemon from the Command Prompt in Windows" on page 21
- "Stopping the Server and the mosdaemon manually in UNIX" on page 21

Manually Starting the Operations Center Server

To manually start the Operations Center Server, do one of the following:

- **Windows:** Select *Start NetIQ Operations Center* under *Start* > *Programs* > *NetIQ Operations Center*.

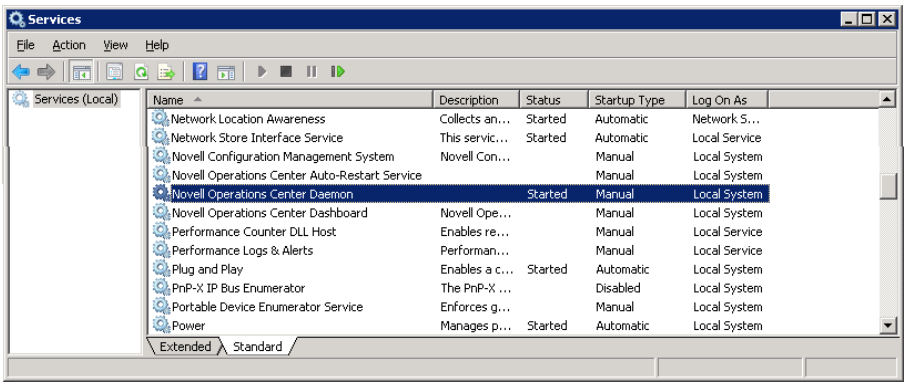
  Starting Operations Center via the Windows Start menu, starts the Operations Center server locally, but not as a service. Therefore, when you log out, the Operations Center server stops.
- **UNIX:** Log in as the user `formula` (or any user with root privileges) and from the `/OperationsCenter_install_path/bin` directory, type `mosdaemon` at a command prompt.

Automatically Starting the Operations Center Server in Windows

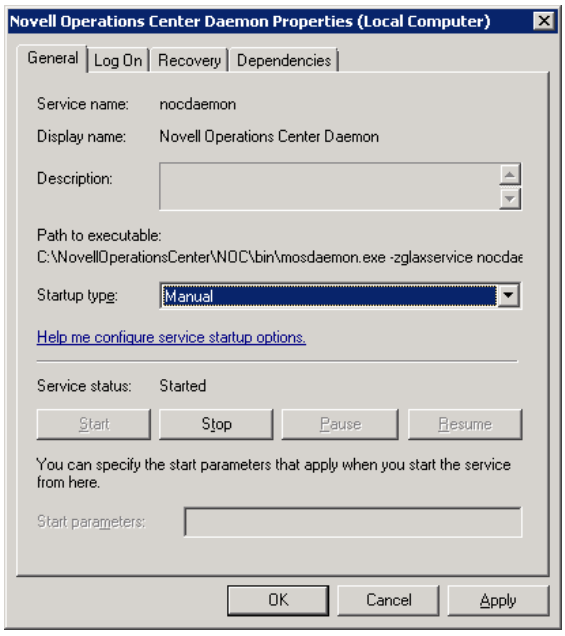
By default, the Operations Center daemon is configured to automatically start. If this is disabled, you can re-enable automatic startup by editing the property for the service.

To enable automatic start up for Operations Center:

1. From the desktop, click *Start*, *Settings*, *Control Panel*. For Windows 2003, in Category View, double-click the *Performance and Maintenance* link.
2. Double-click the *Administrative Tools* icon.
3. Double-click the *Services* icon. The Services dialog box is displayed:



4 Right-click *Operations Center Daemon* and select *Properties* to display the NetIQ Operations Center Daemon Properties dialog box:



5 Select *Automatic* from the *Startup Type* list.

Starting the Operations Center Server in UNIX

During installation, if you configured the server to automatically start, it starts shortly after the Operations Center daemon starts by default. If not, you will need to start it manually.

For more information on daemon configurations, see "Configuring Daemon Control" in the *Operations Center 5.5 Server Configuration Guide*.

To start the Operations Center server:

1 If the Operations Center daemon is not running, from the `/OperationsCenter_install_path/bin` directory enter `mosdaemon` at the command prompt.

2 Enter `mosstart Formula`.

The following messages display:

```
Starting the server "Formula" ...

The server "Formula" has been started.
```

Stopping the Operations Center server in Windows

From the desktop, click the *Start* button and then select *Programs* > *NetIQ Operations Center* > *Stop NetIQ Operations Center*.

Shutting Down the Operations Center server and mosdaemon service from Windows

1. From the desktop, click *Start* > *Settings* > *Control Panel*.

   For Windows XP, click *Start* > *Control Panel* > *Performance and Maintenance*.
2. Double-click the *Administrative Tools* icon to display the Administrative Tools dialog box.
3. Double-click the *Services* icon to display the Services dialog box.
4. Right-click the *Operations Center Daemon* line and select Stop.

   Stopping the daemon also shuts down the server.

Stopping the Server and the mosdaemon from the Command Prompt in Windows

From the *drive*:*OperationsCenter_install_path*\bin directory enter `mosstop -shutdown` at the command prompt where *drive* is the installation drive.

The server and mosdaemon stop.

Stopping the Server and the mosdaemon manually in UNIX

From the */OperationsCenter_install_path*/bin directory enter `mosstop -shutdown` at the command prompt.

The Operations Center server stops.

2.3.4 Verifying the Installation

After Operations Center software is installed, verify that the installation was successful before proceeding to install any other Operations Center software on the Operations Center server. To do this, start Operations Center and perform a status check.

The `mosstatus` command verifies that the Operations Center software started correctly. This command also lists the name and status of any adapters that are running, and the number of active sessions. At this point, there are no adapters running and no active sessions. Refer to the *Operations Center 5.5 Adapter and Integration Guide* for information on defining adapters.

To check the Operations Center server status:

- "Windows" on page 21
- "UNIX" on page 22

Windows

To verify the installation on Windows:

1. From the *drive*:*OperationsCenter_install_path*\bin directory, type `mosstatus -all` at the command prompt where *drive* is the installation drive.

   A message displays stating that the Operations Center software was successfully installed and is running.
2. Proceed to Section 2.3.5, "Configure the Installation," on page 22.

UNIX

To verify the installation on Unix:

1 From the */OperationsCenter_install_path*/bin directory, type `mosstatus -all` at the command prompt.

A message similar to the following displays:

```
Server Formula
Status: 0 adapter(s), 0 active session(s)
```

This message indicates that the Operations Center software is successfully installed and running. The message indicates that no adapters are running, as none has been defined.

2 Proceed to Section 2.3.5, "Configure the Installation," on page 22.

2.3.5 Configure the Installation

After installing and verifying the installation, configure the installation and/or access the Operations Center console. Some configurations might require restarting the Operations Center server.

1 Launch the Operations Center console or deploy the console to management machines.

NOTE: The default user account is `admin` with a password of `formula`.

For instructions, see Chapter 3, "Operations Center Console Deployment," on page 25.

2 Do one of the following to protect the security of your installation:

- Change the default password on the `admin` user account.
- Delete the default `admin` account and create a new administrator account.

For information about user and group accounts, see the *Operations Center 5.5 Security Management Guide*.

3 After installing and verifying the installation, configure the installation.

Refer to "Overview of Post-Installation Configurations" in the *Operations Center 5.5 Server Configuration Guide* for more information and links to the following configurations and more:

- **Run the Configuration Manager:** Configure settings for the Operations Center server as well as Configuration Storage. If you are installing on a cluster, run it after completing all the installations.
- **Create databases:** If you plan to use any external databases with Operations Center, you should create them. Be sure to see the sample scripts and Readme files in the */OperationsCenter_install_path*/databases/samples directory.
- **Define databases:** Many Operations Center data stores require database definitions that are created and managed in the Operations Center console.
- **Determine server security and networking settings, such as IP addresses:** For additional information about security in Operations Center, refer to the *Operations Center 5.5 Security Management Guide*.
- **Determine port usage:** Operations Center is installed using default ports, but do consider the ports currently used and how they fit within your environment.

- **Determine memory usage:** The Java Virtual Machine is configured with parameters for memory allocation and installs with these default values. Before adjusting the memory, it is important to understand how memory is allocated.

2.4 Uninstalling Operations Center from a Server

You can uninstall Operations Center software and its related components by running the uninstaller then deleting any remaining files in the Operations Center directory.

To uninstall Operations Center software:

1. Log in to the Operations Center server.
2. Stop the server and all related Operations Center services.
3. Do one of the following:
   - **Windows:** From the desktop, select *Start* > *Programs* > *NetIQ Operations Center* > *Uninstall NetIQ Operations Center*.
   - **UNIX:** From the `/OperationsCenter_install_path/Uninstall_NetIQ Operations Center v5` directory, type `./Uninstall_NetIQ_Operations_Center_ v5`.
4. Notice if the installer indicates that the server must be rebooted to complete the uninstall. Click *Quit* to finish uninstalling Operations Center software and close the window.
5. If advised in Step 4, reboot the server.

   When uninstalling some features, you will be notified by the installer that a reboot to the server is required to complete some install processes such as removing the Event Manager service. If required, it is important to perform this step before reinstalling Operations Center software.
6. If necessary, delete the directory where the Operations Center software was installed.

   The Uninstall window might state that not all files were deleted. This is normal, since the Operations Center installation generates some files that are not known to the installer such as logs.

2.5 Reinstalling Operations Center to a Server

To reinstall Operations Center to a Server:

1. Before reinstalling Operations Center software, back up the following directories under the existing Operations Center installation directory:
   - **database:** A repository for all new services, sites, scripts, and so on that are created by administrators.
   - **config:** Properties files.
   - **html/images:** Custom images.
   - **webapps:** Custom JSP Web pages.
   - **classes/ext**

A new Operations Center software installation overwrites only the following items:

Operations Center overwrites…	Because…
/OperationsCenter_install_path/`database/examples`	This directory might contain old examples that need to be updated with newer examples provided by Operations Center to increase flexibility.
/OperationsCenter_install_path/`database/scripts`	This directory might contain old examples that need to be updated with new examples provided by Operations Center to maximize Managed Object's flexibility regarding right-click operations and automation.
/OperationsCenter_install_path`/html/applet_params.xml` */OperationsCenter_install_path*`/html/index.jsp`	The */OperationsCenter_install_path/*`html` directory might contain changes to Operations Center software.

2 To reinstall Operations Center software, save a copy of the */OperationsCenter_install_path*`/config/license.dat` file for use during the reinstallation process.

3 Before reinstalling Operations Center software, stop Operations Center software and all its components, including the mosdaemon, all servers, and all ORBs.

3 Operations Center Console Deployment

The software for the NetIQ Operations Center console is deployed to your management machine using Java Web Start. You can open the console using the Operations Center server Login page, which you can modify.

NOTE: The default user account is `admin` with a password of `formula`.

- Section 3.1, "Launching the Console," on page 25
- Section 3.2, "Customizing the Console Login," on page 26
- Section 3.3, "Disabling Java Version Warnings on Console Launch," on page 28
- Section 3.4, "Deleting Older Versions of the Console," on page 29

3.1 Launching the Console

The Operations Center console is accessed through the Operations Center server Login page, which can be opened from a Web browser. For a list of supported Web browsers, see the *Operations Center 5.5 Getting Started Guide*.

To launch the Operations Center console:

1 On the machine where you have deployed the Operations Center console, do one of the following:

- Open a Web browser and access the following URL:

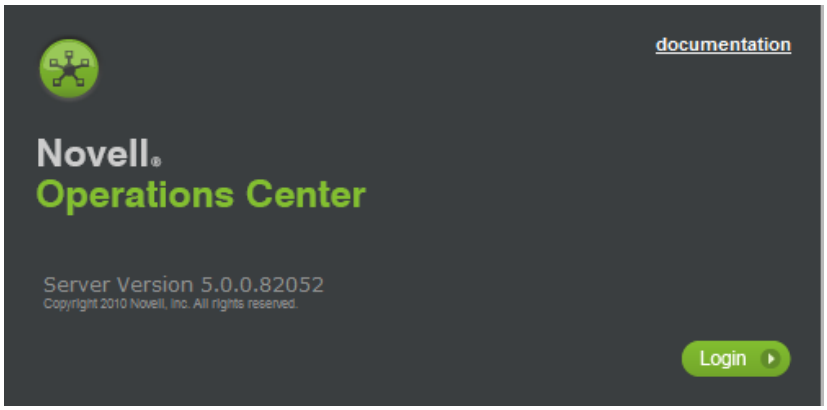
  `http://OperationsCenterServer:port`

  where `port` is the port specified during the configuration of the Operations Center server. By default, it is port 80.

- If you've previously accessed the Operations Center console, click the desktop shortcut to the Operations Center server Login page.

  A shortcut is automatically created when you access the Operations Center console the first time.

The following page is displayed:



2 Click *Login* and enter a user ID and password.

These are assigned using the Operations Center console.

If you are using Java Web Start over HTTPS, you must have a valid certificate that is recognized by the JRE. See the *Operations Center 5.5 Security Management Guide* for more information about user accounts and communication security.

3 If the JRE is not installed or has not been updated to version 1.6, follow the prompts to install or upgrade the JRE. If an upgrade is necessary, exceptions are displayed in the Java console which can be ignored.

4 The Operations Center console opens.

If the Operations Center console application is not found or does not match the version loaded on the Operations Center server, Java Web Start automatically downloads all of the necessary files from the Operations Center server to the console machine. It then caches the files on the console machine so that the console application can be restarted at any time, using a desktop icon or a browser link.

The mechanism that automatically updates the Operations Center console on the Operations Center console machine is optimized to reduce network traffic. It analyzes the differences between the version of the Operations Center console's `.jar` file loaded on the Operations Center console machine and the version of the Operations Center console's `.jar` file installed on the server, and sends only the differences to the Operations Center console machine.

To determine the differences, the server must contain both the latest version of the Operations Center console software and the same version that is installed on the Operations Center console machine. If the server cannot find the version of the Operations Center console software that is loaded on the Operations Center console machine, it sends the entire latest version of the Operations Center console software to the Operations Center console machine.

3.2 Customizing the Console Login

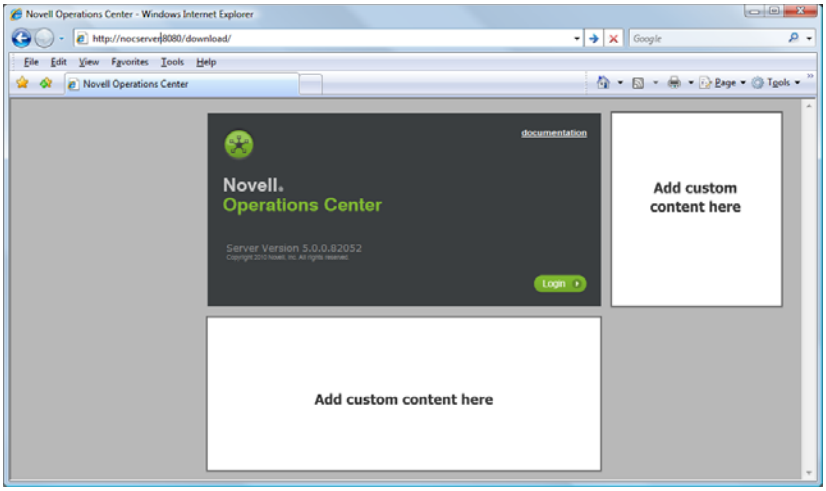
To further customize browser defaults, console configuration and console focus:

- Section 3.2.1, "Adding Custom Content to the Server Login Page," on page 27
- Section 3.2.2, "Browser Default and Console Configuration," on page 28
- Section 3.2.3, "Customizing the Console Element Focus," on page 28

3.2.1 Adding Custom Content to the Server Login Page

Custom content can be added to the Home or Documentation Web pages using Hypertext Markup Language (HTML). Custom content can be placed on the right side or bottom of the Operations Center server Login page as shown below.

Figure 3-1 *Add Custom Content to the Server Login or Documentation Pages.*



Because adding custom HTML content requires a working knowledge of HTML and XML (Extensible Markup Language), a basic understanding of HTML is required to complete this procedure.

To add custom content to a Operations Center server Login page:

1. In a text editor, create an HTML file containing content to display on the Operations Center server Login page and save it to the */OperationsCenter_install_path*/config directory:
   - Do not use well-formed HTML files since this code is imported into a well-formed document. Use only the HTML code that is normally between the <body> tags.
   - Do not use frames because they cause formatting errors.
   - To retain the customized files in a separate folder, save them in a new folder named custom in the */OperationsCenter_install_path*/config directory.
2. Create a new file named customcode.xml in the */OperationsCenter_install_path*/config directory.
3. Insert and edit the following code to refer to the HTML files created in Step 1:

```
<clientconfig>
<page name="default">
<position name="right" relativeUrl="/custom/test.html" />
<position name="bottom" relativeUrl="default" />
</page>
</clientconfig>
```

4. Re-start the Operations Center server.

3.2.2 Browser Default and Console Configuration

The */OperationsCenter_install_path*/html/browser_defaults.xml file specifies the defaults for running the Operations Center Client via a browser. If a user has not run Operations Center before, the browser uses the default behavior specified in this file.

You can change the current Operations Center console configuration directly through the applet_params.xml file located in the */OperationsCenter_install_path*/html directory.

You can create a custom applet parameters file that is not overwritten during installation. Saving custom parameters in a separate file called applet_params.custom.xml guarantees that you need not reapply them after installation.

The Operations Center server merges the applet_params.xml and the apple_params.custom.xml upon startup and creates a file named applet_params.GENERATED.xml. Do not modify this file. The server uses this file to create all applet parameters. During future installations, the applet_params.custom.xml file remains intact and is merged with the updated applet_params.xml.

WARNING: Do not modify the applet_params.GENERATED.xml file.

To create a custom applet_params.xml file:

1. Copy the existing */OperationsCenter_install_path*/html/applet_params.xml file to a new file named applet_params.custom.xml.
2. Follow the same XML hierarchy as the applet_params.xml file and remove all duplicate parameters. Add new parameters where necessary.
3. Restart the Operations Center server.

3.2.3 Customizing the Console Element Focus

Optionally, append the login URL with the -targetdname parameter to override the profile preferences for the primary user window and specify the element to be selected when the client starts:

http://*OperationsCenterServer*:*port*/client?-targetdname=*Base64encoded_dname*

To find the Base64 dname, go to http://*OperationsCenterServer*:*port*/toolkit/util/dname.jsp and navigate to the desired element. View dname, and the URL encoded and Base64 id displayed.

Note that this option can be used to customize the Operations Center Client start script in the */OperationsCenterServer*/bin directory.

3.3 Disabling Java Version Warnings on Console Launch

A Java version check is automatically performed when the Operations Center console is launched. After the user specifies to ignore the warning message, no additional checks are made until Operations Center is upgraded. This process can be disabled (and the warning messages turned off) by setting a property in the Formula.custom.properties file.

To disable the Java verification check, add the following line to the */OperationsCenter_install_path*/config/Formula.custom.properties file:

```
Formula.Client.suppressJavaCheck=true
```

For more information about the custom properties file, see *Making Custom Changes* in the *Operations Center 5.5 Server Configuration Guide*.

3.4 Deleting Older Versions of the Console

NetIQ recommends deleting old `.jar` files to ensure that users access the latest version of Operations Center software. Older versions of the Operations Center console `.jar` files are located in the `/`*`OperationsCenter_install_path`*`/html/client` directory. Do not delete the corresponding `.jar` file in the `launch.jnlp` file (the current version ID `.jar`).

WARNING: Do NOT delete the current client `.jar` file. Deleting the current version of the Operations Center console `.jar` file causes Java Web Start to fail.

---

4 Upgrading to Operations Center v5.5 from Previous Versions

NetIQ Operations Center supports upgrades to 5.5 from versions 5.0 March 2014 Patch Release, or 5.0 October 2014 Patch Release. For assistance with the other upgrades, contact Support (https://www.netiq.com/support/).

If you have customized the Operations Center configuration, properties, or templates, it is necessary to follow instructions for retaining those changes when upgrading.

The Operations Center servers can be upgraded one at a time to allow Operations Center to be available to users during the upgrade process. The upgrade strategy varies depending on your Operations Center installation.

After an upgrade is performed, you can restore earlier versions of Operations Center if you encounter issues.

Review the following sections to perform an upgrade of the Operations Center software:

- Section 4.1, "Determining an Upgrade Strategy," on page 31
- Section 4.2, "Retaining Custom Settings," on page 32
- Section 4.3, "Performing the Upgrade to 5.5," on page 32
- Section 4.4, "Completing the Upgrade," on page 32
- Section 4.5, "Restoring Your Previous Version of Operations Center," on page 33

4.1 Determining an Upgrade Strategy

Operations Center allows upgrading one server at a time while continuing to provide access to the Operations Center product.

We advise that you transition to Operations Center 5.0 quickly, within several days to a few weeks. You should not maintain a mixed version environment for an extended period of time.

Table 4-1 describes how you can upgrade to the next version of Operations Center software based on your environment and the number of Operations Center servers.

Table 4-1 *Operations Center Upgrade Strategies*

Installation Configuration	Upgrade Strategy
Single Operations Center server	Set up a new server, install version 5.x, test it, then switch all users to the new server. Shut down the old server and upgrade it to version 5.x.
Multiple Operations Center servers that do not share ORBs	Upgrade one server at a time to version 5.x.

Installation Configuration	Upgrade Strategy
Multiple Operations Center servers that share ORBs	Contact Support (https://www.netiq.com/support/) for instructions on upgrading servers and installing two versions of ORBs.

If you have custom settings, continue with Section 4.2, "Retaining Custom Settings," on page 32.

4.2 Retaining Custom Settings

Upgrades to the Operations Center server overrides settings in the `formula.properties` file and the `templates` directory. To retain your custom settings, do the following:

1. To capture customizations made to files in the following directories, which are overwritten during an upgrade, make a copy of the following directories:
   - *`installation_path`*`/config/template`
   - *`installation_path`*`/html/classes/template`
   - *`installation_path`*`/bin/template/html/template`

   WARNING: Do not overwrite any files in these locations with your older versions of them. The copies made of these files before an upgrade are for reference only. After the upgrade, each file must be opened and directly edited to reinsert any custom changes.
2. Continue with Section 4.3, "Performing the Upgrade to 5.5," on page 32 or Section 4.3, "Performing the Upgrade to 5.5," on page 32.

4.3 Performing the Upgrade to 5.5

Before performing any upgrades, consult the Release Notes and the Readme for any technical considerations. To upgrade to version 5.5, you must be running version 5.0 March 2014 Patch Release, or 5.0 October 2014 Patch Release.

If upgrading a version 5.0 installation to version 5.5, perform the following steps before installing version 5.0:

1. Shut down the Operations Center server.
2. Continue with Chapter 2, "Operations Center Server Installation," on page 11.

4.4 Completing the Upgrade

Perform the following steps to compete the upgrade:

1. After upgrading, clean up the upgraded installation directory by removing the following files without causing harm to the system:
   - Client, Server, Experience Manager, and Event Manager (Eve) patch directories are renamed and retained upon upgrade.

     You can delete any of these renamed directories without affecting anything other than the ability to rollback to a prior version of Operations Center.

- Files in the `/database/notconverted` directory.

  This directory exists after you start the Operations Center server the first time. Review these files before deleting them to ensure that everything that should have been converted during upgrade was converted cleanly.

2. Manually edit the hierarchy XML files for existing Data Integrator adapter definitions or other adapters to point to the NetIQ DTD web site at http://www.netiq.com/dtds/hierarchy_2.0.dtd.

   - XML files for Data Integrator definitions are located in `/OperationsCenter_install_path/bdi/adapter_name/data/adapter_nameHierarchy.xml`.
   - XML files for adapter definitions are located in `/OperationsCenter_install_path/database/examples`. To verify the XML file used for an adapter, check the adapter's property settings.

3. If upgrading to 5.0 September 2011 Patch Release or later, recreate any links to existing EMC SMARTS objects from the Services hierarchy or in BSCM definitions.

   The DName structure for EMC SMARTS adapter elements has been modified for the support of multiple domains.

4. (Optional) You may want to disable the Java version check on console launch. This will turn off the warning message to users that the version has changed. For instructions, see Section 3.3, "Disabling Java Version Warnings on Console Launch," on page 28.

4.5 Restoring Your Previous Version of Operations Center

If an upgrade fails, you can restore your previous version of Operations Center:

1. Stop the Operations Center server and all components completely, including mosdaemon, all servers, all adapters, and all ORBs.

   For details on stopping ORBs, see "ORB Installation" in the *Operations Center 5.5 Adapter and Integration Guide*

   For details on stopping mosdaemon and all servers, see "Manually Stopping Operations Center Components" in the *Operations Center 5.5 Server Configuration Guide*.

2. Turn off the Auto-Restart Service if it is running.

   For details about the auto-restart service, see "Configuring an Auto-Restart" in the *Operations Center 5.5 Server Configuration Guide*.

3. Restore the previous copy of your databases.

   For assistance with restoring your database, see your Database Administrator.

4. Reinstall your prior version.

   Follow the upgrade instructions in this chapter and see Chapter 2, "Operations Center Server Installation," on page 11.

5. Restore the backup copies of the configuration files that were made prior to the upgrade.

   Migrate any custom changes made in files from directory backups in Section 4.2, "Retaining Custom Settings," on page 32 into the new properties files.

5 Patching Operations Center Server Software

In addition to providing product upgrades through a new version of the product, NetIQ Operations Center distributes product enhancements and any required updates in patch files.

Patch files are delivered by Technical Support via e-mail through a designated FTP site, or by CD. Always review the Readme and e-mail associated with the patch carefully for updated instructions on applying the patch and for any technical considerations.

The instructions related to the patch in this chapter pertain only to patches for version 5.0 and not for any prior versions.

- Section 5.1, “Understanding Patch Names,” on page 35
- Section 5.2, “Pre Installation Tasks,” on page 36
- Section 5.3, “Installing a Server Patch,” on page 36
- Section 5.4, “Rolling Back a Patch Installation,” on page 38
- Section 5.5, “Installing the Patch on a Client,” on page 39

5.1 Understanding Patch Names

Operations Center patch releases for Operations Center version 5.0 use the following naming convention: *nnn-yyyy-mm-dd*CR*iiiiii*-R*xxxxx*-META-*product*.jar as defined in Table 5-1.

Table 5-1 *Patch File Naming Convention*

Patch File Name Component	Explanation
nnn	Software version number (i.e., 500 for version 5.0.0).
yyyy	Current year
mm	Current month (i.e., 03 for March)
dd	Current day (i.e., 01, 02, 03)
iiiiii	Issue number
xxxxx	Release number
META	If present in the patch file name, indicates that the patch contains all interdependent patches.

Patch File Name Component	Explanation
product	Indicates the product component that the patch is applied to: ◆ **BEM:** the Operations Center Experience Manager. ◆ **NOC:** the Operations Center server. ◆ **DASH:** Operations Center Dashboard. ◆ **CMS:** Operations Center CMS. See the *Operations Center 5.5 Experience Manager Guide* for more information on installing Experience Manager patches. See the *Operations Center 5.5 Dashboard Guide* for more information on installing dashboard patches.

5.2 Pre Installation Tasks

Before upgrading or installating a patch, do the following:

- Make a backup of the Operations Center directories, configuration storage database and Service Warehouse database.
- Make a copy of any custom template files, using a unique name extension to identify the files as custom, found in the following directories:
  - `/OperationsCenter_install_path/config/template`
  - `/OperationsCenter_install_path/bin/template`
  - `/OperationsCenter_install_path/html/client/template`

  WARNING: Patch bundles overwrite several template and properties files that are known to be routinely modified by our customers. It is the customer's responsibility to document and manage custom template and properties files.
- Verify the installation directory in the file system has a minimum free disk space of twice the size of the patch bundle file. For example, if the `.jar` file is 50 MB, then the free disk space should be at least 100 MB.

5.3 Installing a Server Patch

The procedure for installing the patch is the same for UNIX and Windows. The type of file for a patch is `.jar`. If you receive the file with a different extension, rename it to `.jar` before installing it.

One or more patches can be applied at a time, but patches and rollbacks cannot be applied at the same time with the same command. When a patch has already been applied, but is a older version than what you are installing, it is necessary to rollback the patch before installing the newer version of the patch.

When a patch bundle is applied, all previously applied patches are removed before the patch is applied.

To install the patch:

1. Verify all clients are logged off.
2. Shutdown all Operations Center processes.

3 Copy the patch bundle file to the Operations Center installation root directory.

4 At the command prompt from within the Operations Center installation directory, enter:

```
java -jar patch_filename(s) patch_option(s)
```

For example:

```
C:/OperationsCenter_install_path>java -jar 500-20110328-NOC.jar --describe
```

where `C:/OperationsCenter_install_path>` is your command prompt. Note that patch files can be listed in any order as the installation process automatically sorts and applies them.

and where, `patch_filename(s)` can be a list of one or more patch files separated by a space,

and where, `patch_option(s)` are any of the following commands that can be added at the end of the patch command:

- **--help:** Displays a list of possible commands including the following options.
- **--describe:** Prints patch manifest information
- **--prompt:** Displays the Operations Center Configuration Manager after the patch is installed.
- **--verbose:** Prints detailed information to the screen as the patch is installed.
- **--force:** Forces a patch to install even if it has already been applied. Never use the force command unless instructed to by Technical Support.

If installing on Windows and User Access Control (UAC) is enabled, you must run the command prompt as the Administrator.

5 During installation, the following occurs:

- A back up is automatically created for all files that are overwritten. For more information about rollback files, see Section 5.4, "Rolling Back a Patch Installation," on page 38.
- Patches (of the same version) that have already been applied are skipped unless the `--force` option was set.
- The Operations Center Configuration Manager always runs silently and applies the current settings.
- The patch does not override the existing Operations Center Configuration Manager settings.

  For more information regarding the Operations Center Configuration Manager, see the *Operations Center 5.5 Server Configuration Guide*.
- A `Done` message displays when the patch install completes and the command prompt displays.

6 After the installation is complete, do the following:

6a Implement custom template modifications into the new template files.

Do NOT overwrite new template files with old template files or modify default properties files. Add custom property modifications into a custom.properties file. For example, any customizations to the `Formula.properties` file should be added to a `Formula.custom.properties` file. For more information about the custom properties file, see "Making Custom Changes" in the *Operations Center 5.5 Server Configuration Guide*.

6b Run the Operations Center Configuration Manager and make changes as needed.

6c Start the Operations Center server.

6d Log on to the Operations Center server as the Operations Center user.

6e If running an FX Monitor from another location other than the default */OperationsCenter_install_path*/html/classes/ directory, do the following:

6e1 Shutdown the FX Monitor.

6e2 Copy the */OperationsCenter_install_path*/html/classes/fxmonitor.jar file to the alternate FX Monitor location.

6e3 Start the FX Monitor.

For more information about the FX Adapter, see *Operations Center 5.5 F/X Adapter Guide*.

6f If running Relay, do the following:

6f1 Shutdown Relay.

6f2 Copy the relay/bin/relay.jar file into the *relay_base_directory*/bin directory.

6f3 Start Relay.

6g If running HP Network Node Manager (NNM), do the following:

6g1 Shutdown the OvORB service.

6g2 Rename the *OvORB_base_dir*/integrations/nnm.jar file as nnm-ga.old.

6g3 Copy the */OperationsCenter_install_path*/integrations/nnm.jar file into the *OvORB_base_dir*/classes directory.

6g4 Start the OvORB service.

For more information about OvORB, see "OvORB for HP OpenView Network Node Manager" in *Operations Center 5.5 Adapter and Integration Guide*.

If an Experience Manager patch is supplied, additional steps are required to update Experience Manager (see the *Operations Center 5.5 Experience Manager Guide* for more information).

After the patch has been installed and a rollback file is created, the patch cannot be installed again. If you attempt to run the patch bundle .jar file again, the following error messages are displayed:

```
ERROR: Unable to continue since rollback jar already exists
```

```
ERROR: unable to create rollback jar
```

5.4 Rolling Back a Patch Installation

As part of the patch installation process, Operations Center automatically backs up all files that are overwritten and places them in a file called *patch_filename*-rollback.jar, such as 500-201080723-NOC-rollback.jar.

If you decide to remove the changes made by the patch to Operations Center, run this rollback JAR file from the Operations Center root installation directory. The command for running the rollback file is the same as when the patch is installed. For example:

```
C:/OperationsCenter_install_path>java -jar 500-20100723-NOC-rollback.jar
```

When multiple rollback patches are applied using the same command, they are applied in the reverse order.

5.5 Installing the Patch on a Client

The files necessary to update the Operations Center console are installed automatically when the patch is installed on the Operations Center server. For users that are logged in to the Operations Center server during the patching process, they must log out and back in again to see the updates.

6 Implementing a High Availability Solution

Corporate applications utilized by large audiences typically require a higher level of availability. However, other applications can require a higher level of availability based solely on user type, as in the case of corporate executives, partners, or customers.

Regardless of the need, methods used to achieve higher levels of availability are numerous. Understanding availability requirements, as well as the extent of the required availability, must be identified before implementing a solution. This section discusses the aspects of Operations Center as it relates to availability of the Operations Center server and information required in order to architect a high availability solution.

TIP: If Fault Tolerance and High Availability are important goals of your implementation, NetIQ recommends that you contact your Account Manager to set up a meeting to discuss your requirements in order for us to assist you in designing a solution that best fits your needs.

This section covers the following topics:

- Section 6.1, “Introduction to Availability, Fault Tolerance, and Redundancy,” on page 42
- Section 6.2, “Architecting a High Availability Solution,” on page 43
- Section 6.3, “Implementing a High Availability/Disaster Recovery (Hot/Hot) Configuration,” on page 46
- Section 6.4, “Configuring Operations Center for Clustering,” on page 48
- Section 6.5, “Upgrading Operations Center in a High Availability Environment,” on page 58
- Section 6.6, “Scaling Operations Center,” on page 58

6.1 Introduction to Availability, Fault Tolerance, and Redundancy

High Availability (HA) and Fault Tolerance (FT) are terms used to convey the importance to the total amount of time that an application is up and running. Availability requirements might include specific days and times; or can be 24 hours a day, 7 days a week. In addition, there is a percentage of uptime that must be met, such as “five nines” equating to 99.999% or “three nines” equating to 99.9%.

While costs of achieving the goal are directly correlated to the number of “nines” required, specific calculations aren’t available as HA and FT solutions are different from application to application. However, because implementations are the same in concept, the following points should be taken into account when planning your solution:

- **Fault Tolerance:** This design allows the system to continue operating, possibly at reduced levels, when specific technologies fail.

  For example, a single disk fails in a RAID 5 volume set. The RAID 5 guidelines allow for a single disk to fail while the entire volume continues to operate without data loss. If for some reason a second disk in the RAID volume fails, the disk volume is no longer available and the applications fail. At this point, the recovery time is the time required to replace two drives, restore the file system, and bring the server back online.

  Requirements dictate the levels of redundancies necessary to achieve high levels of Availability. Configuring mirrored drives is good, configuring mirrored RAID drives is better. Configuring dual servers with mirrored RAID drives could even be better, but at double the cost.

  Redundancy is not just servers and hardware; it also touches the networking components, other applications in the environment, and possibly even other companies that are providing a service to you. The Availability requirements might dictate that all of it be protected, or it might put “fences” around specific technologies that must be protected.

- **High Availability:** Is typically used around the running state of an application and generally deals with the whole system as an entity being available.

  Dual Web servers providing the same Web based applications make an application more available in the event something on one of the servers (or the server itself) stops working in such a manner that the application no longer works. Users then utilize the secondary server while the primary is being repaired. Providing the dual Web servers is the initial step to High Availability. Providing the Web service to the users in a manner that users do not know that a server failed and that they are now running on the backup is the next step.

- **Downtime:** Refers to periods of time when the system is not available.

  Planned downtime is the result of a logical, management-initiated event and usually is maintenance that cannot be avoided. Unplanned downtime events typically arise from some physical event, such as a hardware or software failure. Planned downtime is often excluded from availability calculations because there is little or no impact on users because of scheduling. However, if a backup server can be used during these downtime periods, it is possible that users won’t even be aware that the server was down.

The following technologies and/or Operations Center's products commonly have HA/FT requirements:

- Operations Center Server
- Management Systems integrated with Operations Center
- Databases integrated with Operations Center
- Secondary applications and/or tools launched or integrated with Operations Center, such as Help Desk software, Knowledgebase systems, Reporting software, and so on
- Networking components (LAN and/or WAN)

6.2 Architecting a High Availability Solution

Implementing a stand alone system with some fault tolerance - such as a single Operations Center Server in an environment on a RAID volume with a UPS - is never a configuration that can achieve 99.999% availability. Any single failure (such as software, motherboard, network card, and so on) causes the service to be unavailable to end users until the problem is resolved. And, in the case of a Operations Center integration, the management systems that Operations Center integrates with, are also not likely high availability.

Systems that require five nines with little to no maintenance windows are a challenge to achieve while still being able to upgrade systems or deploy new features, and so on, on a single system. Therefore, HA could require one or more of the following scenarios:

- Dual (or more) servers for Operations Center (physical or clustered)
- Dual (or more) management systems (OV, Netcool, etc… physical or clustered)
- Dual (or more) backend applications (help desk, knowledge base, etc)
- Potentially dual networking components

Gathering specific requirements and looking at budget constraints are all of the steps required to be successful. If the system can be down for 20 minutes in an unscheduled outage manner during the course of a week versus only being able to be down for 20 minutes over an entire month, the budgetary requirements are vastly different.

- Section 6.2.1, "Hardware Versus Software Solutions," on page 43
- Section 6.2.2, "Availability Levels on Servers," on page 44
- Section 6.2.3, "Example of an Implementation with Multiple Levels of Failover," on page 45
- Section 6.2.4, "Integrating Processes," on page 45

6.2.1 Hardware Versus Software Solutions

High Availability solutions can be implemented using hardware and/or software. Some solutions are provided directly from the manufacturers of the hardware while other technologies are add-on from third parties (hardware and/or software).

- **Clusters:** Multiple servers are configured identically and provide the same type of service, but with a front door component that makes them appear as a single server. In this configuration, only one server provides the service with the secondary server taking over if it fails. To the outside, the end user does not need to reconfigure or reconnect to the server or service, and it often appears as if the service never failed. While cluster solutions can be implemented with

hardware or software, the software-based solution typically relies on physical servers being configured, while the hardware-based solution relies on an individual server to appear as multiple servers.

- **Load Balancers:** Using load balancers is a common practice used to distribute end user loads evenly across multiple servers. Smart technologies monitor and understand the amount of resources being utilized on a server at any given time, and automatically direct users to the server with the lowest utilization rate. While not necessarily a requirement for HA or FT, it can be a nice addition to provide the best end user experience possible.
- **Redirectors:** Sometimes built into Load Balancers, redirector technology is used to implement software-based clustering (or could be a physical box). Redirectors send existing or new users to other available servers when a service is no longer available on a particular server.

6.2.2 Availability Levels on Servers

When designing your HA environment, these service descriptions are important when determining the availability:

- **Hot:** The failover server is up and running with all data updated and ready to be used.
- **Warm:** The failover server is up and running, but data is not current and an update is needed to synchronize the data or information.
- **Cold:** The failover server is off (not running) and does not have any of the data.

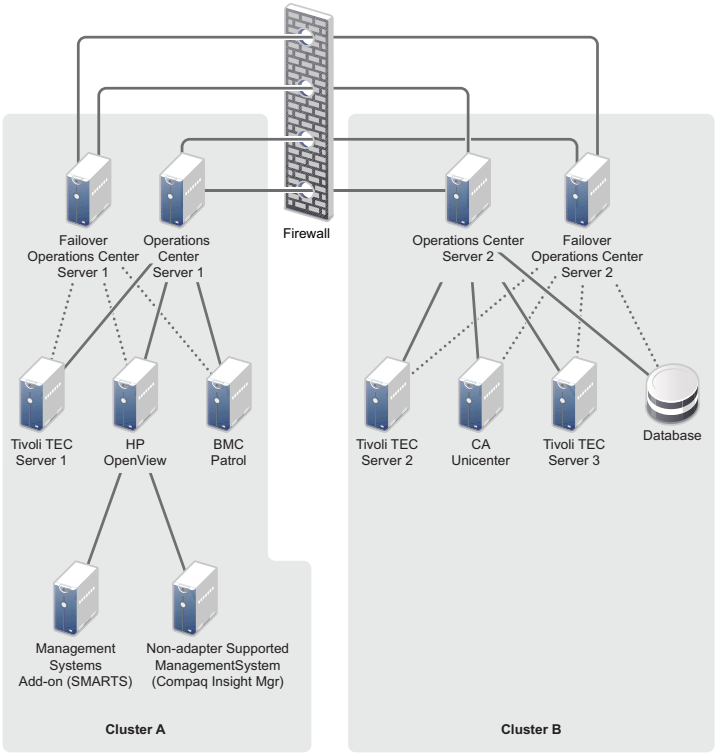
Many clustering systems are Hot/Cold: when the production server process (hot) stops working, the cluster automatically activates the secondary/backup server process (cold) to take over. The drawback to a Hot/Cold solution is that the "Cold" process is started from the ground up as if the computer were just turned on. If an application server typically takes 20 minutes for start up, then the HA environment must allow for a 20 minute outage (minimum) for any type of failure.

While Hot/Warm configurations are faster, they are still not transparent to end users because of the synchronization or update necessary to bring data current. Hot/Hot always remains the best option available, but while it does not always provide a seamless failover, it can be close to meeting the goal of no downtime.

6.2.3 Example of an Implementation with Multiple Levels of Failover

Figure 6-1 is an example of a multisite, multi-integration implementation that has multiple levels of failover in order to provide HA and FT:

Figure 6-1 *Multiple Levels of Failover*



In this example, users access a operationscenter.myCompany.com URL. A redirector (not shown in Figure 6-1) sends the user to Operations Center Server 1 (left side). In the event of a failure, users are directed to Failover Operations Center Server 1. This achieves the first level of HA.

Both Operations Center servers are configured and running at the same time (Hot/Hot) with the same data because of the dual connections to the underlying management systems. An assumption is made that the underlying management systems are configured in the same manner: one Operations Center server can be configured with dual adapters into the primary and backup of each management system.

6.2.4 Integrating Processes

Architecting a solution is only one of the steps in achieving a highly available implementation. Processes must be implemented around changes to the environment to ensure that changes are propagated, as well as the guidelines where changes occur in general.

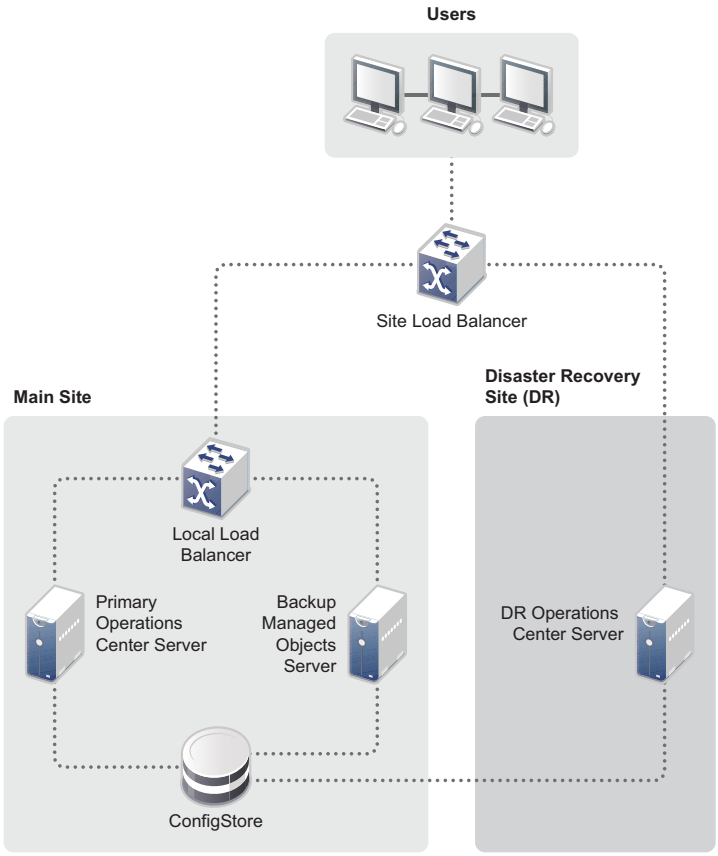
When implementing a Hot/Cold solution, the process to keep configuration files, security, scripts, etc up to date is relatively straight forward. Regular backups or copies from the primary (hot) server to the backup (cold) server can keep these files up to date.

6.3 Implementing a High Availability/Disaster Recovery (Hot/Hot) Configuration

This section describes a standard methodology for creating and maintaining a High Availability/Disaster Recovery configuration for a Operations Center implementation. It serves as a starting point for the creation of a site-specific High Availability implementation plan that can be customized, as required, for your environment.

A Hot/Hot type of architecture is required to implement a High Availability (HA) configuration of "high nines." This requires that there be two (at a minimum) identically configured systems that are up and running and available to users, as well as a separate Disaster Recovery platform. For example:

Figure 6-2 *High Availability/Disaster Recovery Configuration*



6.3.1 Servers

Table 6-1 describes the recommended configuration to meet the HA requirements, as well as additional requirements around system upgrades, maintenance, and so on.

Table 6-1 *HA Configuration Requirements*

Server Sites	Servers Required
Main Site	**Primary Server:** An Operations Center Server with all adapters, Service Models, Users/Groups, SCM definitions, BSLM definitions and Dashboards. **Backup Server:** One additional Server with a “mirrored” image of the Primary Server.
Disaster Recovery Site	**Disaster Recovery Server:** An additional Server, a “mirrored” image of the Primary Server.

For the above architecture:

- All Operations Center Servers are configured with the *Clustering* option turned on and use the same backend databases for the configStore and Service Warehouse
- The backend database requires a separate, third-party Hot/Hot clustering technology specific to that database implementation

6.3.2 Load Balancers for Traffic Management

The use of a load balancer is recommended for traffic management with a Hot/Hot solution. A local load balancer is placed in front of the Primary and Backup Server in the Main Site. An additional load balancer is added in front of the Main Site to direct users to the Disaster Recovery site in the event of a complete site outage.

Users log in to the Operations Center server via the Site Load Balancer. The Site Load Balancer directs the user either to the Primary (if running) Operations Center server or to the Backup Operations Center server if the Primary is down. If both the Primary and Backup servers are down, users are directed to the DR Operations Center server.

While load balancing solutions are available from vendors, such as F5Networks, Cisco, and Symantec, Operations Center does not recommend any particular vendor, brand, make or model.

6.3.3 Backend Database

The backend database, that houses the configStore and Warehouse, requires its own High Availability configuration based on available offerings. If failover can be handled by another database server, instead of using backups to restore the database, downtime can be shortened considerably.

Review solutions offered by your database manufacturer as many vendors offer standard clustering options that can provide for either Hot/Cold or Hot/Warm database methodologies. For example, this can include a shared disk for the database files and two servers utilizing the shared disk subsystem to provide the database role.

6.4 Configuring Operations Center for Clustering

Before configuring Operations Center for a clustered environment, it is useful to understand Section 6.4.1, "About ConfigStore," on page 48 and how Operations Center handles Section 6.4.2, "Persistence and Synchronization in a Clustered Environment," on page 50 and what happens Section 6.4.3, "When the Primary Server, the configStore Database, or the Data Warehouse is Unavailable," on page 52.

The following configurations must be performed to configure Operations Center in a clustered environment:

- Section 6.4.4, "Requirements for Clustering," on page 52
- Section 6.4.5, "Configuring the Operations Center Server, Database, and Data Warehouse," on page 53
- Section 6.4.6, "Additional Considerations and Configurations," on page 57
- Section 6.4.7, "Configuring Operations Center Clients," on page 57

After Operations Center is initially configured, determine how the servers are to run in the cluster (such as hot, warm, or cold). This determines how to administer the servers to keep the configurations up-to-date. For more information, see Section 6.2.2, "Availability Levels on Servers," on page 44.

6.4.1 About ConfigStore

The configStore database records various configuration settings, including:

- All configuration changes made under the *Administration* hierarchy, including user/user group profiles, algorithms, automations, adapter profiles and properties, behavior models, custom properties, right-click operations, and scripts
- Any service model objects created under the *Service Models* hierarchy, including SCM definitions, SVG drawings, and BSLM definitions
- Session properties, including user preferences and last known location for users

While subdirectories in the `/database` directory are synchronized, files in the `/database/shadowed` directory are instrumental in communicating changes to the configStore. While it is not recommended to manually edit these files, there are some instances where this might be necessary.

When operating Operations Center in a clustered environment, all servers share the same configStore. When a file is updated in the `/database/shadowed` directory, either manually or through the Operations Center console, the configStore pulls in any changes. All other servers in the cluster are notified that a change has occurred, and the servers synchronize their `/database/shadowed` files.

Files saved and synchronized by the configStore include the following:

Adapters.ini
Consoles.ini
Elements.ini
Operations.ini

Algorithms.xml
bindings.xml
containers.xml
Databases.xml

jobConfiguration.xml
performanceConfiguration.xml
ScriptHierarchy.xml
ScriptStyle.xsl
ScriptTesting.xml
standard.xml
timeManagementConfig.xml

CICAccountMap.properties
CPAccountMap.properties
IconAliases.properties
NetcoolAccountMap.properties
SmartsAlarmFilter.properties
SmartsRelationFilter.properties
SmartsSecurityFilter.properties

BDIConfig.rdfs
BDIConfigResources.rdfs
elementmail.template
element_and_alarm_mail.template

AclManager_2.0.dtd
Algorithms.dtd
hierarchy_2.0.dtd
msmomConfiguration_1.0.dtd
ServiceManagerConfiguration_1.0.dtd
ServiceCenterConfiguration_1.0.dtd
views_1.0.dtd

AlarmForm.form
AlarmNotifyForm.form
AlarmForm.java
AlarmNotifyForm.java
bemHierarchy.xml
BladeLogicOMHierarchy.xml
BMCRemedyHierarchy.xml
CICHierarchy.xml
CorbaNSHierarchy.xml
CPHierarchy.xml
DefaultNNMHierarchy.xml
DefaultOVOHierarchy.xml
DefaultPatrolHierarchy.xml
DefaultSnmpcHierarchy.xml
EveHierarchy.xml
EveTesting.xml
FoundationHierarchy.xml
FXAdapterHierarchy.xml
Mercury Application MappingHierarchy.xml
MCHierarchy.xml

MOSServiceCatalogHierarchy.xml
msmom.xml
msmomConfiguration.xml
NetcoolHierarchy.xml
PlateSpin ReconHierarchy.xml
RemedyHierarchy.xml
ServiceCenterConfiguration.xml
ServiceCenterHierarchy.xml
ServiceCenterRel61Configuration.xml
ServiceCenterRel62Configuration.xml
ServiceManagerRel62Configuration.xml
ServiceManagerConfiguration.xml
ServiceManagerHierarchy.xml
ServiceManagerRel61Configuration.xml
SolarWinds OrionHierarchy.xml
Symantec ClarityHierarchy.xml
TADDMHierarchy.xml
TecTesting.xml
TecHierarchy.xml
TecStyle.xsl
TecTerse.xml

6.4.2 Persistence and Synchronization in a Clustered Environment

When operating a clustered environment, the base server configuration is still unique for each Operations Center server. However, Operations Center configStore database is instrumental in persisting and synchronizing various configurations and stored data. Table 6-2 describes the configurations.

Table 6-2 *Configurations and stored data persisted and synchronized in Operations Center*

Area	Shared/Synchronized	Not Shared/Synchronized
Operations Center/ Server Installation and Configuration	◆ Files in the `/database/shadowed` directory, including `Operations.ini`, `Adapters.ini`, `Algorithms.xml`, `Consoles.ini`, and hierarchy XML files ◆ Subdirectories in the `/database` directory, including scripts	◆ License keys ◆ JVM parameters ◆ Files from the `/config` directory
Client Sessions	◆ Session properties, including last known location and user preferences	

Area	Shared/Synchronized	Not Shared/Synchronized
Administration Configuration	All configuration changes made under the *Administration* hierarchy ◆ Adapters and adapter properties ◆ Algorithms ◆ Automations ◆ Behavior Models ◆ Custom properties and classes ◆ Right-click operations ◆ Scripts ◆ User/Group profile changes (such as password changes) ◆ Enable/disable jobs	◆ Management actions, such as start/stop adapter (enable/disable jobs is an exception to this).
Adapter Elements		◆ Custom algorithms defined on adapter elements are not propagated to clustered servers.
Service Models	◆ Any service model objects created under the *Services* hierarchy ◆ Custom algorithms ◆ SCM definitions ◆ SVG drawings ◆ BSLM definitions ◆ Service Model updates	

Also note the following:

- Real-time alarms and elements from adapters are not stored in the configStore
- State is propagated based on real-time alarms and/or algorithms
- State is not represented based on content of the configStore

6.4.3 When the Primary Server, the configStore Database, or the Data Warehouse is Unavailable

In the event of an outage on the primary server, one of the other servers takes over the writing role to the data warehouse. All readers cache a small window of data in case it must take over as a writer and Operations Center continues to function – new users can log in and users can perform actions on alarms, create and/or modify Service Views, and so on.

When the backend database or configStore is not available, Operations Center continues to operate and users can remain in the system. However, specific capabilities or services within Operations Center might not be available to users.

When the backend database is not available, data stored in the Service Warehouse (such as historical alarms, performance data, persisted metrics, and so on) is not available.

Table 6-3 specifies if actions are available or not when the warehouse, configStore, or both are offline.

Table 6-3 *Availability of Actions When Warehouse, configStore, or Both are Offline*

Action	Warehouse	configStore	Both
Create/Edit Service Models	Yes	No	No
Add/Update Views	Yes	No	No
View Alarm History	No	Yes	No
View Perf Charts	No	Yes	No
View SLA	No	Yes	No
Actions on Alarms (Ack, Close)	Yes	Yes	Yes
Modify Alarm Filters	Yes	Yes	Yes
Login	Yes	No	No
Stay logged In	Yes	Yes	Yes
Add/Update User Profiles	Yes	No	No
Auto-reconnect remembers your last known location	Yes	No	No

Be aware that when the configStore is down, users can encounter many error messages while functioning in this mode.

6.4.4 Requirements for Clustering

Before starting the configurations to run Operations Center servers in a clustered environment, note the following requirements:

- When creating a new cluster, all of the initial setup of ConfigStore and the Service Warehouse must be performed while only a single node is running.
- If you need to perform a *Database Initialize* operation, then only one member of the cluster should be running.

- Start one member of the cluster before the other nodes in the cluster and allow it to start initialization. We recommend giving the first node a 1 minute head start to allow it to become the cluster coordinator so the other nodes then wait for it to complete initialization.
- All cluster nodes must have Java JREs installed from the same Java vendor. Having the cluster nodes using Java JREs from different vendors generates serialization errors.

6.4.5 Configuring the Operations Center Server, Database, and Data Warehouse

To configure Operations Center servers in a clustered environment, the following configurations are required:

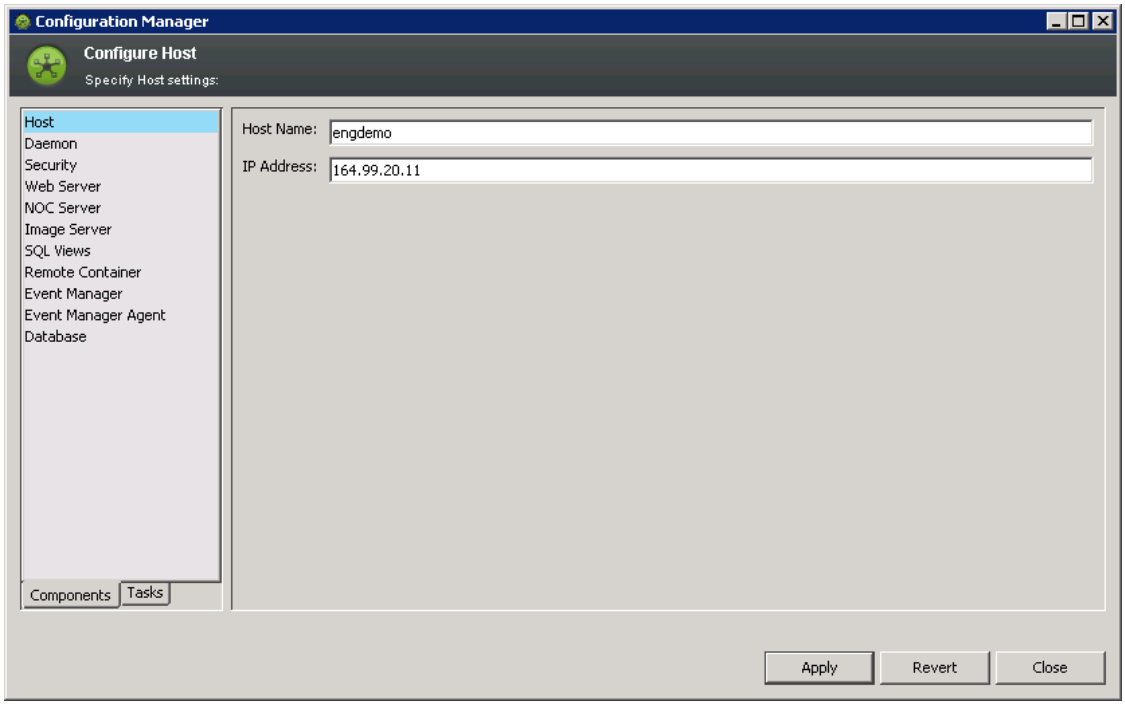
- License keys for Operations Center are required to be locked to all physical and logical TCP/IP addresses in the cluster
- Configuration storage settings for each Operations Center server must be identical
- If using a Service Warehouse, one server must be specified as the primary database writer (or cluster coordinator), that aggregates all updates from clustered servers and updates the database

For installation in a clustered environment, configure *Configuration Storage* settings after installation of Operations Center is complete and not during installation.

To define *Configuration Storage* and *BSW Writer* settings for clustered servers, do the following for each server:

1. Stop the Operations Center software.
2. Open the Configuration Manager.

   The Configuration launches with the *Server* section of the *Components* tab open.
3. Specify the virtually known cluster name in the *Host Name* field:

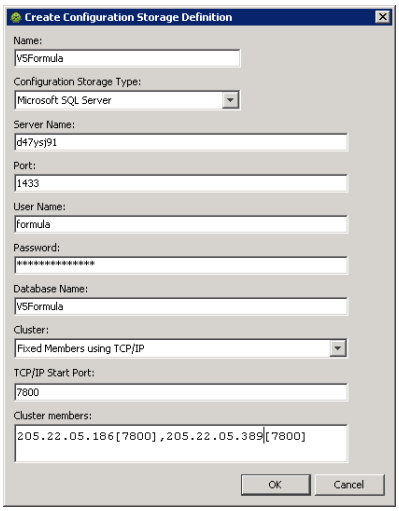
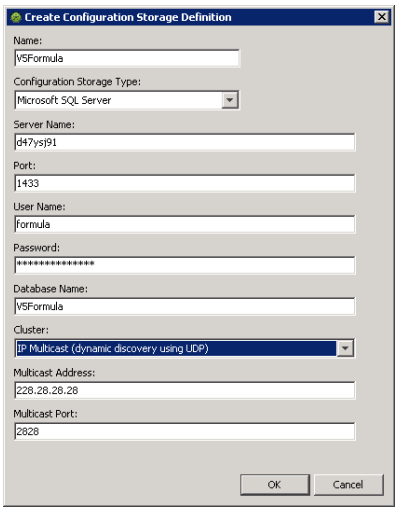


Perform this step for all servers in the cluster.

4 To define configuration storage, do the following on one server only:

4a Click *NOC Server* to open the *Configure NOC Server* panel.

4b For *Configuration Storage Create*, click *Create* to open the Create Configuration Storage dialog box:

TCP/IP Based Cluster	UDP IP Multicast Configuration
	

4c From the *Cluster* drop-down list, select one of the following options:

None: Select only when not part of a cluster.

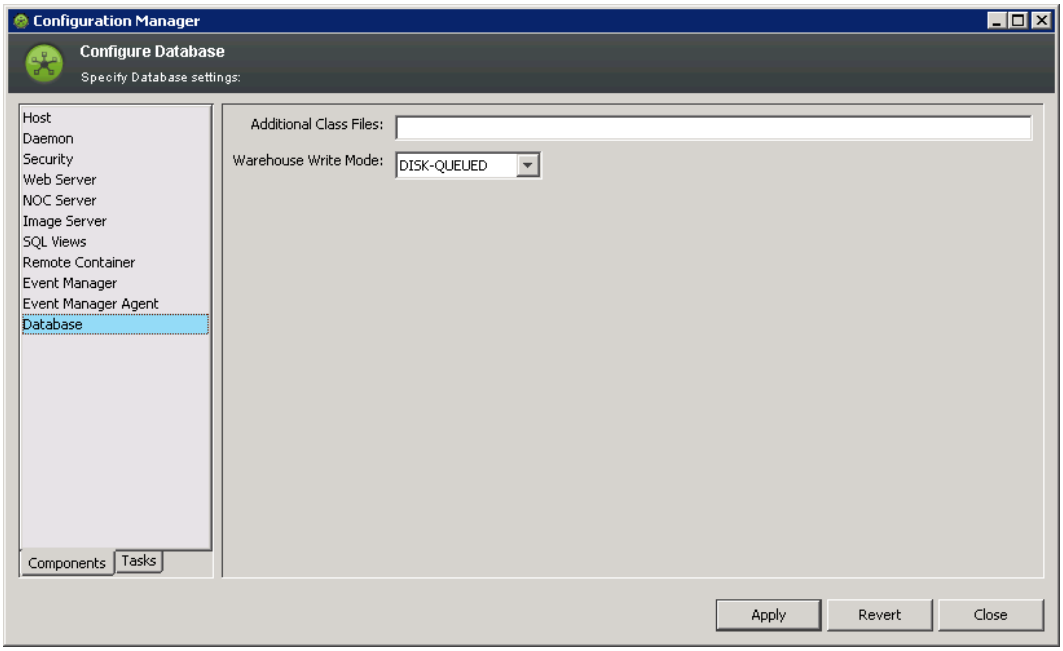
IP multicast (dynamic discovery using UDP): Allows the server to be dynamically discovered and added to the cluster when server has the same settings. Then, you can specify the Multicast Address that is the IP address for communication and the Multicast Port used for communication. Note that some networks do not allow UDP discovery. Talk to you Network Administrator to see or verify the servers are on the same subnet.

Fixed members using TCP/IP: Sets the server as a dedicated member of the cluster. Then, specify the TCP/IP Start Port for communication and the IP address for servers that are cluster members. List the IP Address for the cluster coordinator as the first cluster member.

4d Click *OK*.

5 If using a Service Warehouse, specify a primary database writer (or cluster coordinator by doing the following:

5a Click *Database* on the *Components* tab to open the *Database* tab:



5b Select one of the following *Primary Warehouse Writer* options to determine the server to function as the primary writer to the Data Warehouse:

Memory-Queued: Sets the server as the primary writer. All other servers must be set as Disabled.

Disk-Queued: Causes all servers to automatically select the "oldest" server as the primary writer.

Disabled: Select this when another server in the cluster is set to *Memory-Queued* or the server is to not be eligible for selection in a *Disk-Queued* cluster:

Strategy	Set to…	Description
Optimize performance; select one server as the primary server.	*Memory-Queued*	Set this value for one server that is the primary server writing to the Service Warehouse (BSW). This server performs all bulk alarm history and Service Level Agreement (SLA) profile data collection. Performance is optimized, but delivery is not guaranteed. Set all other servers to disabled.
Fault tolerance operation; float the role of primary server between multiple servers.	*Disk-Queued*	Set this value for all servers to have the role of primary server float among the cluster servers. The server is selected by the “oldest member” heuristic to become the equivalent of a cluster coordinator. When the oldest member leaves, the next oldest becomes the new coordinator and the writer to the BSW. When a server comes back online, it becomes the “newest” member. In the event that the "writer" cluster node is taken offline or fails, the other nodes queue 10 minutes (configurable) of rewind data to be pushed to the repository. The rewind buffer is consulted to “catch up” to the point where of the last performed write operation. BSW writes then occur normally.

5c Click *Apply*.

6 Click *Close* to close the Configuration Manager.

7 Open the `config/custom.formula.properties` file (or create one if you do not already have it) to set the hostname resolution (not numeric or IP-based) and add or edit to have the following settings:

```
ooc.iiop.numeric=false
ooc.fssl.numeric=false
ooc.iiop.host=OperationsCenterServerHostName
ooc.fssl.host=OperationsCenterServerHostName
```

8 Start the Operations Center server.

9 Do the following as required to set up other servers in the same cluster:

9a Copy the `/OperationsCenter_install_path/configstore/configurations.xml` file from the server you configured above to all other servers in the cluster.

All servers in the cluster must have the same settings for *Configuration Storage* and this applies configuration storage settings made in Step 4 to the other servers.

IMPORTANT: All servers in a cluster must have the same settings for *Configuration Storage*.

9b Stop the Operations Center server.

9c Do Step 3 through Step 7 to add servers to the same cluster.

9d Perform Step 5 on all servers in the same cluster to indicate how they are to participate (or not) in writing BSW information to the data warehouse.

9e Restart the Operations Center server.

6.4.6 Additional Considerations and Configurations

The following products do not work in a clustered environment:

- Operations Center Experience Manager
- Operations Center Script Adapter
- BMC BEM Adapter

The following products work in a clustered environment with the indicated considerations or customizations:

- **SCM:** In order to utilize SCM within an HA environment, you cannot use "schedules" defined within the actual SCM definition. It is recommended that you define schedules for SCM jobs via the Operations Center job scheduler. This ensures the SCM definitions are only run on one of the clustered servers in the cluster and only run once.

  The top of the Java script must check to see if the Job is being started on the Primary server by calling. The following method returns a Boolean True or False:

  ```
  server.isCoordinator()
  ```

- **Operations Center Event Manager:** While the Operations Center Event Manager can work in a clustered environment, there are certain actions that are not synchronized or shared. In other words, if an alarm is closed one server, it is not closed on the other server.
- **Operations Center F/X Adapter:** While the F/X adapter can work in a clustered environment, there are certain actions that are not synchronized or shared. In other words, if an alarm is closed one server, it is not closed on the other server.

6.4.7 Configuring Operations Center Clients

When Operations Center is configured in a Clustering mode, users utilize a generic network address (typically the Load Balancer) to log in. The Load Balancer then redirects the user to the appropriate server. This process should be invisible to the user. In the event of a server outage, the Load Balancer detects the outage, users are swung to another Operations Center Server and can continue working.

IMPORTANT: In a clustering environment, the Java security file for the Java Runtime Environment (JRE) for each client machine must be updated.

To configure a Operations Center client to access Operations Center in a clustered environment:

1. Navigate to the Java Web Start installation path, usually located at:

   ```
   C:/Program Files/Java/jre1.x.x_**
   ```

2. Change the directory to `C:/Program Files/Java/jre1.x.x_**/lib/security`.
3. Edit the `java.security` file as follows:
   - **3a** Locate the line:

     ```
     #networkaddress.cache.ttl=-1
     ```

   - **3b** Uncomment the line, then change the value as follows:

     ```
     networkaddress.cache.ttl=0
     ```

4 Launch the Java Control Panel and clear the Java cache.

   For instructions, see Java's Web page on clearing the Java cache (http://www.java.com/en/download/help/plugin_cache.xml).

5 Connect to Operations Center.

6.5 Upgrading Operations Center in a High Availability Environment

High Availability environments can provide a means of upgrading the Operations Center platforms without significant impact on the user population.

One possible approach is described here as a sample upgrade methodology:

1 Verify that the Primary and Backup servers are available.

2 Swing all DR users off the DR box.

3 Shut down Operations Center on the DR server.

4 Export the configuration from Production and import it into another configStore instance.

   This should be separate from the "primary" configStore instance.

5 Turn off the *Cluster* option in the customizer.

6 Start Operations Center on the DR server.

7 Point Operations Center at the copy of the production configStore instance.

8 Test, test, test.

After testing is complete on the DR server, start the process of upgrading the rest of the environment; users would log in to the DR server while the Primary and Backup are being upgraded. While users are in the DR environment, most Operations Center administrators choose not to make and/or synchronize changes to the Operations Center configuration (such as Service Models, Users/Groups, and so on); however, operators are still be able to perform real-time operations, such as closing/acknowledging alarms, opening tickets, and so on.

This process, as described above, typically does not cause an outage because the Load Balancers swing users from one system to another. For instance, you might be able to instruct end users to log out and log in again without specifying the server; the Load Balancer could be reconfigured moments before hand to automatically redirect the users when they log in again.

While upgrades can require patches on the client, client upgrades are automatically downloaded when a users logs in again.

6.6 Scaling Operations Center

Because every customer's implementation is different, ongoing user load and performance monitoring might be required to determine when and if the Operations Center configuration should be modified. A Operations Center sizing study can be performed to help determine Java memory settings and/or architectural recommendations.

- "Example 1: Run SCM on a Separate Server" on page 59
- "Example 2: Use Remote Containers to Off-Load Adapter Overhead, and Migrate the Dashboard and SCM to Separate Servers" on page 59

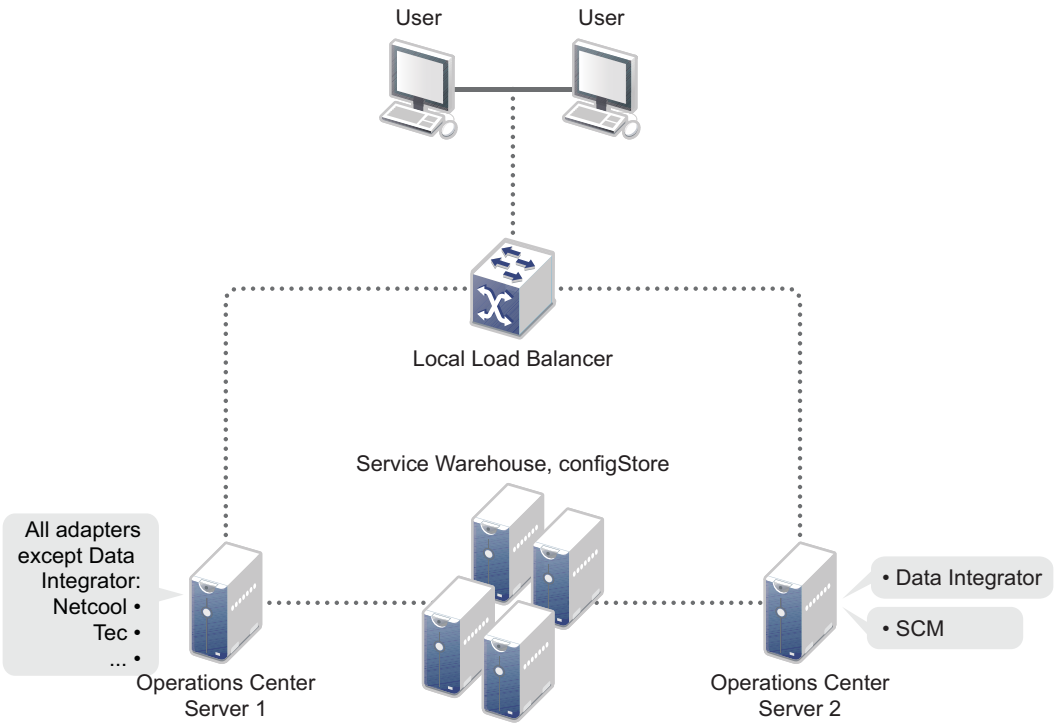
6.6.1 Example 1: Run SCM on a Separate Server

As an example, lets look at a configuration that runs various application and network management integration adapters (such as Netcool, TEC, and so on), Data Integrator, and SCM, which implements service models on an enterprise level. Instead of one server bearing the load, the following could be implemented to scale the environment:

1. Server 1 runs adapters for all application and network management integrations.
2. Server 2 runs Data Integrator and is the designated server for all SCM functionality.

   Note that the SCM job is disabled and `isCordinator()` is implemented so that related scripts are run only on this server.

   For more information, see Section 6.4.6, "Additional Considerations and Configurations," on page 57.
3. A load balancer shares user load between both servers:

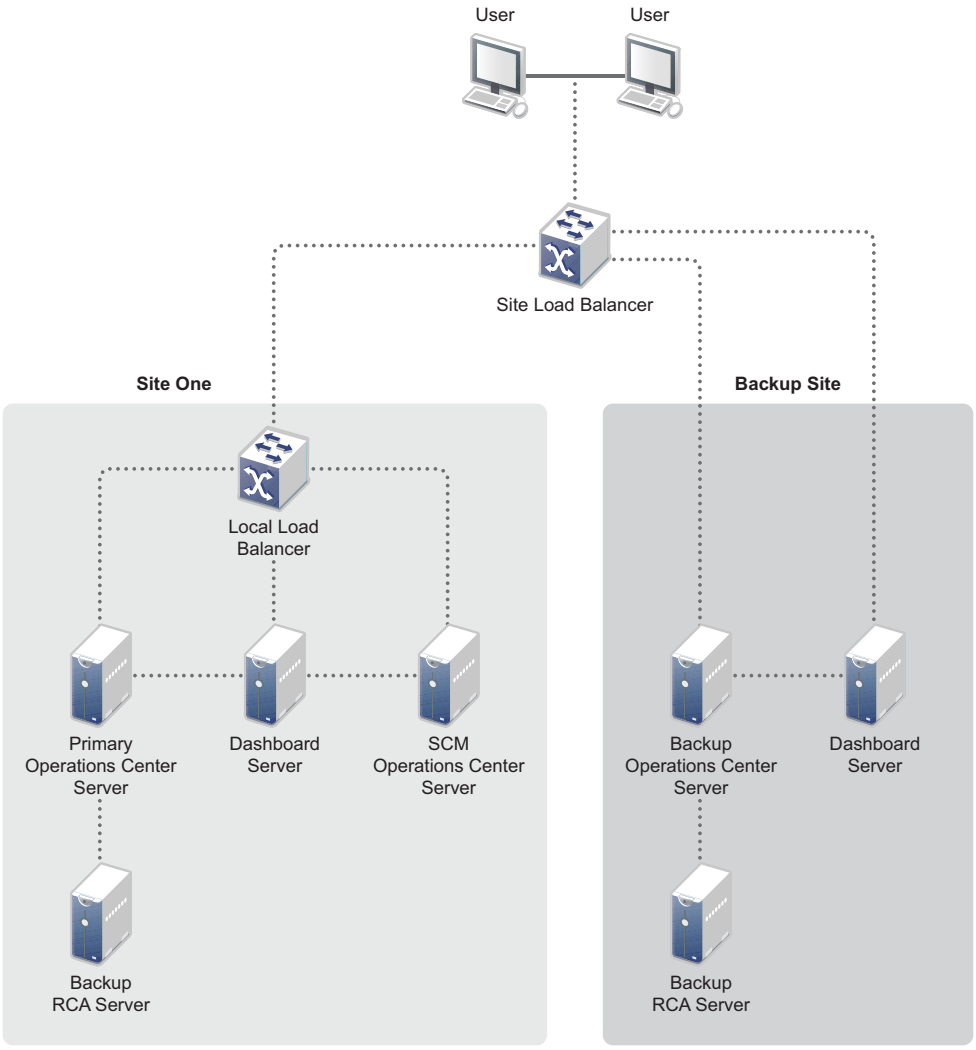


6.6.2 Example 2: Use Remote Containers to Off-Load Adapter Overhead, and Migrate the Dashboard and SCM to Separate Servers

For an additional example, we'll take an even larger environment and see some additional ways Operations Center might be further scaled. In this example, the dashboard can be run from a separate server and remote containers can be used to take overhead of the adapters.

- The Primary server handles SLM.
- The Operations Center dashboard server runs the dashboard.
- The SCM Server runs Data Integrator and is the designated server for all SCM functionality.
- An additional server is added to off-load the overhead of adapters (implemented using Remote Container Adapters (RCAs)) while the adapters appear to be running on the primary Operations Center server and the Backup Operations Center server.

- While a local load balancer is used to fail over between Primary and Backup servers, a site load balancer is used for site to site:



A Running a Console or Unattended Installation

Alternative methods for installing Operations Center software are provided in the following sections:

- Section A.1, “Console Installation,” on page 61
- Section A.2, “Unattended Installation,” on page 62

A.1 Console Installation

The console installation runs a text-based version of the Operations Center installation wizard. In a console installation:

- The options are the same as the Windows-based version, except that you must type the responses.
- There are no *Choose* buttons to open directories to locate files. Instead, you must provide the path names for the files.
- There is no option to open the Configuration Manager at the end of the installation. The default settings for the Configuration Manager are automatically applied.
- You can run a console installation on a UNIX machine without having an X Window system set to display graphical (X client) applications on the local X server display. However, you will still need the local X server display to open the Configuration Manager on that machine, if you opt to do so after installing Operations Center.

To run a console installation:

1. Do one of the following:
   - **Windows:** Insert the Operations Center Installation CD and from the directory where the installation executable file resides, type `install.bat -i console` at a command prompt.
   - **UNIX** Create a home directory for the installation, mount the Operations Center Installation CD, then from the directory where the installation executable file resides, type `./install.sh -i console` at a command prompt.
2. Follow the prompts in the script to provide the information required to install the product. For more information about installer prompts, see Section 2.2, “Installing the Server Software,” on page 12.
3. Continue with Section 2.3, “Post Installation Tasks,” on page 14.

A.2 Unattended Installation

This method installs Operations Center without opening the Installation Wizard. It takes all of the default values and run silently in the background. A response file can be used to supply predefined values including:

- Options from the installation wizard
- Licensing information from the license file
- Configuration Manager settings
- A configuration stored in the Configuration Storage data source

This method is intended for when you need to rerun the installation often, such as in a test environment.

You can run a silent installation on a UNIX machine without having an X Window system set to display graphical (X client) applications on the local X server display. However, you will still need the local X server display to open the Configuration Manager on that machine.

For more information about the Configuration Manager and configurations and the Configuration Storage data source, see the *Operations Center 5.5 Server Configuration Guide*.

Use the following sections to run an unattended installation:

- Section A.2.1, "Running an Unattended Installation," on page 62
- Section A.2.2, "Sample Response File," on page 64

A.2.1 Running an Unattended Installation

To run an unattended installation:

1. To install Operations Center, do one of the following:
   - **Windows:** Insert the Operations Center Installation CD and from the directory where the installation executable file resides, type `install.bat -i silent` at a command prompt.
   - **UNIX** Create a home directory for the installation, mount the Operations Center Installation CD, then from the directory where the installation executable file resides, type `./install.sh -i silent` at a command prompt.

   Default install options are used to complete the installation.
2. After the unattended installation has completed, continue with Section 2.3, "Post Installation Tasks," on page 14.

Using a Response File to Customize Installation Options

To run an unattended installation with a response file:

1. Because there are multiple ways to create a response file, depending on the content you want to include, do one of the following:
   - To create a response file that includes the options from the installation wizard, licensing information, configuration manager settings, and a configuration stored in the Configuration storage data source, at a command prompt on the machine that has the existing Operations Center installation that you want to use, enter the following:

     ```
     mosjava com.mosol.install.InstallerResponseFile responsefile.rsp
     installdir
     ```

replacing *responsefile* with the name of the response file to be created and *installdir* with the installation directory for the existing Operations Center installation.

For example, type:

```
mosjava com.mosol.install.InstallerResponseFile C:/moresponse.rsp C:/
OperationsCenter_install_path
```

to create a response file called `moreresponse.rsp` that uses the Operations Center installation located in the `C:/` directory.

- To create a response file that includes installation wizard options only, run a wizard-based or console installation by typing the following at a command prompt:
  - `install.bat –i install method –r filename` for Windows where *install method* is the installation method (either GUI or console) and *filename* is the name of the response file, such as `myinstall.rsp`.
  - `install.sh –i install method –r filename` for UNIX where *install method* is the installation method (either GUI or console) and *filename* is the name of the response file, such as `myinstall.rsp`.

When a response file is created, it is saved in the Operations Center installation directory.

2 Copy the response file to the server where want to install Operations Center.

If necessary, edit the file using a text editor. Some changes that you can make include:

- Adding licensing information
- Changing configuration settings
- Modifying the configuration from the Configuration Storage data source

3 To use the response file to install Operations Center, do one of the following:

- **Windows:** Insert the Operations Center Installation CD and from the directory where the installation executable file resides, type `install.bat -i silent -f filename` at a command prompt replacing *filename* with the name of the response file.
- **UNIX** Create a home directory for the installation, mount the Operations Center Installation CD, then from the directory where the installation executable file resides, type `install.sh -i silent -f filename` at a command prompt replacing *filename* with the name of the response file.

The options in the response file are used to automatically complete the installation.

4 After the unattended installation has completed, continue with Section 2.3, “Post Installation Tasks,” on page 14.

A.2.2 Sample Response File

This section contains a sample response file, which is a standard ASCII text file. Response files are created from an actual installation of the product, giving you default values that are determined by that installation.

Because a response file's content contains very few carriage returns, the following sample's content is word-wrapped automatically where the documentation program can break a long string, such as at spaces, forward slashes, or certain characters. For example, in a text editor with word-wrap turned off, this sample response file contains 13 lines, three of which contain most of the content.

```
#Thu Feb 07 09:15:17 EST 2008
JAVA_EXECUTABLE=$USER_INSTALL_DIR$$/$jre\\bin\\java.exe
WebServerSecurePort=7443
CUSTOMIZE_PROPERTIES_CONTENTS=<config>\n  <properties>\n    <entry>\n
<string>DatabaseJre</string>\n      <string>C\:\\MOFeb7\\jre\\bin\\java.exe</
string>\n    </entry>\n    <entry>\n      <string>DefaultConfig</string>\n
<string></string>\n    </entry>\n    <entry>\n      <string>jvm.eve.config.home</
string>\n     <string>C\:\\MOFeb7\\jre</string>\n    </entry>\n    <entry>\n
<string>jvm.daemon.home</string>\n      <string>C\:\\MOFeb7\\jre</string>\n    </
entry>\n    <entry>\n      <string>RemoteContainerLogInfo</string>\n
<string>FILE "C\:\\MOFeb7\\logs\\MOSServerName.%36datetime.trc"</string>\n    </
entry>\n    <entry>\n      <string>DatabaseLogLevel</string>\n      <string>WARN</
string>\n    </entry>\n    <entry>\n      <string>wsHttpsCommentEnd</string>\n
<string></string>\n   </entry>\n   <entry>\n    <string>EveAlarmJre</string>\n
<string>C\:\\MOFeb7\\jre\\bin\\java.exe</string>\n    </entry>\n    <entry>\n
<string>MOFeb7Security</string>\n      <string>ssl</string>\n    </entry>\n
<entry>\n      <string>RMIPort</string>\n      <string>7099</string>\n    </
entry>\n    <entry>\n      <string>FormulaLogInfo</string>\n      <string>FILE
"C\:\\MOFeb7\\logs\\formula.trc" SIZE 5000000 RENAME
"C\:\\MOFeb7\\logs\\formula.%36datetime.trc"</string>\n   </entry>\n  <entry>\n
<string>IpAddress</string>\n     <string>192.168.10.228</string>\n   </entry>\n
<entry>\n      <string>EveAgentJreOptions</string>\n      <string>-Xmx128m</
string>\n    </entry>\n    <entry>\n      <string>MOHost</string>\n
<string>dhendricks</string>\n    </entry>\n    <entry>\n
<string>PasswordExpiration</string>\n      <string>0</string>\n    </entry>\n
<entry>\n      <string>RemoteContainerJre</string>\n
<string>C\:\\MOFeb7\\jre\\bin\\java.exe</string>\n    </entry>\n    <entry>\n
<string>ImageAdminPort</string>\n      <string>7004</string>\n    </entry>\n
<entry>\n      <string>UserName</string>\n      <string>sshetty</string>\n    </
entry>\n   <entry>\n     <string>jsp.compiler</string>\n     <string></string>\n
</entry>\n    <entry>\n      <string>DatabaseCmdLine</string>\n
<string>"C\:\\MOFeb7\\bin\\mosdatabase.exe" -jvmhome "C\:\\MOFeb7\\jre"</string>\n
</entry>\n    <entry>\n      <string>jvm.opt.loggc</string>\n      <string>"-
Xloggc\:C\:\\\\MOFeb7\\logs\\fsgc.log"</string>\n    </entry>\n    <entry>\n
<string>EveConfigCmdLine</string>\n     <string>"C\:\\MOFeb7\\bin\\mosevecfg.exe"
-jvmhome "C\:\\MOFeb7\\jre"</string>\n    </entry>\n    <entry>\n
<string>jvm.opt.maxpermsize</string>\n      <string>-XX\:MaxPermSize\=128m</
string>\n    </entry>\n    <entry>\n      <string>ClientJreOptions</string>\n
<string>-Xmx256m</string>\n    </entry>\n    <entry>\n      <string>ImagePort</
string>\n      <string>7001</string>\n    </entry>\n    <entry>\n
<string>PasswordPattern</string>\n      <string></string>\n    </entry>\n
<entry>\n      <string>VDBPort</string>\n      <string>7560</string>\n    </
entry>\n    <entry>\n      <string>WsapiPort</string>\n      <string>7084</
string>\n    </entry>\n    <entry>\n      <string>MosCfgJreOptions</string>\n
<string>-Xmx1g</string>\n    </entry>\n    <entry>\n      <string>EveLogLevel</
string>\n      <string>WARN</string>\n    </entry>\n    <entry>\n
<string>HttpsCommentHead</string>\n      <string></string>\n    </entry>\n
<entry>\n      <string>DatabaseLogInfo</string>\n      <string>FILE
"C\:\\MOFeb7\\logs\\database.trc" SIZE 5000000 RENAME
"C\:\\MOFeb7\\logs\\database.%36datetime.trc"</string>\n  </entry>\n  <entry>\n
<string>EveAlarmCmdLine</string>\n
<string>"C\:\\MOFeb7\\bin\\mosevealarm.exe" -jvmhome "C\:\\MOFeb7\\jre"</string>\n
</entry>\n    <entry>\n      <string>JreService</string>\n
<string>"C\:\\MOFeb7\\bin\\javaservice.exe" -jvmhome "C\:\\MOFeb7\\jre"</string>\n
</entry>\n    <entry>\n      <string>DaemonJreOptions</string>\n      <string>-
server -Xmx128m</string>\n    </entry>\n    <entry>\n
```

```
<string>EveConfigJreOptions</string>\n      <string>-Xmx128m</string>\n    </
entry>\n    <entry>\n      <string>ClassPath</string>\n
<string>C\:\\MOFeb7\\patches;C\:\\MOFeb7\\html\\classes\\common.jar;C\:\\MOFeb7\\h
tml\\classes;C\:\\MOFeb7\\classes\\server.jar;C\:\\MOFeb7\\classes\\pstools.jar;C\
:\\MOFeb7\\classes;C\:\\MOFeb7\\html\\classes\\rse.jar;C\:\\MOFeb7\\html\\classes\
\ide.jar;C\:\\MOFeb7\\html\\classes\\jena.jar;C\:\\MOFeb7\\html\\classes\\xmledit.
jar;C\:\\MOFeb7\\html\\classes\\xml.jar;C\:\\MOFeb7\\html\\classes\\hibernate.jar;
C\:\\MOFeb7\\html\\classes\\bemui.jar</string>\n    </entry>\n    <entry>\n
<string>FormulaLogLevel</string>\n      <string>WARN</string>\n    </entry>\n
<entry>\n      <string>RemoteContainerJreOptions</string>\n      <string>-server -
Xmx512m</string>\n    </entry>\n    <entry>\n      <string>WebServerSSLPort</
string>\n      <string>7443</string>\n    </entry>\n    <entry>\n
<string>JavaHome</string>\n    <string>C\:\\MOFeb7\\jre</string>\n   </entry>\n
<entry>\n     <string>jvm.opt.server</string>\n     <string>-server</string>\n
</entry>\n    <entry>\n      <string>ServerJreOptions</string>\n      <string>-
server -Xmx512m -XX\:MaxPermSize\=128m "-Xloggc\:C\:\\\\MOFeb7\\logs\\fsgc.log" </
string>\n    </entry>\n    <entry>\n      <string>EveLogInfo</string>\n
<string>FILE "C\:\\MOFeb7\\logs\\eve.trc" SIZE 5000000 RENAME
"C\:\\MOFeb7\\logs\\eve.%36datetime.trc"</string>\n    </entry>\n    <entry>\n
<string>EveConfigJre</string>\n      <string>C\:\\MOFeb7\\jre\\bin\\java.exe</
string>\n    </entry>\n    <entry>\n      <string>WebServerHost</string>\n
<string>dhendricks</string>\n    </entry>\n    <entry>\n
<string>WsapiSecurity</string>\n      <string>ssl</string>\n    </entry>\n
<entry>\n      <string>jvm.eve.alarm.home</string>\n
<string>C\:\\MOFeb7\\jre</string>\n    </entry>\n    <entry>\n
<string>WarehouseWriteEnabled</string>\n      <string>false</string>\n    </
entry>\n    <entry>\n      <string>CorbaMode</string>\n      <string>bidirSSL</
string>\n    </entry>\n    <entry>\n      <string>ClassesToLoad</string>\n
<string></string>\n   </entry>\n   <entry>\n    <string>EveAgentJre</string>\n
<string>C\:\\MOFeb7\\jre\\bin\\java.exe</string>\n    </entry>\n    <entry>\n
<string>jvm.container.home</string>\n      <string>C\:\\MOFeb7\\jre</string>\n
</entry>\n    <entry>\n      <string>wsHttpsCommentHead</string>\n      <string></
string>\n    </entry>\n    <entry>\n      <string>HttpCommentEnd</string>\n
<string>--&gt;</string>\n    </entry>\n    <entry>\n      <string>ImageJreOptions</
string>\n      <string>-server -Xmx128m</string>\n    </entry>\n    <entry>\n
<string>ImageJre</string>\n      <string>C\:\\MOFeb7\\jre\\bin\\java.exe</
string>\n    </entry>\n    <entry>\n      <string>Jre</string>\n
<string>C\:\\MOFeb7\\jre\\bin\\java.exe</string>\n    </entry>\n    <entry>\n
<string>DatabaseJreOptions</string>\n      <string>-server -Xmx128m</string>\n
</entry>\n    <entry>\n      <string>MOAddress</string>\n
<string>192.168.10.228</string>\n    </entry>\n    <entry>\n
<string>PasswordReuse</string>\n      <string>0</string>\n    </entry>\n
<entry>\n      <string>EveAlarmServerJreOptions</string>\n      <string>-server -
Xmx512m</string>\n    </entry>\n    <entry>\n      <string>HostName</string>\n
<string>dhendricks</string>\n    </entry>\n    <entry>\n
<string>ImageAgentVMSize</string>\n      <string>64</string>\n    </entry>\n
<entry>\n     <string>jvm.home</string>\n    <string>C\:\\MOFeb7\\jre</string>\n
</entry>\n    <entry>\n      <string>ImageAgentPort</string>\n      <string>7003</
string>\n    </entry>\n    <entry>\n      <string>ImageCmdLine</string>\n
<string>"C\:\\MOFeb7\\bin\\mosimage.exe" -jvmhome "C\:\\MOFeb7\\jre"</string>\n
</entry>\n   <entry>\n     <string>wsSsl</string>\n     <string>true</string>\n
</entry>\n    <entry>\n      <string>DaemonJre</string>\n
<string>C\:\\MOFeb7\\jre\\bin\\java.exe</string>\n    </entry>\n    <entry>\n
<string>InactivityTimeout</string>\n      <string>0</string>\n    </entry>\n
<entry>\n      <string>HttpsCommentEnd</string>\n      <string></string>\n    </
entry>\n    <entry>\n      <string>ImageLogLevel</string>\n      <string>WARN</
string>\n    </entry>\n    <entry>\n      <string>jvm.database.home</string>\n
<string>C\:\\MOFeb7\\jre</string>\n    </entry>\n    <entry>\n
<string>ImageCommPort</string>\n      <string>7002</string>\n    </entry>\n
<entry>\n      <string>wsSslClientAuth</string>\n      <string>false</string>\n
</entry>\n    <entry>\n      <string>StartServers</string>\n      <string>Database
Image Formula</string>\n    </entry>\n    <entry>\n
<string>RemoteContainerLogLevel</string>\n      <string>WARN</string>\n    </
entry>\n    <entry>\n      <string>JrePlatformOptions</string>\n      <string></
string>\n    </entry>\n    <entry>\n      <string>NsIpAddress</string>\n
<string>192.168.10.228</string>\n    </entry>\n    <entry>\n
<string>FormulaJre</string>\n      <string>"C\:\\MOFeb7\\bin\\mosformula.exe" -
jvmhome "C\:\\MOFeb7\\jre"</string>\n    </entry>\n    <entry>\n
<string>jvm.image.home</string>\n      <string>C\:\\MOFeb7\\jre</string>\n    </
entry>\n    <entry>\n      <string>wsTransport</string>\n      <string>https</
```

```
string>\n    </entry>\n    <entry>\n      <string>ImageLogInfo</string>\n
<string>FILE "C\:\\MOFeb7\\logs\\image.trc" SIZE 5000000 RENAME
"C\:\\MOFeb7\\logs\\image.%36datetime.trc"</string>\n   </entry>\n   <entry>\n
<string>HttpCommentHead</string>\n     <string>&lt;\!--</string>\n   </entry>\n
<entry>\n      <string>EveAgentCmdLine</string>\n
<string>"C\:\\MOFeb7\\bin\\moseveagent.exe" -jvmhome "C\:\\MOFeb7\\jre"</string>\n
</entry>\n    <entry>\n      <string>jvm.eve.agent.home</string>\n
<string>C\:\\MOFeb7\\jre</string>\n    </entry>\n    <entry>\n
<string>DaemonLogInfo</string>\n     <string>FILE @C\:\\MOFeb7\\logs\\daemon.trc@
SIZE 5000000 RENAME @C\:\\MOFeb7\\logs\\daemon.%36datetime.trc@</string>\n    </
entry>\n    <entry>\n      <string>InstallDir</string>\n      <string>C\:\\MOFeb7</
string>\n    </entry>\n    <entry>\n      <string>DaemonLogLevel</string>\n
<string>WARN</string>\n    </entry>\n    <entry>\n      <string>WebServerPort</
string>\n      <string>7080</string>\n    </entry>\n    <entry>\n
<string>RemoteContainerCmdLine</string>\n
<string>"C\:\\MOFeb7\\bin\\moscontainer.exe" -jvmhome "C\:\\MOFeb7\\jre"</
string>\n   </entry>\n   <entry>\n    <string>WebServerShutdownPort</string>\n
<string>7005</string>\n    </entry>\n    <entry>\n      <string>LocalDomain</
string>\n      <string>localdomain</string>\n    </entry>\n  </properties>\n</
config>
JAVA_DOT_HOME=$USER_INSTALL_DIR$$/$jre
WebServerPort=7080
USER_INSTALL_DIR=C\:\\MOFeb7_Clone1
AUTOSTART_BSM_SERVICES=0
LICENSE_FILE=C\:\\license.dat
LICENSE_CONTENTS=<license
signature\="MCwCFDSrKNBwA2KJqgrkU1x50XMTeb9NAhR2uqEaiRQg2Szugiqt5KqZhPdaig\=\="><c
ontents><envelope destination\="Internal Managed Objects - V4 - BETA testing"
issued\="02/02/2008 09\:25 PM" licenseNode\=""
subnet\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;12
7.0.0.1;218.168.0.*;10.0.0.*">Internal key for 4.0 testing requested by Leslie.
djo 04192006\n\nAdded MyMO and WSAPI\nEP - 060607\n\nChanged expiry to 12/31/2008
\nPB - 01022008\n\n</envelope><feature description\="Managed Objects License
Server - 4.*" name\="MOS/License/Server" operator\="and" version\="4.*"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /><expiry expiry\="12/31/2008 11\:59 PM" grace\="0" /
></feature><feature description\="Managed Objects Formula - 4.*" name\="MOS/
Formula/Server" operator\="and" version\="4.*"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Managed Objects
Formula User" name\="MOS/Formula/Server/Session" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /><concurrent count\="100" grace\="0" /></
feature><feature description\="Managed Objects Formula Web User" name\="MOS/
Formula/Server/Session/Web" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /><concurrent count\="100" grace\="0" /></
feature><feature description\="Managed Objects Business Service Analyzer"
name\="MOS/Formula/BSA/Local" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Managed Objects
Embedded Database Option" name\="MOS/Formula/EmbeddedDB" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Managed Objects
Advanced Security Option" name\="MOS/Formula/Server/ExternalAuthentication"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Managed Objects
Demonstration Adapter" name\="MOS/Formula/Adapter/
com.mosol.Adapter.Demo.DemoAdapter" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Managed Objects Eve
- 4.*" name\="MOS/Eve/EveConfigManager" operator\="and" version\="4.*"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Managed Objects Eve
Adapter" name\="MOS/Formula/Adapter/com.mosol.Adapter.Eve.EveAdapter"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Managed Objects
InterCommunication Adapter" name\="MOS/Formula/Adapter/
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com.mosol.Adapter.RemoteFormula.RemoteFormulaAdapter" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Managed Objects
FormulaScript Adapter" name\="MOS/Formula/Adapter/
com.mosol.Adapter.Script.Adapter" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Managed Objects
SIGpro Performance Manager Adapter" name\="MOS/Formula/Adapter/
com.mosol.Adapter.SIGNALpro.SpAdapter" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Managed Objects
SIGpro Performance Manager - 4.*" name\="MOS/SIGNALpro/Server" operator\="and"
version\="4.*"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Business Data
Integrator Definitions" name\="MOS/Formula/Element/
bdidefinitions\=Business+Data+Integrator/adapters\=Adapters/root\=Administration"
operator\="and" version\="1.*"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /><concurrent count\="100" grace\="0" /></
feature><feature description\="BDI Integration" name\="MOS/Formula/Adapter/
com.mosol.integration.bdi.BDIIntegration" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /><concurrent count\="100" grace\="0" /></
feature><feature description\="BDI Business Metric Demo Integration" name\="MOS/
Formula/Adapter/com.mosol.integration.bdi.BDIIntegration/BusinessMetricDemo"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="BEM Integration"
name\="MOS/Formula/Adapter/com.mosol.integration.apm.apmIntegration"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="BEM Monitor"
name\="MOS/BEM/Monitor" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="BMC Software
COMMAND/POST Adapter" name\="MOS/Formula/Adapter/com.mosol.Adapter.CP.Adapter"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="BMC Software MAX/
Enterprise Adapter" name\="MOS/Formula/Adapter/com.mosol.Adapter.Maxm.MaxAdapter"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Managed Objects
Business Service Configuration Manager" name\="MOS/Formula/BSCM"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="BTI Nodes
Component" name\="MOS/Formula/Adapter/com.mosol.integration.bti.Nodes"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /><concurrent count\="100000" grace\="0" /></
feature><feature description\="Computer Associates Unicenter TNG Adapter"
name\="MOS/Formula/Adapter/com.mosol.Adapter.Unicenter.Adapter"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Cisco Info Center
Adapter" name\="MOS/Formula/Adapter/com.mosol.Adapter.CIC.Adapter"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="ConnectPoint
LinkXChange Adapter" name\="MOS/Formula/Adapter/
com.mosol.Adapter.LinkXChange.LinkXChangeAdapter" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Simple Object Based
IDK Demo" name\="MOS/Formula/Adapter/
com.mosol.integration.develdemo.DevelDemoIntegration" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="CiscoWorks2000 DFM
Integration" name\="MOS/Formula/Adapter/

com.mosol.integration.smarts.DfmIntegration" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Simple Event Based
IDK Demo" name\="MOS/Formula/Adapter/
com.mosol.integration.ebidemo.EBIDemoIntegration" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Event-based OpenNMS
Integration" name\="MOS/Formula/Adapter/
com.mosol.integration.ebiopennms.OpenNMSIntegration" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Managed Objects XML
Interconnection Adapter" name\="MOS/Formula/Adapter/
com.mosol.guard.integration.highside.GuardIntegration" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Managed Objects low
side XML Interconnection Adapter" name\="MOS/Formula/Adapter/
com.mosol.guard.lowside.GuardLowsideController" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="IDK Hello World
Demo" name\="MOS/Formula/Adapter/
com.mosol.integration.helloworld.HelloWorldIntegration" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="HP OpenView IT/
Operations Adapter" name\="MOS/Formula/Adapter/com.mosol.Adapter.ITO.Adapter"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="HP OpenView Network
Node Manager Adapter" name\="MOS/Formula/Adapter/
com.mosol.Adapter.OpenView.OvAdapter" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Legacy InCharge
Integration" name\="MOS/Formula/Adapter/
com.mosol.integration.smarts.InChargeLegacyIntegration" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="EMC SMARTS
InCharge" name\="MOS/Formula/Adapter/
com.mosol.integration.smarts.InChargeIntegration" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="BMC Event Manager"
name\="MOS/Formula/Adapter/com.mosol.Adapter.MasterCell.Adapter"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="IBM Micromuse
Netcool/Omnibus" name\="MOS/Formula/Adapter/com.mosol.Adapter.Netcool.Adapter"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Microsoft Operation
Manager Integration" name\="MOS/Formula/Adapter/
com.mosol.integration.msmom.msmomIntegration" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="NetIQ AppManager
Adapter" name\="MOS/Formula/Adapter/com.mosol.Adapter.NetIQ.NetIQAdapter"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="NetIQ AppManager
Integration" name\="MOS/Formula/Adapter/
com.mosol.integration.netiq.AppManagerIntegration" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="HP NNM Integration"
name\="MOS/Formula/Adapter/com.mosol.integration.nnm.NNMIntegration"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="BDI NorthWind Demo
Integration" name\="MOS/Formula/Adapter/com.mosol.integration.bdi.BDIIntegration/
NorthWind Demo" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="OEM Integration"
name\="MOS/Formula/Adapter/com.mosol.integration.oem.oemIntegration"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.

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0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="OMG CosNaming
Service Adapter" name\="MOS/Formula/Adapter/com.mosol.Adapter.CorbaNS.Adapter"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="OpenNMS
Integration" name\="MOS/Formula/Adapter/
com.mosol.integration.opennms.OpenNMSIntegration" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="HP OVO Integration"
name\="MOS/Formula/Adapter/com.mosol.integration.OVO.OVOIntegration"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="BMC Patrol
Integration" name\="MOS/Formula/Adapter/
com.mosol.integration.Patrol.PatrolIntegration" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="BMC PEM
Integration" name\="MOS/Formula/Adapter/com.mosol.integration.PEM.PEMIntegration"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="RealTech the
Guard\! Integration" name\="MOS/Formula/Adapter/
com.mosol.integration.RealTechtheGuardIntegration" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="IDK Remedy
Integration" name\="MOS/Formula/Adapter/
com.mosol.integration.remedy.RemedyIntegration" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="JAVA RMI Demo
Integration" name\="MOS/Formula/Adapter/com.mosol.integration.RMIDemoIntegration"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="SNMP Integration"
name\="MOS/Formula/Adapter/com.mosol.integration.SNMP.SNMPIntegration"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="T/EC Plus
Integration" name\="MOS/Formula/Adapter/
com.mosol.integration.TecDB.TecDBIntegration" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Tivoli NetView
Adapter" name\="MOS/Formula/Adapter/com.mosol.Adapter.NetView.NvAdapter"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Tivoli TEC Adapter"
name\="MOS/Formula/Adapter/com.mosol.Adapter.TEC.Adapter" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Tivoli TEC+
Adapter" name\="MOS/Formula/Adapter/com.mosol.Adapter.TECDB.Adapter"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Insight Adapter"
name\="MOS/Formula/Adapter/com.mosol.integration.insight.InsightIntegration"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Pathfinder Adapter"
name\="MOS/Formula/Adapter/com.mosol.integration.pathfinder.PathfinderIntegration"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Foundation Adapter"
name\="MOS/Formula/Adapter/com.mosol.integration.foundation.FoundationIntegration"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="File Adapter"
name\="MOS/Formula/Adapter/
com.mosol.integration.fileadapter.fileAdapterIntegration" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="PXTI X-EMS
Management Adapter" name\="MOS/Formula/Adapter/
com.mosol.integration.pxti.xemsIntegration" operator\="and"><subnet
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mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="HP/Peregrine
Service Center Adapter" name\="MOS/Formula/Adapter/
com.mosol.integration.peregrine.servicecenter.SCIntegration"
operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Prototype Unicenter
TNG Adapter" name\="MOS/Formula/Adapter/
com.mosol.Adapter.Unicenter.prototype.UniAdapter" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="IBM Tivoli
Application Dependency Discovery Manager" name\="MOS/Formula/Adapter/
com.mosol.integration.configNia.ConfigniaIntegration" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="MOSSQL" name\="MOS/
Formula/BSM-SQL" operator\="and"><subnet
mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="CA Spectrum 6.6"
name\="MOS/Formula/Adapter/com.mosol.integration.spectrum.SpectrumIntegration"
operator\="and"><subnet
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Collation" name\="MOS/Formula/Adapter/
com.mosol.integration.configNia.ConfigniaLegacyIntegration"
operator\="and"><subnet
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0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Legacy Aprisma
Management Technologies SPECTRUM(r)+ 6.6" name\="MOS/Formula/Adapter/
com.mosol.integration.spectrum.SpectrumLegacyIntegration" operator\="and"><subnet
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Management Technologies SPECTRUM(r)+ 7.1.0" name\="MOS/Formula/Adapter/
com.mosol.integration.spectrum.SpectrumLegacyIntegration" operator\="and"><subnet
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0.0.1;218.168.0.*;10.0.0.*" /></feature><feature description\="Blade Logic OM"
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operator\="and"><subnet
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Integration (MOS)" name\="Customer/Formula/Adapter/
com.ericsson.alarmirp.AlarmIRPIntegration" operator\="and"><subnet
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name\="MOS/Formula/Adapter/com.mosol.integration.itheon.ItheonIntegration"
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mask\="206.55.26.*;192.168.*.*;66.160.14.*;10.24.43.*;10.10.*.*;207.152.147.*;127.
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iDiscovery " name\="MOS/Formula/Adapter/
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com.mosol.integration.iDiscovery.DiscoveryIntegration" operator\="and"><subnet
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Computing SNMPc" name\="MOS/Formula/Adapter/
com.mosol.integration.snmpc.SnmpcIntegration" operator\="and"><subnet
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Integration" name\="MOS/Formula/Adapter/
com.mosol.integration.orion.OrionIntegration" operator\="and"><subnet
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Mapping Integration" name\="MOS/Formula/Adapter/
com.mosol.integration.mam.MAMIntegration" operator\="and"><subnet
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License Server - 4.* BETA" name\="MOS/License/Server/beta" operator\="and"
version\="4.*"><subnet
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JDK_HOME=
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