

**BigFix Lifecycle
Server Automation**



Special notice

Before using this information and the product it supports, read the information in Notices.

Edition notice

This edition applies to version 10.0 of BigFix and to all subsequent releases and modifications until otherwise indicated in new editions.

Contents

- Chapter 1. Overview..... 8**
 - What's new in this release..... 9
 - Features added in previous releases..... 10
 - Supported content..... 16
 - Key concepts and terminology..... 22
 - Architecture..... 23
 - Key features..... 25
 - Installing the Automation Plan Engine..... 25
 - Prerequisites..... 25
 - Installing..... 27
 - Configuring the Automation Plan Engine..... 28
 - Upgrade the Automation Plan Engine..... 30
 - Upgrade from BigFix V8.2..... 30
 - Upgrade from BigFix V9.x..... 31
 - Uninstalling the Automation Plan Engine..... 32
 - Installing the management extender..... 33
 - Server Automation domain upgrades..... 34
- Chapter 2. Automation..... 35**
 - Introducing Automation Plans..... 35
 - Creating an Automation Plan..... 36
 - Creating your Automation Plan..... 37
 - Defining step failure behavior settings..... 43
 - Targeting by computer group..... 47
 - Managing pending restart states and automated restart of endpoints..... 48
 - Parallel step processing..... 50
 - Running steps in parallel and setting dependencies between steps..... 51
 - Excluding non-reporting endpoints..... 54
 - Configuring email notification for Server Automation..... 55
 - Running baselines from a site..... 61
 - Plan-specific log files..... 63

How your Automation Plan is processed.....	64
Automation Plan Engine shut down and recovery.....	66
Editing an Automation Plan.....	67
Copying an Automation Plan.....	72
Deleting an Automation Plan.....	73
Running an Automation Plan.....	73
Viewing Automation Plan actions.....	80
Stopping an Automation Plan.....	81
Exporting an Automation Plan	82
Changing default values of parameters.....	83
Chapter 3. Virtualization.....	84
VMware.....	84
Setup and maintenance.....	84
Virtual server overview.....	87
Host management tasks.....	89
Snapshot management tasks.....	105
Power management tasks.....	108
AIX® NIM.....	111
Setup and Maintenance	111
AIX® NIM Tasks.....	116
PowerVM®.....	118
Setup and Maintenance.....	118
Managed System Tasks.....	124
LPAR Tasks.....	133
State Management Tasks.....	146
Sample Automation Plans.....	150
Management Extender Log Viewer.....	154
Turning off validation in a task.....	155
Chapter 4. Configuring your system.....	156
Overview.....	156
Server Automation components.....	157
Enhancing the performance of Server Automation.....	159

Troubleshooting.....	160
Server Automation REST API.....	162
Chapter 5. Sample Automation Plans.....	163
Sample plan: Server Patching (Client-Server sample).....	163
Sample plan: Physical Server Build.....	164
Sample plan: Faster Virtual Server Build (with baseline).....	166
Sample plan: Server patching.....	167
Sample plan: Microsoft® Windows® 2008 Release 2 to Microsoft® Windows® 2012 Release 2 Cluster - OS patching (Non-Baseline from Site Sample).....	169
Sample plan: Microsoft® Windows® 2008 Release 2 to Microsoft® Windows® 2012 Release 2 Cluster - OS patching.....	171
Sample plan: Microsoft Exchange 2007 Cluster - OS patching.....	171
Install Oracle Database 11g on Linux.....	173
Sample plan: Microsoft Hyper-V Servers Cluster - OS patching.....	175
Sample plan: Microsoft Exchange 2010/2013 Cluster - OS patching.....	176
Sample plan for Exchange 2010 and 2013 and Windows Server 2008.....	179
Sample plan: Dynamically Run All Baselines from a Site and Restart the Endpoints.....	184
Sample plan: Microsoft® Windows® 2008 Cluster - OS patching.....	185
Sample plan: Microsoft® SQL Server 2008 Release 2 Cluster - Middleware patching.....	186
Sample Plan: Microsoft® SQL Server 2012 and later Cluster - Middleware patching.....	187
Sample Plan: IBM® WebSphere® Application Server Cluster - OS patching.....	188
Sample Plan: IBM® WebSphere® Application Server Cluster - Middleware patching.....	190
Sample Plan: Microsoft Exchange 2007 Mailbox Cluster - Middleware Patching.....	191
Sample Plan: Microsoft Exchange 2010 or 2013 DAG Cluster - Middleware Patching.....	192
Sample Plan: IBM® WebSphere® Application Server Standalone - OS patching.....	193
Sample Plan: IBM® WebSphere® Application Server standalone - Middleware patching.....	194
Sample Plan: Patching a VMware Windows Template.....	195
Sample Plan: Patching a VMware Linux® Template.....	197
Chapter 6. Server Automation content.....	199
Advanced patching.....	199
Patching WebSphere® Application Server clusters.....	199
Patching VMware virtual machine templates.....	200
Patching Microsoft Windows® clusters.....	201

Patching Windows® clusters.....	202
Patching Exchange 2007 clusters.....	209
Patching Exchange 2010 and later clusters.....	210
Automating patching of operating system servers in a Microsoft Hyper-V cluster.....	212
Automating middleware patching of Microsoft® SQL Server 2008 Release 2 in Windows clusters.....	214
Automating patching of Microsoft® SQL Server 2012 and later in Windows clusters.....	215
Cluster patching terms and concepts.....	216
Server Automation middleware content.....	217
Prerequisites.....	218
Middleware Tasks.....	220
Log file locations.....	238
OSD content.....	239
Example: end-to-end provisioning.....	239
How it works.....	240
Fixlets for operating system deployment.....	240
Server Automation Chef-Solo content.....	242
Chef-Solo Tasks.....	243
Server Automation Remote Connector.....	243
Installing Remote Connector.....	244
Notices.....	ccxlv
Index.....	

Chapter 1. Overview

BigFix Lifecycle Server Automation provides you with the capability to automate provisioning workflows. You can automate a sequence of Fixlets, Tasks, and Baselines across different endpoints, such as servers or computers. Server Automation exploits the agility and scalability of BigFix to deliver powerful functionality in a lean and efficient manner, with minimal impact on your network.

Server Automation enables you to automate workflows by running automation tasks in a simple sequence or in parallel across multiple endpoints. You do this by creating an Automation Plan that contains a separate step for each action that you want to run across the endpoints. Your Automation Plan can run in a simple straight sequence, where each step is processed one after the other, or you can include parallel processing in the plan. For example, you can create an Automation Plan to sequence actions that deploy an operating system on a set of virtual servers, then install a database on one of those virtual servers while concurrently installing middleware applications on the other virtual servers. You can create sequenced automation that is based on conditions, for example, you might want the Automation Plan to begin only if the virtual servers are powered on successfully.

To sequence your automation flows, you create an Automation Plan. Each Automation Plan contains a number of steps. Each step is a Fixlet, Task, or Baseline and represents an action to be deployed across multiple endpoints, such as the deployment of a Fixlet to install patches on endpoints.

Some key Server Automation use cases are as follows:

Patch sequencing for endpoints

You can automate patching across multiple endpoints, for example, you can patch servers.

Running Baselines from a site

You can easily run all of the Baselines contained in a site against a set of endpoints.

Automate patching of Microsoft® Windows® clusters

You can also automate patching of applications running on Microsoft® Windows® clusters. For example, you can use Server Automation Fixlets in an Automation Plan to automate the patching of clusters on which Microsoft® SQL Server is installed.

Middleware application installations and deployments

You can install, remove, and upgrade middleware applications across multiple endpoints in a single Automation Plan. You can target different endpoints in different steps in the Automation Plan. Some examples are multi-tier application deployments.

Virtual server management

You can manage your virtual servers and include virtual server management actions in your Automation Plans.

Example: sequencing automation across endpoints

This example shows a typical automation flow over a number of servers in a data center. You can automate the process with an Automation Plan. The Automation Plan contains a number of steps, with each step representing a single action, such as the installation of software or the restarting of a system.

Using Server Automation, you can create an Automation Plan to run actions in sequence and in parallel, without requiring manual intervention. To automate the scenario, you create an Automation Plan to run the actions in the following table in the sequence shown.

Table 1. Creating an Automation Plan

Requirement	Action
1. Deploy an operating system on two different computers.	Add a step to your Automation Plan to deploy the operating system. You can use the <code>Deploy an operating system to one or more computers (133)</code> Server Automation Task to do this.
2. Install DB2® on one of the operating systems that are deployed in step 1.	Add a second step to your Automation Plan to install DB2®. There is a Server Automation Task available to install DB2®. Make this step dependent on step 1.
3. Install WebSphere® Application Server on one of the other operating systems that are deployed in step 1.	Add a third step to install WebSphere® Application Server. There is a Server Automation Task available to install WebSphere® Application Server. Make this step dependent on step 1. This step runs in parallel with step 2.
4. Create a database on the computer on which you installed DB2®.	Add a step to your Automation Plan to create the database for the DB2® installation in step 2. There is a Server Automation Task available to create the database. You make this step dependent on step 2.
5. Run a baseline on the computer on which WebSphere® Application Server was installed in step 3.	Add a fifth step to your Automation Plan to include the baseline that you want to use to patch the computer. You then make this step dependent on step 3. This step runs in parallel with step 4.
6. Process the action.	Run the Automation Plan to perform the actions. The Automation Plan Engine processes the Automation Plan running some of the steps in parallel.

What's new in this release of Server Automation

This release of Server Automation contains the following updates.

Server Automation 9.5.65 site version 87

This table lists the changed or new features and enhancements included in BigFix® Server Automation 9.5.65

Updates	Description
Server Automation Plan Engine	With this release, multi-threaded Plan Engine performance is optimized.
Server Automation REST API	The Node.js library is upgraded to Version 18.
Defect Article addressed	<ul style="list-style-type: none"> • KB0094898: SA Rest Node : SSL Certificate Configuration • KB0100953: Incorrect SA REST documentation • KB0100416: Steps having Baselines with pending restart, doesn't have the step status updated until the entire plan stops. • KB0100903: Server Automation plan fails when automation plans is scheduled via REST API • KB0101206: Plan engine multi-threading issue while parsing plan stop time • KB0103430: Global Notifications not being sent from plans • KB0103538: Failure steps of an automation plan do not run on FAILED ONLY endpoints, forcing the plans to stop prematurely • KB0102112: Delays in starting Automation Plans

Features added in previous releases

A summary of changed or features and enhancements included in BigFix® Server Automation in previous releases.

Server Automation 9.5.64 site version 86

This table lists the changed or new features and enhancements included in BigFix® Server Automation 9.5.64

Updates	Description
Multi-threaded Plan Engine	With this release, Server Automation provides an increased throughput and better resiliency through multi-threaded Plan Engine that can process multiple plans in parallel.
Defect Article addressed	<ul style="list-style-type: none"> • KB0099913: Timeout condition not honored for plans with pending restart option set as Continue to next step. • KB0099934 : Automation Plan is interrupted when one of its target has no computer name. • KB0100011 : Failure on Powershell-type step in Automation Plan

Server Automation 9.5.63 site version 85

This table lists the changed or new features and enhancements included in BigFix® Server Automation 9.5.63

Updates	Description
Introducing Status Collector service implemented as a Windows scheduled task	Status Collector is introduced to facilitate enhanced monitoring and process improvement to manage Windows 2012 and later clusters with Always On Availability Groups (AAGs). For more detailed information about the procedure to install, run, and manage AAGs, see Managing Always On Availability Groups (on page 204) .
Defect Article addressed	<ul style="list-style-type: none"> KB0098080: Plan Parsing issue - Automation Plan do not start at scheduled time. KB0098101: While executing the automation plan action, the VM is getting created and native client is restarted, but that VM ESXi client reporting with two entries in BigFix Console.

Server Automation 9.5.62 site version 84

This table lists the changed or new features and enhancements included in BigFix® Server Automation 9.5.62

Updates	Description
IBM Semeru Open Runtime	Replaced the IBM JRE with the IBM Semeru Open Runtime.
Defect Article addressed	<ul style="list-style-type: none"> KB0097779: Automation Plan Dashboard - Improving relevancies to avoid error "Singular expression refers to non-existent object" when any attribute

Server Automation 9.5.61 site version 83

This table lists the changed or new features and enhancements included in BigFix® Server Automation 9.5.61

Updates	Description
Introducing SA Remote Connector tool to replace RXA	Remote Connector module provides the same level of functionality as the existing RXA module. The existing RXA module is getting deprecated in subsequent releases. Remote Connector for the SA module uses SSH protocol by leveraging JSCH jar which is open source and is much more secure. For more information, see Server Automation Remote Connector (on page 243) . For installation steps, see Installing Remote Connector (on page 244) .

Updates	Description
	 Note: BigFix does not support new installation or further maintenance of RXA. New users have to use Remote Connector and existing customers can use both in the same environment if needed.
Defect Article addressed	<ul style="list-style-type: none"> • KB0094336: Server Automation Plan engine custom log amendments • KB0094182: Patching Windows VM Template Automation Plan issues

Server Automation 9.5.60 site version 82

This table lists the changed or new features and enhancements included in BigFix® Server Automation 9.5.60

Updates	Description
Defect Article addressed	<ul style="list-style-type: none"> • KB0091870 : RHEL : Unable to start Plan Engine : Failed to initialize IBMJCEPlus provider KB0093719 : Deploy Management Extender for PowerVM fails because it cannot download the file and AIX Plugin Download Issue KB0088923 : Unable to run REST API with 157 Task - SA Rest Node KB0094085 : Script Error occurs when taking action on automation plans at custom site

Server Automation 9.5.59 site version 81

This table lists the changed or new features and enhancements included in BigFix® Server Automation 9.5.59

Updates	Description
Defect Article addressed	<ul style="list-style-type: none"> • KB0091870: RHEL : Unable to start Plan Engine : Failed to initialize IBMJCEPlus provider • KB0093719 : Deploy Management Extender for PowerVM fails because it cannot download the file and AIX Plugin Download Issue

Updates	Description
	<ul style="list-style-type: none"> • KB0088923 : Unable to run REST API with 157 Task - SA Rest Node • KB0094085 : Script Error occurs when taking action on automation plans at custom site

Server Automation 9.5.58

This table lists the changed or new features and enhancements included in BigFix® Server Automation 9.5.58

Updates	Description
Defect Article addressed	<ul style="list-style-type: none"> • KB0090918: BigFix Automation plan search for computer group very slow • KB0087302: Server Automation Plan Engine performance issues after upgrading to 9.5.56 • KB0091477: Automation Plan Action Status Dashboard - special characters are not working • KB0081819: BigFix Server Automation Plan is not updating the Last Modified User • Security vulnerability issues addressed
Make server build faster via baseline parameter support	<ul style="list-style-type: none"> • Multi-step server build plan has been improved to include baseline that shows the components in a parent-child structure to facilitate entering parameter values for each component.
Last modified user of a plan is captured in plan detail	<ul style="list-style-type: none"> • From 10.0.4 onwards, in the Details tab of a plan, the last modified user of a plan is captured in the <code>Last Modified By</code> field. In previous versions, by default, the last modified user was always admin, even if some other operator has modified the plan.

Server Automation 9.5.57

This table lists the changed or new features and enhancements included in BigFix® Server Automation 9.5.xx

Updates	Description
Defect Article addressed	<ul style="list-style-type: none"> • KB0089756: Unable to schedule a plan when using TZ UTC +5:30
Updates	<ul style="list-style-type: none"> • Refreshed the embedded version of OpenSSL 1.0.2y. • SA Rest Node 14.16.0 upgrades • JDK version upgraded to 8.0.6.26 (Security vulnerability issues addressed)

Server Automation 9.5.56

This table lists the changed or new features and enhancements included in BigFix® Server Automation 9.5.56

Updates	Description
Defects fixed	<ul style="list-style-type: none"> • KB0079739: Fixlets : 137 - Baseline SiteURL not found. • Security vulnerability issues addressed
Replaced IBM GSKit with OpenSSL	<ul style="list-style-type: none"> • IBM GSKit cryptographic libraries replaced with the OpenSSL 1.0.2u FIPS compliant.

Server Automation 9.5.55

This table lists the changed or new features and enhancements included in BigFix® Server Automation 9.5.55

Updates	Description
Defect Article addressed	<ul style="list-style-type: none"> • KB0076964: Automation plans are failing after upgrading to Automation Plan Engine 9.5.54 • KB0077283: Task "Install IEM RXA Tool" in the Server Automation site fails

Server Automation 9.5.54

This table lists the changed or new features and enhancements included in BigFix® Server Automation 9.5.54

Updates	Description
Configure Sender Email Address at plan level to send notifications	Enhanced <code>Task 153 Configure Email Notification Settings for Server Automation</code> to allow the user to configure Sender Email Ad-

Updates	Description
	dress in place of the default configuration at Plan level to send email notifications.
Configure Sender Email Address at plan level to send notifications	Enhanced <code>Task 153 Configure Email Notification Settings for Server Automation</code> to allow the user to configure Sender Email Address in place of the default configuration at Plan level to send email notifications.
Check for already running plan engine	Enhanced BigFix Server Automation Plan Engine to check for already running plan actions.
Install Latest Automation Plan Engine task	Enhanced Install Latest Automation Plan Engine task to show the status as 'Completed' when the Plan Engine is running and to show 'Failed' if the Plan Engine is not running.
Server Automation REST API	<p>Introducing Node-based Server Automation REST API to execute and monitor Server Automation Plans. You can install/uninstall this service using the following tasks:</p> <pre>(ID: 157) Deploy Server Automation REST API (ID: 158) Remove Server Automation REST API</pre> <p>Fore more information, refer to Server Automation REST API (on page 162).</p> <p>API (ID: 158) Remove Server Automation REST API</p>

Table 2. Features added in previous releases

A summary of changed or new features and enhancements included in BigFix® Server Automation .

This table lists the features added to Server Automation for the previous release.

Feature	Description
Exclude non-reporting endpoints	You can configure the system to exclude non-reporting endpoints from the plan targets list. Computers are considered non-reporting if they have not reported to the BigFix server as seen in the Computers view in the All Content domain. To configure Server Automation to exclude non-reporting endpoints, you specify a non-reporting threshold at a global level when you configure the Automation Plan Engine. For each automation plan, you can configure whether endpoints that have exceeded the non-reporting threshold are excluded from the target list for each plan step. For more information about how this feature works, see Excluding non-reporting endpoints (on page 54) .

Table 2. Features added in previous releases

A summary of changed or new features and enhancements included in BigFix® Server Automation .

This table lists the features added to Server Automation for the previous release.

(continued)

Feature	Description
Automation Plan Engine configuration	You can now configure the Automation Plan Engine more easily using a Task. For more information, see Configuring the Automation Plan Engine (on page 28) .
Patch VMware templates	You can patch VMware templates on Windows and Linux. To patch the templates you use a sample automation plan. For more information, see Patching VMware virtual machine templates (on page 200) . Read the documentation carefully before using the plan as the targeting requirements for this sample plan are different to other sample plans.
Specify plan stop time	You can set a plan stop time to control when your Automation Plans stop. This enables you to set a time window during which your Automation Plans run. For more information about the expected behavior, see Running an Automation Plan (on page 73) .
Schedule prefetch downloads	From the Take Automation Plan Action screen, you can schedule a time and date on which to prefetch downloads. For more information, see Running an Automation Plan (on page 73) .
User interface improvements	The Take Automation Plan Action user interface has been streamlined and improved.
Quality improvements and enhancements	Several defects have been fixed and quality enhancements have been included in this release.
New sample Automation Plans	Several new sample automation plans have been added. Also, existing sample plans have been updated and improved. For more information about the Server Automation sample plans, see Sample automation plans (on page 163) .

Supported content

This section lists the software and software versions supported by Server Automation.

The following table lists the supported content for cluster patching. For complete information, see [Patching Microsoft Windows clusters \(on page 201\)](#).

Table 3. Cluster patching support on Microsoft® Windows®

This table lists the cluster patching support on Microsoft® Windows®, listing the content, versions, and operating systems.

Content	Version	Operating System
Patching Microsoft® Windows® clusters (Manage the cluster so the underlying operating system can be patched)	<ul style="list-style-type: none"> • Microsoft® Windows® 2003 • Microsoft® Windows® 2008 • Microsoft® Windows® 2008 Release 2 • Microsoft® Windows® 2012 • Microsoft® Windows® 2012 Release 2 	Same as versions.
Patching clusters running Microsoft Exchange 2007 (Manage the cluster so the underlying operating system can be patched)	Microsoft® Windows® Exchange 2007 Service Pack 1 - Service Pack 3	<ul style="list-style-type: none"> • Microsoft® Windows® 2003 • Microsoft® Windows® 2008 • Microsoft® Windows® 2008 Release 2 <p>For information about Exchange versions and operating system version support, see Exchange support matrix.</p>
Patching clusters running Microsoft Exchange 2010 (Manage the cluster so the underlying operating system can be patched)	Microsoft Exchange 2010	<ul style="list-style-type: none"> • Microsoft® Windows® 2008 Release 2 • Microsoft® Windows® 2012 <p>For information about Exchange versions and operating system version support, see Exchange support matrix.</p>
Patching clusters running Microsoft Exchange 2013 (Manage the cluster so the underlying operating system can be patched)	Microsoft Exchange 2013 Service Pack 1 and newer	<ul style="list-style-type: none"> • Microsoft® Windows® 2008 Release 2 • Microsoft® Windows® 2012 <p>For information about Exchange versions and operating system version</p>

Table 3. Cluster patching support on Microsoft® Windows®

This table lists the cluster patching support on Microsoft® Windows®, listing the content, versions, and operating systems.

(continued)

Content	Version	Operating System
Patching clusters running Microsoft SQL Server (Manage the cluster so the underlying operating system can be patched)	SQL Server 2008	support, see Exchange support matrix . <ul style="list-style-type: none"> • Windows 2003 • Windows 2008
Patching clusters running Microsoft SQL Server (Manage the cluster so the underlying operating system can be patched)	SQL Server 2012	<ul style="list-style-type: none"> • Windows 2012 • Windows 2012 Release 2
Patching Hyper-V clusters (Manage the cluster so the underlying operating system can be patched)	<ul style="list-style-type: none"> • Windows 2012 • Windows 2012 Release 2 • Windows 2008 Release 2 	Same as versions.
Patching Microsoft® SQL Server running in clusters (Manage the cluster as the middle-ware is patched)	Microsoft® SQL Server 2008 Release 2	Tested on the following operating systems: <ul style="list-style-type: none"> • Microsoft® Windows® 2008 Release 2 • Microsoft® Windows® 2012
Patching Microsoft® SQL Server running in clusters (Manage the cluster as the middle-ware is patched)	Microsoft® SQL Server 2012	Tested on the following operating systems: <ul style="list-style-type: none"> • Microsoft® Windows® 2008 Release 2 • Microsoft® Windows® 2012 • Microsoft® Windows® 2012 Release 2
Patching Microsoft® SQL Server running in clusters	Microsoft® SQL Server 2014 and later	Tested on Microsoft® Windows® 2012 Release 2

Table 3. Cluster patching support on Microsoft® Windows®

This table lists the cluster patching support on Microsoft® Windows®, listing the content, versions, and operating systems.

(continued)

Content	Version	Operating System
(Manage the cluster as the middle-ware is patched)		
Patching WebSphere® Application Server in clusters	WebSphere® Application Server ver-sions 8.0, 8.5, and 8.5.5	Microsoft® Windows® 2008 Server Release 2 or later
(Manage the cluster as the middle-ware or operating system is patched)		

The following table lists advanced patching support.

Table 4. Advanced patching support

This table lists the advanced patching support, listing the content, versions, and operating systems.

Content	Version	Operating system
Patching standalone nodes of WebSphere® Application Server in a cluster	WebSphere® Application Server versions 8.0, 8.5, and 8.5.5	Microsoft® Windows® 2008 Server Release 2 or later
Patching VMware virtual machine templates	Not applicable	Microsoft® Windows® and Linux®.

The following table describes the supported content for middleware automation. For complete information, see [BigFix Lifecycle Server Automation middleware Tasks \(on page 220\)](#).

Table 5. Middleware automation

This table lists the supported middleware content, versions, and operating systems.

Content	Version	Operating system
<ul style="list-style-type: none"> • Oracle 11g Enterprise Edition • Oracle 11g Client 	11.2.0.4	Red Hat Enterprise Linux versions later than V5.0
DB2® Enterprise Server Edition and DB2® Client	9.7	<ul style="list-style-type: none"> • Windows 2003 • Windows 2008

Table 5. Middleware automation

This table lists the supported middleware content, versions, and operating systems.

(continued)

Content	Version	Operating system
MS SQL Server Enterprise	<ul style="list-style-type: none"> • 2008 • 2008 Release 2 • 2012 • 2014 	<ul style="list-style-type: none"> • Windows 2008 Release 2 • Windows 2012 • Windows 2012 Release 2 • AIX 5.3 • AIX 6.1 • AIX 7.1 • Red Hat Enterprise Linux version later than V5.0 • SUSE Linux versions later than V10.0 • Windows 2003 (except for SQL Server 2014) • Windows 2008 • Windows 2008 Release 2 • Windows 2012 • Windows 2012 Release 2
WebSphere® Application Server and WebSphere® Application Server Network Deployment 7.x		<ul style="list-style-type: none"> • Windows 2003 • Windows 2008 • Windows 2008 Release 2 • Windows 2012 • Windows 2012 Release 2 • AIX 5.3 • AIX 6.1 • AIX 7.1 • RHEL V4.6 or later than V5.0 • SUSE V9.4 and V10.0 or later

Table 5. Middleware automation

This table lists the supported middleware content, versions, and operating systems.

(continued)

Content	Version	Operating system
WebSphere® Application Server and WebSphere® Application Server Network Deployment	v8, v8.5, and v8.5.5	Red Hat Enterprise Linux® V6.0 or newer

The following table lists the supported virtualization versions. For complete information, see [Virtualization \(on page 84\)](#).

Table 6. Virtualization support

This table lists the supported virtualization content.

Content	Version	Operating system
ESXi Audit fixlets for VMware patches	<ul style="list-style-type: none"> • 5 • 5.1 • 5.5 • 6.0 • 6.5 • 6.7 • 7.0 	Not applicable.
VMware Management	<ul style="list-style-type: none"> • 4 • 4.1 • 5 • 5.1 • 5.5 • 6.0 	Not applicable.
PowerVM Logical partition provisioning	POWER7 Tested on Hardware Management Console V7.9.0.0, VIOS version 2.2.3.0, and NIM V7.1.	AIX®

The following table lists other supported content.

Table 7. Other supported content

This table lists other content supported by Server Automation.

Content	Version	Operating system
Chef-Solo	11.6	<ul style="list-style-type: none"> • Windows 2003 Release 2 • Windows 2008 • Windows 2008 Release 2 • Windows 2012 • Windows 7

Key concepts and terminology

Server Automation provides automation functionality that you can use to automate IT processes. To automate your workflows using Server Automation, you use an Automation Plan. The Automation Plan contains steps, one for each distinct phase in the automated workflow. When you execute an Automation Plan, an action is created for the plan. Child actions will then be created for each of the steps in the plan as the plan is processed.

Some of the most important Server Automation terms are described here:

Automation Plan

A Server Automation container that controls your automated workflow (automation flow). Automation Plans contain one or more steps. Each step is a Fixlet, Task, or Baseline that is executed against the endpoints that you specify.

Automation Plan Engine

The Server Automation component that processes your Automation Plans and therefore your automation flows. You must install the Automation Plan Engine before you can automate your workflows by running Automation Plans.

Default values

When you create or edit an Automation Plan, you can save default values for parameters and targets. This allows you to execute the plan quickly at runtime and also facilitates easy reuse of plans.

Failure step

When you create or edit an Automation Plan, you can add a single corresponding failure step for each step in the Automation Plan. A failure step can be a Fixlet, Task, or Baseline. If a step action fails and the Automation Plan contains a failure step for the failed step, the system identifies and runs the failure step action. You can target a failure step to run on either all the endpoints for the corresponding step action or only on the endpoints that returned a failed status for the step action.

Step failure behavior

Use the step failure behavior feature when designing your Automation Plan. The step failure behavior feature provides you with the ability to control the flow of the Automation Plan on endpoints. It gives you the ability to define the behavior that occurs when steps in your Automation Plan fail on some or all endpoints.

Step failure threshold

Setting a step failure threshold allows you to specify the percentage of failing targets that determines the success or failure of the step. The step failure threshold enables you to manage the success or failure of each step in your Automation Plan, based on the percentage success and failure rate of the step on the total number of target endpoints.

Management extender

Before you can use the Virtualization functionality, you must install a management extender to communicate with the VMware vCenter or ESX host. Before you install the management extender, you must enable the license for Virtual Endpoint Manager.

Sample plans

Out-of-the-box automation plans for common automation scenarios to help you get up and running quickly. To use a sample plan, you create a copy of the sample plan and then edit the copy to specify target endpoints and parameters.

Sequential processing

You can design your Automation Plans to process your automation flows in a straight sequence, where each step is processed after the prior step. This is known as a sequential plan.

Parallel processing

You can design your Automation Plans to process your automation flows in parallel, where multiple steps are processed simultaneously. This is known as a parallel plan.

Architecture

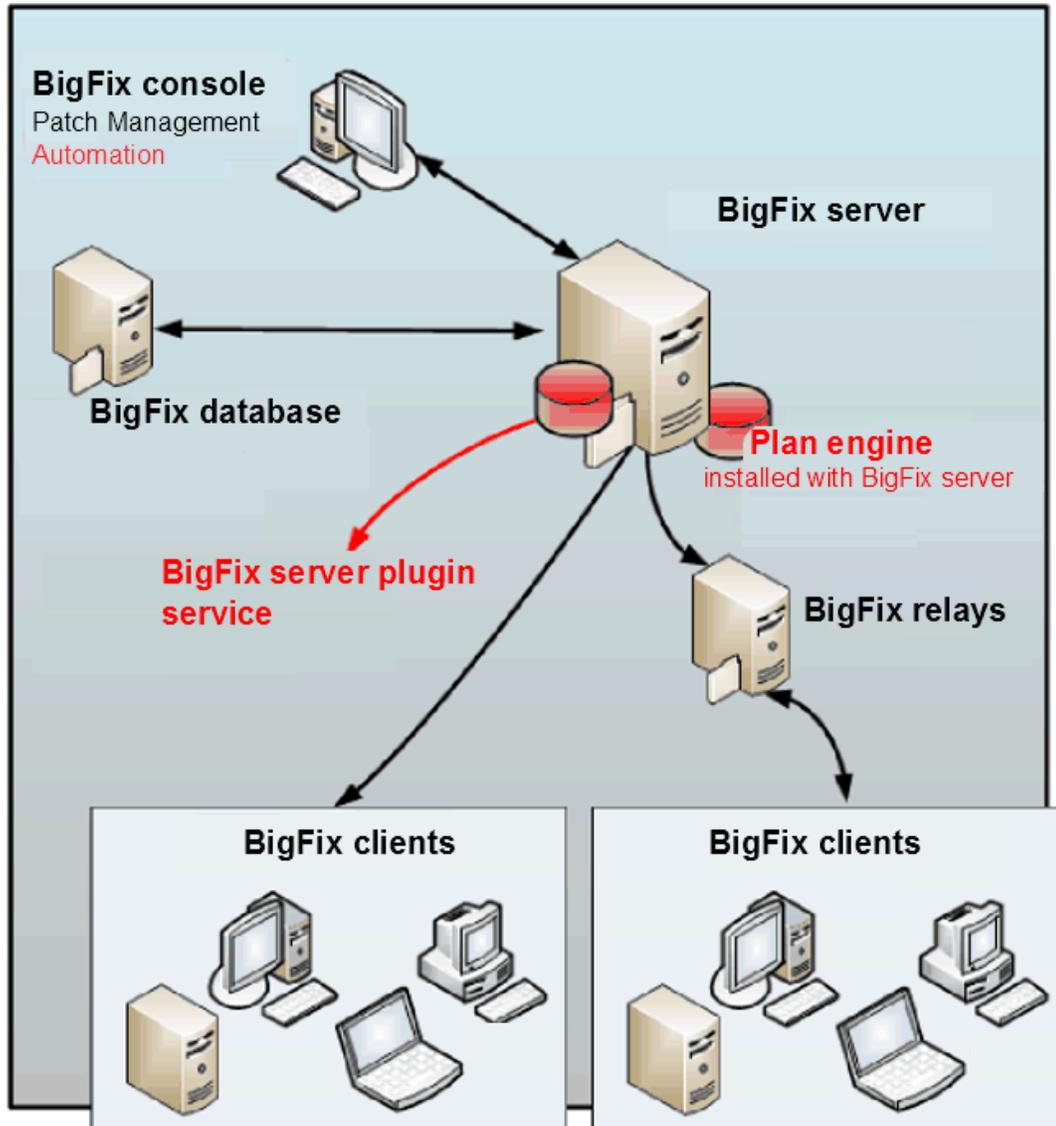
Server Automation is based on the BigFix architecture. The only additional component required to use Server Automation is the Automation Plan Engine. The Automation Plan Engine processes your Automation Plans by running each step in the Automation Plan. You install the Automation Plan Engine using a Task. The Automation Plan Engine is located on the same system as the BigFix server.

Server Automation integrated in BigFix

The following diagram shows the BigFix architecture with the Server Automation component displayed in red. Server Automation is a BigFix application, similar to the other Lifecycle applications. You access and use Server Automation using the BigFix console.

Architecture

New components in red



The Automation Plan Engine communicates with the BigFix server via the REST API. The BES server plug-in service is required on the BigFix server. Server Automation requires no additional components. Server Automation can operate with or without relays.

For information about configuring the BES server plug-in service, see [Server plugin service configuration](#).

Key features

Server Automation provides key automation features that allow you to automate best practices for your data center.

Server Automation provides the following important features:

- Integration with the BigFix platform.
- Automation technology that allows you to automate IT workflows, across multiple endpoints.
- Ability to manage VMware virtualization resources.
- Ability to provision logical partitions for POWER7 on AIX®.
- Middleware content that you can use to automate deployment of middleware applications.
- Advanced patching content to automate patching of middleware such as WebSphere® Application Server.
- Fixlet content for automating the patching process for Microsoft® Windows® clusters.
- Preconfigured Fixlets that allow you to deploy operating systems as part of your Automation Plans.
- Ability to run all of the Baselines contained in a site as part of an Automation Plan.

Installing the Automation Plan Engine

To install the Automation Plan Engine, you must have BigFix V9.5 with the Server Automation site installed. Make sure that your system meets all of the prerequisites before you begin installing the Automation Plan Engine. You can then install the Automation Plan Engine by executing a Task from your BigFix console.

Install the Automation Plan Engine by completing the following steps:

1. Read the documentation for important information about the installation.
2. Complete the prerequisites. After you have completed the prerequisites, you are ready to install the Automation Plan Engine and the Task that installs the Automation Plan Engine becomes relevant.
3. Run the Task that installs the Automation Plan Engine on the BigFix server. The installation takes a few minutes and when it has completed, the Task that installs the Automation Plan Engine is no longer relevant.
4. Verify that the Automation Plan Engine installed successfully and has started. The BigFix server plugin service starts the Automation Plan Engine when it is installed on the BigFix server.

The following sections describe each of these steps in detail.

Automation Plan Engine prerequisites

You can install the Automation Plan Engine on Linux® and Windows® platforms. Before installing the Automation Plan Engine, make sure that your system meets all of the prerequisites. This section describes all of the prerequisite tasks that you must complete before installing the Automation Plan Engine and the instructions are the same for both Windows® and Linux®.

Before you begin completing the prerequisite tasks, make sure that the external content site, BES Support, is accessible. This site publishes the Tasks to install the required component, the BigFix server plugin service.



Note: The `BES Server Plug-in Service`, displayed on the user interface, is a synonym for the BigFix server plugin service. The BigFix server plugin service is the new term.

For each of the Fixlets or Tasks described here, there is normally a lag between the time you run one Fixlet or Task and when another becomes relevant and available.

Complete the following prerequisite steps in the order in which Tasks or Fixlets become relevant in the Server Automation domain. The Tasks or Fixlets only become relevant after you complete a dependent step.

1. You must have BigFix V9.5 installed to install the Automation Plan Engine. For a Linux® installation, the BigFix console must be installed on a Windows® system.
2. You must have Web Reports installed with your BigFix installation, and create a user with normal access rights in Web Reports. You must do this in Web Reports and this is a different user than the users that you create in the BigFix console. For more information about creating a user in Web Reports, see [Web Reports User's Guide](#).
3. Create a new BigFix console user for the installation with `master operator` privileges.
4. Ensure that the site for the **Automation** domain, called Server Automation, is accessible. This site publishes the Task that installs the Automation Plan Engine.
5. Your computers must be subscribed to the Server Automation site. To subscribe the computers, select the Server Automation site from the **Sites > External Sites** section in the **All Content** domain. Click the **Computer Subscriptions** tab and subscribe the computers that you want to have access to the Server Automation site.
6. Install the BigFix server plugin service on the BigFix server. Install this plug-in using the `Install BES Server Plugin Service` Task from **Setup and Maintenance > Fixlets and Tasks** in the **Automation** node. When you click **Take Action**, target the BigFix server.
7. Enable encryption of the credentials for the BigFix REST API by running the `Configure REST API credentials for BES Server Plugin Service` Task from **Setup and Maintenance > Fixlets and Tasks** in the **Automation** node:
 - a. Click the `Configure REST API credentials for BES Server Plugin Service` Task. The user interface from which you must start the encryption enablement Task is displayed.
 - b. Enter the user name and password for the master operator user that you created in step 3. This creates an encrypted password.
 - c. Click **Take Action** and specify the server where you are installing the Automation Plan Engine, which is the BigFix server.



Note: The `Configure REST API credentials for BES Server Plugin Service` Task remains relevant after you run it. You can check the action history to confirm that it has run.

After completing all of the steps described in this topic, the Task to install the Automation Plan Engine becomes relevant. You can now proceed to install the Automation Plan Engine.

Installing the Automation Plan Engine

You can install the Automation Plan Engine on Windows® and Linux® systems. To install the Automation Plan Engine, you run a Task from your BigFix console. The Task to install the Automation Plan Engine becomes relevant only if the BigFix server plugin service is installed correctly. You must install the Automation Plan Engine on the system on which the BigFix server is installed. The installation procedure is the same for both Windows® and Linux®.

Before you begin installing the Automation Plan Engine, make sure that your system meets the prerequisites as described in [Automation Plan engine prerequisites \(on page 27\)](#). There is one Task for installing and upgrading the Automation Plan Engine and another Task for uninstalling the Automation Plan Engine. Each of these Tasks becomes relevant depending on whether you already installed the Automation Plan Engine. When you install the Automation Plan Engine, the Task that installs it becomes non-relevant and the Task that uninstalls it becomes relevant. After you install the Automation Plan Engine, it can take a few minutes for the Automation Plan Engine installation Task to become non-relevant.

Complete the following steps to install the Automation Plan Engine.

1. Log on to the BigFix console as the master operator and navigate to the Server Automation domain.

Note: For a Linux® installation,

 - the console must be installed on Windows®.
 - ensure if `dos2unix` package is available for RHEL (To check this, open the terminal with Admin privilege/root access and enter the command `dos2unix`. If the command is not found, install the package using the command `yum install dos2unix`).
2. From the **Automation** node, click **Setup and Maintenance > Fixlets and Tasks** and select one of the following Tasks, depending on your platform:
 - For Windows® platforms, select the **Install Latest Automation Plan Engine**.
 - For Linux® platforms, select the **Install Latest Automation Plan Engine (RHEL)**.
3. Click **Take Action**.
4. From the **Take Action** dialog box, target the system on which the BigFix server is installed.
5. Click **OK**. The Task runs and installs the Automation Plan Engine. The default location for the Automation Plan Engine installation is in the following directory:
 - For Windows® platforms, the `C:\Program Files (x86)\BigFix Enterprise\BES Server\Applications\PlanEngine` directory.
 - For Linux® platforms, the `/var/opt/BESServer/Applications/PlanEngine` directory.

It can take a few minutes for the Automation Plan Engine installation Task to become non-relevant. The uninstallation Task now becomes relevant.

After the Automation Plan Engine is installed, the BigFix server plugin service starts it automatically. The Automation Plan Engine log file, `pe_console.log`, is available in the following location, depending on your platform:

- For Windows®, the `pe_console.log` log file is available in the `\BES Server\Applications\Logs` subdirectory of the installation directory, for example, `C:\Program Files (x86)\BigFix Enterprise\BES Server\Applications\Logs` directory.
- For an installation with default values on Linux®, the `pe_console.log` log file is available in the `/var/opt/BESServer/Applications/Logs` directory.

To verify that the Automation Plan Engine is installed correctly and has started, check for the following lines at the start of the log file:

```
2013-08-23 13:15:20,235 INFO [main] (cli.PlanEngineLauncher:255) :: IZNENG025I \
Plan Engine (build number 0.49) starting in JVM with PID (4508) ...
2013-08-23 13:15:20,235 INFO [main] (cli.PlanEngineLauncher:259) :: IZNENG026I \
Plan Engine CLI initializing ...
2013-08-23 13:15:20,235 INFO [main] (cli.PlanEngineLauncher:130) :: IZNENG001I \
Received command: "start"
```

Troubleshooting the Automation Plan Engine installation

If you have trouble completing the Automation Plan Engine installation, troubleshooting Tasks become relevant to help you to correct the problems. These Tasks only become relevant if you need to run them.

Troubleshooting Tasks become relevant in a **Warnings** folder if you experience problems installing the Automation Plan Engine. If you have problems installing the Automation Plan Engine, look for the **Warnings** folder. If this folder displays, check this folder to see which Tasks are relevant. To correct the problems with the installation, run any Tasks that are relevant.

If you do not see any relevant Tasks or the **Warnings** folder, your system is configured correctly for the installation.

Configuring the Automation Plan Engine

You can configure the Automation Plan Engine to specify the polling interval, log level settings, and settings for how Baseline actions are processed, without stopping the Automation Plan Engine. These are all global settings and therefore apply to all Automation Plans.

Activate Server Automation analysis 150 `Configure the Automation Plan Engine Analysis`, located in **Server Automation > All Server Automation Content > Analyses** before running the Task to configure the Automation Plan Engine.

To configure the Automation Plan Engine, you run a Task from the Server Automation domain, specifying your custom settings. This Task enables you to change the polling interval, the logging level, and the settings for how Baselines are processed.

The Automation Plan Engine queries the BigFix server to find open Automation Plan actions to process. When the most recently retrieved set of open Automation Plan actions are processed, the Automation Plan Engine waits for the time that is specified in the polling interval before querying again.

You can change the logging level of the Automation Plan Engine to different logging configurations. By default, Automation Plan Engine logs information messages, warnings, and errors. You can set the Automation Plan Engine logging level to `Debug` to log more detailed information about the internal operations of the Automation Plan Engine.

You can configure the Automation Plan Engine to control how Baseline actions are processed when failures occur.

Complete the following steps to configure the Automation Plan Engine.

1. From the Server Automation domain, navigate to **Setup and Maintenance > Fixlets and Tasks**.
2. Search for and select Task 156 `Configure the Automation Plan Engine`.
3. Click **Take Action**.
4. From the **Take Action** screen, enter your custom configuration settings, as follows:
 - In the **Global Settings** section, enter a value to specify the **Polling interval** for the Automation Plan Engine. Enter a value in seconds. The default value is three seconds.
 - In the **Log settings** section, for **Console log level** and **Plan-specific log level**, select values to configure the logging level for the console and for plan-specific logs. The options available are `Error`, `Info`, `Debug`, and `Warn`. For Windows, the Automation Plan Engine log file, `pe_console.log`, is located in the `<BES Server Root Directory>\Applications\Logs` subdirectory of the installation directory, for example, `C:\Program Files (x86)\BigFix Enterprise\BES Server\Applications\Logs`. For Linux, the `pe_console.log` file is located in the `/var/opt/BESServer/Applications/Logs` directory.
 - In the **Baseline settings** section, select an option to control what actions are run for Baselines, as follows:

Table 8. Baseline settings

Setting	Value
Ignore failures and run all actions (standard steps)	Select Yes or No , depending on whether you want to run all actions for Baselines for standard steps, regardless of any failures.
Ignore failures and run all actions (failure steps)	Select Yes or No , depending on whether you want to run all actions for Baselines for failure steps, regardless of any failures.

- In the **Non-Reporting Time Threshold** section, enter a value in the **Non-reporting threshold** field to control the check that the Automation Plan Engine performs on each targeted endpoint before deciding if it is considered unresponsive or non-reporting. For each Automation Plan, you can configure a setting to indicate that all non-reporting endpoints should be excluded from the target list of each step. The Automation Plan Engine checks on a per-step basis just before the step is executed, and the most recent "last report time" value is used in the determination. The Automation Plan Engine also uses the step failure behavior settings to determine whether endpoints that were excluded as non-reporting are also automatically excluded from future steps. For more information, see [Excluding non-reporting endpoints \(on page 54\)](#). Enter a value in the format `HH:MM`, where `HH` are hours and `MM`

are minutes. For example, if you want to specify a non-reporting threshold of one hour, enter a value of `1:00`. If you do not enter a value for the **Non-reporting threshold**, the default value is used, which is 9999 hours and 59 minutes.

5. Target the BigFix server and click **OK** to run the Task.

The Automation Plan Engine automatically includes the logging level change without requiring you to restart the system.

Upgrade the Automation Plan Engine

To upgrade the Automation Plan Engine, you run a Task from your BigFix console. There are two upgrade scenarios described here. Use the first procedure if you upgraded your version of BigFix from V8.2 to V9.5 and want to upgrade the Automation Plan Engine. Use the second scenario if you upgraded BigFix V9.x to V9.5 and want to upgrade the Automation Plan Engine. The procedure is the same for Microsoft Windows and Linux upgrades, except where identified as platform-specific.

Upgrade from BigFix V8.2

If you previously had Server Automation running on BigFix V8.2 and upgraded your BigFix system to V9.5, complete the following steps to upgrade the Automation Plan Engine.

1. After upgrading BigFix to V9.5, check that your version of the `BES Server Plugin Service` is V2.0.0.0 or later. If necessary, update the `BES Server Plugin Service`. To check your version of the `BES Server Plugin Service`:
 - On Microsoft Windows® systems, the `BES Server Plugin Service` file is the `MFS.exe` file in the `C:\Program Files (x86)\BigFix Enterprise\BES Server\Applications` directory. Right-click the `MFS.exe` file and select **Properties** and then the **Details** tab to check the version number.
 - On Linux systems, the `BES Server Plugin Service` executable is the `MFS` executable file in the `/var/opt/BESServer/Applications` directory. The `MFS-Linux.ver` file contains the MFS version. Use the `cat MFS-Linux.ver` command to display the version.
2. After upgrading BigFix to V9.5, the `Configure REST API credentials for BES Server Plugin Service Task` becomes relevant. Run this Task, targeting the BigFix server:
 - a. Log on to the BigFix console as the master operator and go to the Server Automation domain.
 - b. From the **Automation** node, click **Setup and Maintenance** and select the `Configure REST API credentials for BES Server Plugin Service Task`.
 - c. Enter the master operator credentials on the **Description** section and click **Take Action**.
 - d. From the **Take Action** dialog box, target the system on which the BigFix server is installed.

A short time later, the `Install Latest Automation Plan Engine Task` becomes relevant.
3. Run the `Install Latest Automation Plan Engine Task` targeting the BigFix server. The latest version of the Automation Plan Engine is installed in the `BES Server\Applications\PlanEngine` subdirectory of the installation directory.

Upgrade from BigFix V9.x

If you upgraded BigFix from V9.x to V9.5, use the `Install Latest Automation Plan Engine` Task to upgrade the Automation Plan Engine. You use the same Task to install the Automation Plan Engine. When the Automation Plan Engine is installed, the **Install Latest Automation Plan Engine** Task is relevant if the version of the Automation Plan Engine that is installed is earlier than the version in the Task.

Before an upgrade, the `Install Latest Automation Plan Engine` Task shuts down the Automation Plan Engine and removes it.



Note:

- The `Install Latest Automation Plan Engine` Task cannot fully remove an existing Automation Plan Engine instance if the files in the `BES Server\Applications\PlanEngine` subdirectory of the installation directory are being accessed by another user or application. To ensure that the `Install Latest Automation Plan Engine` Task runs successfully, you must close all other applications that access this directory before you run the Task.
- When the `Install Latest Automation Plan Engine` task is run and the BES Server Plugin Service does not start the Plan Engine, then the status of this task is displayed as 'Failed'; if the BES Server Plugin Service starts the Plan Engine, then the status of this task is displayed as 'Completed'.

Complete the following steps to upgrade the Automation Plan Engine.

1. Log on to the BigFix console as the master operator and go to the Server Automation domain.
2. From the **Automation** node, click **Setup and Maintenance** and select the **Install Latest Automation Plan Engine** Task.
3. Click **Take Action**.
4. From the **Take Action** dialog box, target the system on which the BigFix server is installed.
5. Click **OK**. The latest version of the Automation Plan Engine is installed in the `BES Server\Applications\PlanEngine` subdirectory of the installation directory.

The latest version of the Automation Plan Engine is installed. The BigFix server plug-in service restarts the Automation Plan Engine automatically. The Automation Plan Engine resumes processing any Automation Plan actions and step actions that were running before the upgrade. All the configuration data in the `config.xml` file and the `log4j.prop` file is unchanged by the upgrade. The version of the Automation Plan Engine installed by the `Install Latest Automation Plan Engine` Task is logged in the `pe_console.log` file in the `\BES Server\Applications\Logs` subdirectory of the installation directory.



Note: Do not uncomment to enable any of the entries in the Local Settings section of the `log4j.prop` file in the `BES Server\Applications\PlanEngine\config` folder. If you enable any of these settings by uncommenting them, you might encounter errors.

Uninstalling the Automation Plan Engine

To uninstall the Automation Plan Engine, you run a Task from your BigFix console. The Task to uninstall the Automation Plan Engine becomes relevant when you install the Automation Plan Engine.

There is one Task to install the Automation Plan Engine and another Task to uninstall the Automation Plan Engine. When you install the Automation Plan Engine, the Task to install becomes non-relevant and the Task to uninstall becomes relevant.

Complete the following steps to uninstall the Automation Plan Engine.

1. Log on to the BigFix console as the master operator and go to the Server Automation domain.
2. From the **Automation** node, click **Setup and Maintenance > Fixlets and Tasks** and select one of the following Tasks, depending on your platform:
 - For Windows®, select the `Uninstall Automation Plan Engine Task`.
 - For Linux®, select the `Uninstall Automation Plan Engine (RHEL) Task`.
3. Click **Take Action**.
4. From the **Take Action** dialog box, target the system on which the BigFix server is installed.
5. Click **OK**. After uninstallation, the Automation Plan Engine installation Task becomes relevant. The uninstallation Task becomes non-relevant.

The **Uninstall Automation Plan Engine** Task runs and uninstalls the Automation Plan Engine.

Troubleshooting the uninstallation

You can use the information about troubleshooting errors in uninstalling the Automation Plan Engine if your uninstallation is unsuccessful.

There are several ways an Automation Plan Engine uninstallation might fail. For each type of failure, there are one or more potential causes and one or more solutions.

The Uninstall Automation Plan Engine Task fails

The uninstallation Task might fail to complete successfully if it cannot remove files from the file system because they are in use.

If this happens, shut down any applications that are using the files that cannot be removed and run the **Uninstall Automation Plan Engine** Task again. The **Uninstall Automation Plan Engine** Task remains relevant until it has been completed successfully.

The Install Latest Automation Plan Engine Task does not become relevant as soon as the Uninstall Automation Plan Engine Task is complete

This is normal. There is a time lag because of the frequency of the Task relevance evaluation.

Installing the management extender for VMware

Using the **Deploy Management Extender for VMware vCenter Task**, you can install a management extender plug-in on a BigFix server.

Before you work with BigFix Lifecycle Server Automation virtualization features, you must install a management extender to communicate with the VMware vCenter or ESX host. Before you install the management extender, you must enable the license for Virtual Endpoint Manager.

You can install the management extender plug-in on a server that is running Windows™ 2008, Windows™ Server 2008, Windows™ Server 2008 R2, Windows™ 8, Windows™ 2012 and Windows™ 2012 R2.

You must have a relay server or a root server Version 9.0 or later. A VMware management extender must not be already installed on the server. Because of the workload that the management extender imposes on the system, it is recommended that you install the management extender on a relay server and not a root server.

! **Important:** Before you install the management extender plug-in, you must install the latest version of the proxy agent with a separate Fixlet®. In the BES Support site, run the latest version of the **Install Proxy Agent Fixlet®** to install the proxy agent.

! **Important:** You must ensure that the license for Virtual Endpoint Manager is enabled. To enable the Virtual Endpoint Manager license, go to the **Bigfix Management** domain, navigate to **License Overview > Lifecycle Management**. From the list of **Available Sites**, enable **Virtual Endpoint Manager**. When **Virtual Endpoint Manager** is enabled, it disappears from the **Available Sites** list and is displayed in the **Enabled Sites** list.

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Setup and Maintenance > Deploy VMware Components**.
3. In the **Deploy VMware Components** window, select the **Deploy Management Extender for VMware vCenter Task**.
4. In the **Task: Deploy Management Extender for VMware vCenter** window, click **Take Action**.
5. In the **Take Action** dialog box, ensure **Specific computers selected in the list below** is selected.
6. In the **Computer Name** list, select a relay server or a root server and click **OK**.

In the **Action: Deploy Management Extender for VMware vCenter** window, you can check the status of the installation. When the status changes to **Completed**, the management extender for VMware is installed.

After you install the management extender for VMware, you must configure the management extender with your VMware system details. For more information about configuring the management extender, see [Configuring management extenders \(on page 85\)](#).

Server Automation domain upgrades

The Server Automation domain is upgraded automatically when the contents of the Server Automation site is updated.

When you acquire the Server Automation site, the Server Automation domain is also added to your BigFix console. The procedure to acquire the Server Automation site is described in [Acquiring the BigFix Lifecycle Server Automation site](#).

After you acquire the Server Automation site, all updated site content is gathered automatically. When Server Automation domain updates are available, they are automatically updated in your BigFix console.

Chapter 2. Sequencing actions across multiple endpoints with Automation Plans

BigFix Lifecycle Server Automation provides you with technology to sequence actions, such as the deployment of Fixlets, across multiple endpoints. To sequence automation, you create an Automation Plan. Your Automation Plan contains all of the actions for your end-to-end automation sequence.

Automation Plans can run a sequence of Fixlets, Tasks, and Baselines across multiple endpoints, with steps running in parallel. You can target different endpoints for each step in your Automation Plan.

Introducing Automation Plans and how they work

You can create Automation Plans to automate your workflows. Automation Plans run multiple Fixlets, Tasks, or Baselines on a set of endpoints that you specify. Each Fixlet, Task, or Baseline can run on a different set of endpoints and steps can run in parallel or in a sequence. When you create your Automation Plans, you can set and save a set of default endpoints, default parameters, and filters for each step in the Automation Plan. This increases the ease-of-use and facilitates faster reuse of plans. You must run your plans from the **Automation Plans** dashboard in the Server Automation domain.

An Automation Plan is a collection of Tasks, Fixlets, and Baselines, each of which is a step in the plan. The steps in the plan are executed on a set of endpoints that you target. Each step in an Automation Plan represents a single Fixlet, Task, or Baseline and you can target each step at different endpoints. Automation Plans can be sequential or parallel. When creating your automation plans, you choose between a sequential or parallel plan.

Sequential plans

With sequential plans, the plan is executed in a sequence, one step at a time. The plan starts with step 1 and continues to step 2 after step 1 has completed. Then step 3 starts after step 2 has completed, and so on. Sequential plans are executed in the order in which they are displayed in the **Steps** tab. If you move steps up or down in a sequential plan, the UIDs for each step in the plan remain the same. The UIDs do not represent the execution order of the plan. The execution order of a sequential plan is represented by the order in the **Steps** tab or on the **Flow** tab.

Parallel plans

With parallel plans, multiple steps can be executed at the same time. For example, your plan might begin by deploying an operating system to two bare metal computers. The next two steps might then run in parallel, one installing an application on one of the computers, and the other step running a baseline on the second computer. The plan might then merge again into a single sequential path or continue along a parallel path. The steps in a parallel plan are not executed in the order in which they are displayed in the **Steps** tab. To view the execution order of a parallel plan, use the **Flow** tab. You control the execution order of parallel plans by setting dependencies between the steps.

By clicking **Take Action**, you can deploy or schedule the sequence of steps across a set of endpoints that you specify, in the order in which they are displayed on the **Flow** tab in the plan. When a step completes successfully, the step

action state is set to stopped and the next step in the Automation Plan is run. When the final step in the Automation Plan completes, the Automation Plan action state is set to stopped.

You can schedule an Automation Plan to run at a specified date or time. When you schedule an Automation Plan to run at a future date or time, the Automation Plan action is created, and remains in an open state until the Automation Plan Engine starts to run the action at the time and date that you specified.

For each step in your Automation Plan, you can target computer groups as well as individual computers. You can do this by saving default targets when creating your Automation Plan, or at runtime, when you are running your Automation Plan.

All Automation Plans that are created in the Server Automation domain are displayed as Fixlets in the **Fixlets and Tasks** list in the **All Content** domain. If you run or schedule an Automation Plan in the **Fixlets and Tasks** panel, it will fail. If you add an Automation Plan as a Component in a Baseline, it will fail. You must run or schedule an Automation Plan in only the **Automation Plans** dashboard in the Server Automation domain.

When you add a step to an Automation Plan, you are adding a Fixlet, Task, or Baseline to the Automation Plan. A copy of the Fixlet, Task, or Baseline is stored in the Automation Plan. If this source content changes after it is added to the Automation Plan, the changes are not reflected in the copy in the Automation Plan. If the source Fixlet, Task, or Baseline changes, the Automation Plan displays an icon indicating that the copy in your Automation Plan no longer matches the source. You can then update the copy in the Automation Plan with the latest version of the source if you have access to the source. For legacy Automation Plans, this notification is displayed only if you edit and save the plan.

Each step in an Automation Plan has one action. A Fixlet or Task that you add to the step can have multiple actions. When you use the Automation Plan Editor to add a Fixlet or Task with multiple actions to a step, you must choose one action from the list of available actions. If you add a Fixlet or Task with a default action, the Automation Plan Editor automatically adds this action to the step. If you add a Fixlet or Task with an action that has a script type of URL, you cannot add this action to the step.

When you create an Automation Plan, you must select a site and a domain to host the Automation Plan. You must also specify the Automation Plan source release date. You can specify the Automation Plan category, source, and source severity. When you create an Automation Plan, you can assign any value to the category, source, and source severity. The category defines the type of Automation Plan, such as Support, Uninstall, BES Performance. The source specifies the creator of the plan. The source severity is a measure of the severity of the Automation Plan. Typical values are Critical, Important, Moderate, or Low.

Creating an Automation Plan

An Automation Plan contains all of the data required to run a sequence of Fixlets, Tasks, and Baselines across multiple endpoints. You create your Automation Plans in the Server Automation domain. You can select a site and a domain to host your Automation Plan and define a sequential or parallel processing path for the steps in the plan. Each step can have an optional failure step that runs if the step fails. You can also save a set of default targets for both computers and computer groups, default parameters, and filters for each step in the Automation Plan.

Automation Plans contain the following data:

- The Automation Plan name and description.
- The site and domain that host the plan.
- The Automation Plan category.
- The Automation Plan source, source release date, and source severity.
- The Automation Plan steps.
- The plan type, sequential or parallel and the sequence of the steps in the Automation Plan. The sequence can be a simple sequence or can include parallel processing of steps.
- An action for each step in the plan.
- Optional pending restart settings that enable you to pause or continue the plan if the target endpoints require a restart.
- Optional non-reporting threshold settings.
- Optional failure behavior for each step, including step failure mode, advanced failure behavior to fail incomplete targets after a specified time, and an optional failure step for each step in the Automation Plan.
- If the plan is a parallel path plan, the plan also contains the dependencies that you set between steps in the plan. The dependencies determine the execution order of the steps in the plan. Sequential type plans do not contain dependencies because each step runs after the previous step has executed.
- Every step in an automation plan, whether it is sequential or parallel, has a unique identifier (UID).

Creating your Automation Plan

Use the Automation Plan Editor in the Server Automation domain to create an Automation Plan. When you are creating your Automation Plan you can create and save a set of default targets, default parameters, and filters for the plan. These default settings are then selected when you run the plan.

You must log on to the BigFix console as a master operator or a console operator. You must have Custom Content permissions set to Yes to create an Automation Plan. For complete information about BigFix permissions, see [Operator's Permissions](#).

Each Automation Plan step is a Fixlet, Task, or Baseline. The steps are run in the order that they are displayed in the **Flow** tab in the **Automation Plans** dashboard. You can view the BigFix console **Task**, **Fixlet** or **Baseline** panel for a step by clicking the **Go to source** icon for the step in the **Steps** tab. You can view the BigFix console **Task** or **Fixlet** panel for a Component in a Baseline by clicking the Component name in the **Steps** tab. To return to the **Steps** tab, click **Back** in the menu bar.

Each step in the Automation Plan can contain a maximum of one action. When the Fixlet or Task that you add to a step contains one or more actions and no default action, you must select an action for the step. If the Fixlet or Task has a default action, this action is automatically added to the step. An action with `Script Type` of `URL` cannot be added to a step. An Automation Plan that contains Baseline steps will not necessarily fail when the Baselines contain Components for which no action is selected.

To control how the Automation Plan is processed when a step fails on one or more endpoints, you can define step failure behavior for each step in the Automation Plan. If a step in the Automation Plan fails, you can stop the

Automation Plan. Alternatively, you can continue the Automation Plan on only the endpoints on which the step was successful or on all endpoints. For more information about the step failure behavior, see [Defining step failure behavior settings \(on page 43\)](#).

You can define a non-reporting threshold to exclude non-responsive endpoints from your plan. For example, you might set a non-reporting threshold of one hour, and if some endpoints have been unresponsive for one hour before the first step in the plan is processed, these endpoints are excluded from the target list for the first step in the plan. If these endpoints subsequently report back to the BigFix server, and unless the step failure behavior settings for the step specify that they are excluded from future steps, these endpoints will be included in the processing for subsequent steps. To enable the non-reporting threshold, you must check an option on the **Settings** tab for each Automation Plan and you must also specify the non-reporting threshold using Fixlet 156 [Configure the Automation Plan Engine](#).

When you create an Automation Plan, you can optionally add a single corresponding failure step for each Automation Plan step. A failure step can include a Fixlet, Task, or Baseline. However, you cannot add a Baseline that contains Fixlets or Tasks with parameters as a failure step. (Note that you cannot add a Baseline that contains Fixlets or Tasks with parameters as a regular step in a plan either.) If a step action fails and the Automation Plan contains a failure step for the failed step, the Automation Plan Engine identifies and runs the failure step action. You can target a failure step to run on either all of the endpoints for the corresponding step action or only on the endpoints that returned a failed status for the step action. When a failure step action processing is complete, the Automation Plan Engine stops the failure step action and then the Automation Plan action, regardless of the overall final status of the failure step action.



Note: When you create an Automation Plan, the list of available Automation Plans in the **Automation Plans** dashboard is automatically refreshed. To manually refresh the list of available Automation Plans, click the **Refresh** icon in the dashboard.

Complete the following steps to create an Automation Plan.

1. Open the **Server Automation domain** and from the navigation tree in the **Domain Panel**, click **Automation Plans**.
2. From the **Automation Plans** dashboard, click **Create** to open the plan editor. By default, the plan type is a sequential plan. This means that the steps in the plan will be executed in sequence, in the order in which you add them to the plan. You can change a sequential plan type to a parallel plan type (where steps are executed concurrently). This is described below. However, you cannot change a parallel plan type to a sequential plan without manually changing the dependencies so that no steps are run in parallel.
3. In the **Details** tab, enter the Automation Plan name and description. The **Name** is a required value. Enter a site and a domain to host the Automation Plan. The **Site** and **Domain** fields are required values. Enter values in the **Category**, **Source**, **Source Release Date**, and **Category Source Severity** fields. The **Source Release Date** is a required field.
4. To add one or more steps to an Automation Plan, click the **Steps** tab. You must add a minimum of one step to an Automation Plan. Complete the following procedure to add one or more steps to an Automation Plan:

- a. Click **Add Step**. By default, the **Add Step** dialog box does not display any Fixlets, Tasks or Baselines. To search for Fixlets, Tasks, or Baselines to add to the plan, from **Add Step** panel, select **Fixlets, Tasks, or Baselines** from the **Include** list to view Fixlets, Tasks or Baselines. The default value, **All**, displays Fixlets, Tasks and Baselines. Only Fixlets and Tasks which contain actions are displayed.
- b. To filter the list of Fixlets, Tasks and Baselines, use the lists and the input box. To add or remove filters, use **+ -**.
- c. After you add the relevant search criteria, click the search icon or press Enter to search for Fixlets, Tasks and Baselines.
- d. From the list of Fixlets, Tasks and Baselines, select one or more to add to the Automation Plan.
- e. When you finish selecting Fixlets, Tasks and Baselines, click **Add**. The name and execution order of each step in the Automation Plan is shown in the **Flow** tab. Each step in the plan, whether sequential or parallel, is automatically assigned a unique identifier (UID) to help you to identify the step in the **Automation Plan Action Status** dashboard and **Take Action** screen. The UID is read-only and you cannot change it. The UID does not represent the execution order of steps in the plan and does not change if you change the order of steps in the **Steps** tab.
- f. If the Fixlet, Task, or Baseline contains action script that requires the endpoints to be restarted, you see an alert warning on the **Settings** tab, indicating that the step contains an action that requires the target endpoints to be restarted. Go to the **Settings** tab and configure the Pending Restart settings. For more information, see [Managing pending restart states \(on page 48\)](#).



Note: If you add a Baseline to a plan and if the Baseline has custom action settings defined, these custom action settings are not recognized by the Automation Plan Engine and the Baseline is processed based on the settings defined in the Automation Plan.



Note: If you use baseline as (regular) step instead of multi-step fixlets. This practice helps you to execute the plans in a relatively shorter time. Under the take-action and Default dialog box, the baseline step and its component fixlets are represented in parent-child structure to provide parameter support for each component. This feature only works when baseline is added as a regular step and not as a failure-step. For more information, see [Adding Baseline to a multi-step plan](#).



Note: If the source Fixlet, Task, or Baseline is subsequently updated, you are notified of the change by a message displayed in the user interface. You can then update the copy of the Fixlet, Task, or Baseline in the Automation Plan.

5. For each step that is a Fixlet or a Task, select an action from the **Action** list. If the Fixlet or Task contains a default action, this action is automatically selected. If the Fixlet or Task contains one or more actions with no default, **No Action Selected** is displayed in the **Action** list. An action with a `Script Type` of `URL` is not displayed in the **Action** list.
6. Optional: To save a set of default targets, default parameters, and filters for the step, complete the procedures described in the following table, depending on what you want to set.

Table 9. Saving default options

Default setting	Description
Default targets	<p>a. Click the Default Settings icon for the step.</p> <p>b. From the Targets tab, search for and select the computers that you want to save as default targets for the step and add them to the Selected Targets list. You can also save default targets using the The same computers targeted by step or The computers specified in the list of names options. However, you cannot save a computer group by entering the computer group name using the The computers specified in the list of names option. To save default groups, you must select the computer group and move it to the Selected Targets list. When you do this, the computer group name is added to the list of Selected Targets. If you are saving a computer group as a default target, the group membership is not determined until the step is being executed. Therefore if computers belong to the group when you are creating the Automation Plan but not when the step is being executed, they are not targeted. Additionally, if the computer group that you save as a default target does not exist when the step is being executed, the computer group is no longer included in the Selected Targets list because it is no longer a valid target. For more information, see Targeting by computer group (on page 47). Similarly, if computers that you save as default targets do not exist when you are running the Automation Plan, the Selected Targets list in the Take Automation Plan Action dialog box is updated to reflect this. Depending on security settings, users running the Automation Plan might not be able to see all of the default targets that you set if they do not have sufficient permissions. If you filter the search settings to view Computer Groups, the Use Applicability check box is disabled.</p>
Default parameters	<p>a. Click the Default Settings icon for the step.</p> <p>b. If there are parameters associated with the action for the step, you can set and save default parameters. From the Parameters tab, enter the parameters that you want to save as default parameters. You can enter some or all of the parameters associated with the action for the step. Note that the parameters that you set as defaults are not validated when you create the Automation Plan, they are validated when you run the Automation Plan. The Parameters tab is displayed only if there are parameters associated with the action for the step. When you move your mouse over the Default Settings icon after you have saved default parameters, a tooltip is displayed providing information that default parameters have been set. This tooltip provides this information for any Fixlet that has de-</p>

Default setting	Description
Filters	<p>fault parameters, not just for default parameters that you have saved. If a default parameter was set for the Fixlet when the Fixlet was created, the tooltip will display information that default parameters are set.</p> <ol style="list-style-type: none"> Click the Default Settings icon for the step. You can set and save filter criteria, including custom properties, for targets for the step. To save filters, select the filters that you want displayed in the Take Automation Plan Action dialog box when you are running the Automation Plan.



Note: If you are saving custom properties as filters, these properties must not be reserved or default properties, and they cannot come from an analysis. The custom properties must have been reported by at least one computer. If you export an Automation Plan containing custom properties and then import it on another server, and the custom properties are not specified on the server to which you import the Automation Plan, the custom properties are automatically deleted. If you delete the custom properties, they are also deleted from the Automation Plan.

Click **OK** and then **Save** to save the defaults that you have set and repeat this process for each step in the Automation Plan for which you want to save default options. If you delete the Automation Plan, default options are also deleted.

- Optional: To define step failure behavior for a step, expand **Failure Behavior**:
 - From the **Failure Step Mode** list, select either **Stop Automation Plan** or **Continue Automation Plan**, depending on whether or not you want to stop the Automation Plan if this step fails on some or all endpoints. If you select **Stop Automation Plan**, the system runs any associated failure step and then stops the Automation Plan. If you select **Continue Automation Plan**, the system runs any associated failure step and then moves on to the next step in the Automation Plan. You must then choose to continue the Automation Plan on all endpoints, or only on the endpoints on which this step was successful.
 - If you selected **Continue Automation Plan**, from the **Failed Targets** list, select either **Include in Future Steps** or **Exclude from Future Steps**, depending on whether or not you want to continue the subsequent steps in the Automation Plan on the endpoints on which this step failed.

For more information about the step failure behavior feature, see [Defining step failure behavior settings \(on page 43\)](#).

- To add a failure step to a step, click the **Add Failure Step** icon for the step. A failure step is optional and can be a Fixlet, Task, or Baseline. To add a failure step to a step:

- a. In the **Add Step** panel, select **Fixlets, Tasks, or Baselines** from the **Include** list to view Fixlets, Tasks, or Baselines.
 - b. To filter the list, use the lists and the input box. To add or remove filters, use **+ -**.
 - c. After you add the relevant search criteria, click the search icon or press Enter to search.
 - d. From the list of Fixlets, Tasks, and Baselines, select one to add to the step.
 - e. Click **Add**. The failure step is shown in the **Steps** tab. If you selected a Fixlet or Task and there is no action selected for the Fixlet or Task, an icon is displayed indicating this. If necessary, select an action for the Fixlet or Task.
 - f. To change the targeting for the failure step, expand **Failure Step:** for the step. To target all endpoints that are targeted by the step action, select **All** from the **Targeting** list. The default option is **Failed Only**. This option targets only the endpoints that return a failure status in the corresponding step action.
 - g. To choose an action in the failure step, expand **Failure Step:** for the step. Select an action from the **Action** list. Note that you cannot select an action if you have a Baseline selected as a failure step. If you have selected a Baseline as a failure step and if any of the Baseline components do not have an action selected, the failure step remains in view. If you selected a Baseline as a failure step and there are components in the Baseline that do not have an action selected, you are notified in the user interface. To select an action for the components, you must go to the **All Content** domain, search for the Baseline and select an action for any components that do not have an action selected. The Baseline that you added to the failure step in Server Automation will now be out of sync, and an out-of-sync icon will be displayed in Server Automation notifying you of this. Click the out-of-sync icon to update the Baseline so that it contains the latest content, as per the **All Content** domain. If the source Fixlet, Task, or Baseline subsequently changes, an out-of-sync icon is displayed in Server Automation, notifying you of this. You can click the out-of-sync icon in edit mode to synchronize the Fixlet, Task, or Baseline to the latest source content.
-  **Note:** If any of the components in the Baseline you added as a failure step contain steps that require a restart, an icon is displayed to notify you of this. When you see this icon, review the Pending Restart settings for the step.
- h. To remove a failure step from a step, click the **Remove Failure Step** icon for the step.
9. Optional: To enable the non-reporting threshold, click the **Settings** tab. In the **Execution** section, check the **Exclude non-reporting endpoints** option. When you check this option, endpoints that have not reported within the time threshold that you specified in Task 156 [Configure the Automation Plan Engine](#) are excluded from execution. For information about how to configure the non-reporting threshold, see [Configuring the Automation Plan Engine \(on page 28\)](#).
 10. If you want your Automation Plan to be a parallel plan, from the **Steps** tab, click the **Parallel** radio button for the **Plan type**. You must then set the step dependencies to control the flow of the plan. For a step that you

want to make dependent on another step, expand **Depends on** for that step. Enable the check box for the step that you want this step to be dependent on. For example, if you want step 5 to be dependent on step 2, enable the check box for step 2. Refer to the **Flow** tab to see how the processing flow of the plan changes as you makes updates and set dependencies. For more information about setting dependencies, see [Parallel processing and step dependencies \(on page 50\)](#). If you delete a step and other steps use the same targets as that step, a message displays to inform you that other steps are targeting those endpoints. You can confirm that you want to remove the step but you then need to re-select target endpoints for the steps that use the same endpoints. If you delete a step and other steps are dependent on that step, a message displays on the user interface to notify you that other steps have a dependency on the step that you are deleting. Where possible the system will maintain the dependencies but in some cases this is not possible and you must set the dependencies between steps.

 **Attention:** After you have selected a parallel plan type and set dependencies, you cannot revert the plan to a sequential plan type by selecting the **Sequential** radio button for the **Plan type**. For complete information about setting dependencies, see [Parallel processing and step dependencies \(on page 50\)](#).

11. Click **Save** to save the Automation Plan.

You created an Automation Plan. The list of available Automation Plans in the **Automation Plans** dashboard is refreshed to display the new Automation Plan. You can run, edit, copy, or delete this plan. You can easily move or replace any of the steps in the plan at a later time. You can also insert new steps before or after existing steps in the plan. If you need to subsequently change the steps in the plan, click the **Move, Insert, or Replace this step** icon for any step in the plan while in edit mode. From the pop-up menu that is displayed, select an option to move an existing step, insert a new step, or replace the currently selected step. Make the updates to the plan as required.

Defining step failure behavior settings

When creating an Automation Plan, for each step in the plan you can define the behavior that occurs if a step in the plan fails. This is known as step failure behavior and is distinct from adding a failure step to a step. You can also set advance failure behavior. Advanced failure behavior enables you to specify a period of time after which to fail the step on targets that have not returned a status.

How it works

Use the step failure behavior feature when designing your Automation Plan. The step failure behavior feature provides you with the ability to control the flow of the Automation Plan on endpoints. It gives you the ability to define the behavior that occurs when steps in your Automation Plan fail on some or all endpoints.

The overall step failure behavior is defined by two separate settings. The first setting, step failure mode, defines if the Automation Plan should stop at that point. The second setting, the failed targets behavior, defines if failed targets are included or excluded from subsequent steps. Separately, and regardless of the values that you define for step failure behavior, if a failure step is defined, the failure step is always run before the step failure behavior is processed. After

the failure step is run, the system then processes the remaining steps in the plan, based on what you defined in the step failure behavior settings in the step that failed.

To define step failure behavior, first choose whether to continue or stop the Automation Plan. To do this, select an option from the **Step Failure Mode** list. If you select the option to stop the Automation Plan on step failure, you do not make any further selection. The Automation Plan action is stopped at this point. If you want to continue the Automation Plan, you must decide if you want to continue on all endpoints or only on those endpoints on which the step was successful.

When adding a step to your Automation Plan, you can define the failure behavior as described in the following tables.

Table 10. Defining the step failure mode

Option	Description
Stop Automation Plan	Select this option to run any associated failure step and then stop the Automation Plan.
Continue Automation Plan	Select this option to run any associated failure step and then move on to the next step in the Automation Plan.

If you decide to continue the Automation Plan, choose from the options described in the following table to define the targeting. If you stop the Automation Plan, the Automation Plan is stopped.

Table 11. Defining targeting

Option	Description
Include in Future Steps	The endpoints on which the step failed are included in future steps in the Automation Plan. If you specified a non-reporting threshold, unresponsive endpoints are treated as failed steps. If endpoints that have been unresponsive subsequently report back and if you select Include in Future Steps , these unresponsive endpoints are included in future steps if they subsequently report back within the specified
Exclude from Future Steps	The Automation Plan continues on the endpoints on which the step was successful. The endpoints on which the step failed are removed from the future steps. This setting also controls if unresponsive endpoints that were excluded from plan steps are also excluded from future steps in the plan.

For Automation Plans created previously, default values are implemented. The default values are `Stop Automation Plan`. When you open a legacy Automation Plan and save it, the new attributes are added to the saved Automation Plan.

Step failure behavior and failure step targeting

Step failure behavior targeting is different from failure step targeting. When you add a failure step to an Automation Plan, you can apply that failure step to all endpoints targeted in the step, or to only the endpoints on which the step failed. If you add a failure step to a step and set the targeting for that failure step to apply to all endpoints, this targeting might be superseded if you have defined step failure behavior settings. If you have step failure mode defined as `Continue Automation Plan and Exclude from Future Steps`, any associated failure step targeting is set automatically to `Failed Only`. The reason for this is that you do not want to run the failure step against endpoints on which you want to run future steps, as this is defined in the step failure behavior settings. Instead, you want to run the failure step only on the endpoints that will be omitted from future steps.

Tracking Automation Plan actions and step failure behavior

You can view Automation Plan actions and step actions on the **Automation Plan Action Status** dashboard. If a step in your Automation Plan fails, the failure is indicated in the **Status** column. For steps that fail and do not have step failure behavior defined, a status of `Failed` is displayed in the **Status** column. For steps that fail and have step failure behavior defined, a status of `Failed on some targets` is displayed, identifying that the step has step failure behavior defined and has failed on some targets. Therefore, steps that have a status of `Failed` are steps that have failed. In this case, the Automation Plan runs any associated failure step and then stops. Steps that have a status of `Failed on some targets` are steps that have failed on some targets but the Automation Plan continues to run, according to the settings defined by the step failure behavior. The Automation Plan continues to run on all endpoints or only on the endpoints on which the step was successful.

To view the endpoints on which the step failed, click the Detail icon for the particular step.

Advanced failure behaviour

Advanced failure behaviour enables you to design your Automation Plan to run within scheduled maintenance windows by allowing you to specify a time limit for steps to complete on target endpoints. This enables you to control how steps complete and to fail steps on endpoints on which the step has not completed after a period of time that you specify. For example, if you have a maintenance window of 60 minutes and need to include three steps in your plan, you can enable advanced failure behaviour and enter a time period of say 20 minutes for each step. When a step runs and if 20 minutes elapse and the step has not completed on some endpoints, the step is then failed on those endpoints. The advanced failure behaviour settings are disabled by default.

To configure advanced failure behaviour:

- If you are creating your plan, click the **Default Settings** icon for the step and go to the **Execution** tab. Enable the check box for **Fail incomplete targets** and enter a period of time, in minutes after which you want to fail the step on any endpoints on which the step has not completed.
- If you are running your plan, from the **Take Automation Plan Action** screen, click the **Execution** tab and enable the check box for **Fail incomplete targets** and enter a period of time, in minutes, after which you want to fail the step on any endpoints on which the step has not completed.



Note: If you open a legacy Automation Plan that had timeout settings configured, the timeout targets are treated as failures. A message appears to indicate this. When you save the plan, the plan is updated and the timeout settings are changed to failure behavior settings.

Setting step failure threshold

The step failure threshold enables you to manage the success or failure of the step based on the percentage success and failure rate of the step on the total number of target endpoints. Setting a step failure threshold allows you to specify the percentage of failing targets that determines the success or failure of the step. For example, if you set the **Step Failure Threshold** at `more than 5%` and if the step fails on more than 5% of targeted endpoints, the step is treated as a failed step. If you have set a failure step, the failure step will then be executed. If you set the **Step Failure Threshold** at `more than 5%` and the step fails on 5% or fewer of targeted endpoints, the step will be treated as successful and a failure step, if set, is not executed.

To set the step failure threshold:

1. Open the Automation Plan that contains the step for which you want to configure the step failure threshold and click **Edit**.
2. Select the step for which you want to configure the step failure threshold.
3. Click the **Default Settings** icon for the step and go to the **Execution** tab.
4. In the **Step Failure Threshold** section, enter a percentage value for the threshold at which to fail the step. For example, if you enter `more than 25%`, the step will be failed if the step is unsuccessful on more than 25% of endpoints targeted. If the step is unsuccessful on 25% of endpoints, the step is treated as successful. The default value is *any* which means that if any endpoint fails the step, the step is treated as a failure and if you have defined a failure step for the step, the failure step will be executed.
5. Click OK and then repeat this process for each step for which you want to configure a step failure threshold.

Pending Restart step actions and step failure behavior

When target endpoints report a `Pending Restart` status for a step action, the system does not automatically stop those `Pending Restart` step actions. If the `Pending Restart` step action was stopped, it would prevent the step action from being updated with the actual result of the action after the restart completed. Instead, the `Pending Restart` step action remains in an `Open` state, allowing any `Restart Endpoint and Wait for Restart to Complete` step added to update its status after the restart completes. This enables you to get the actual outcome of the step action once it becomes known.

This becomes more complex if the step that requires the restart fails. Steps in a `Pending Restart` state can fail if the step times out or if one or more endpoints report a failure status. If a step in a `Pending Restart` state fails, the Step failure behavior becomes more complex because the `Pending Restart` step action remains open. Here are two examples that illustrate how the `Pending Restart` state works with the step failure behavior settings.

Scenario 1: Failed Pending Restart Step and failure behavior set to Stop plan

In this scenario, step failure behavior is set to **Stop Plan**. A step fails but some endpoints report back a `Pending Restart` status. The step that fails has a failure step set. The failure step is `Restart Endpoints and Wait` step. The `Pending Restart` is then processed as follows:

- The system leaves the failed step in an `Open` state and runs the failure step.
- The targets that are in a `Pending Restart` state eventually report back with the actual result of the step action.
- The system then stops all actions - for the failed step, the failure step, and the plan.

Scenario 2: Failed Pending Restart Step and failure behavior set to Continue Plan

In this scenario, step failure behavior is set to **Continue Plan**. A step fails but some endpoints report back a `Pending Restart` status. The step that fails does not have a failure step set. The `Pending Restart` is processed as follows:

- The system leaves the failed step in an `Open` state and executes the subsequent step. The next step in the plan is a `Restart Endpoints and Wait` step.
- Next, the `Pending Restart` targets of the failed step report back the actual status of the step action.
- The system then stops the `Restart Endpoints and Wait` step and processes the remaining steps in the plan.
- Last, when all steps have been processed, the system stops all remaining open step actions, including the action for the failed step, and then stops the plan action.

Targeting by computer group

For each step in your Automation Plan, you can target computer groups as well as individual computers. You can do this by saving computer groups as default targets using the **Default Settings** feature when creating the Automation Plan, or when running or scheduling your Automation Plan from the **Take Automation Plan Action** screen. When you target a computer group for a step, the list of computers that belong to the computer group is determined at the time that the step is executed. Therefore, if group membership changes between the time you define the step in the Automation Plan and when the Automation Plan is executed, the system determines which computers belong to the computer group that you have targeted at the time that the step action is executed.

To specify a target computer group for a step, you must select an existing computer group and add it to the **Selected Targets** list. You cannot manually enter the name of a computer group using **The computers specified in the list of names below**. You can target by computer group either when creating your Automation Plan using the **Default Settings** feature, or when running the Automation Plan from the **Take Automation Plan Action** screen.

If you save a computer group as a default target when creating your Automation Plan and if that computer group does not exist when the Automation Plan is being executed, the computer group is no longer included in the **Selected Targets** list in the **Take Automation Plan Action** screen. Because the computer group does not exist, it is not a valid target. Only valid targets are included in the **Selected Targets** list.

It is possible that a computer group that you targeted might have been removed from the system by the time the step is executed. This is particularly likely if you have scheduled Automation Plans. In this case, the step is executed only against computers that can be resolved. If no computers can be resolved, for example, if there is only one computer group targeted for the step and the computer group is either removed or has no members at step execution time, then the step action is not executed and the Automation Plan action is stopped.

For the list of targets for each step, there is a single reference for any one target computer. If a computer is a member of more than one computer group and if more than one of those computer groups are targeted, the system includes the computer once in the step action target list.

Managing pending restart states and automated restart of endpoints

When you add a Fixlet, Task, or Baseline to an Automation Plan and if the Fixlet, Task, or Baseline contains an action script that requires the targeted endpoints to restart, this results in your plan remaining in a `Pending restart` state, until the endpoints are restarted. If the endpoints are not restarted, the step remains in this `wait` state and the Automation Plan is effectively stalled. `Pending restart` is a `wait` state in BigFix, and if the endpoints are not restarted, the Automation Plan cannot progress. To prevent this from happening, add a specific Server Automation Fixlet to your plan to automate the restart of the endpoints and configure the **Pending Restart** settings to continue the plan.

Some Fixlets, Tasks, and Baselines contain action script that results in the targeted endpoints going into a `Pending restart` state. The following graphic shows an example of action script that requires a restart.

```

Action1 (default)
Script Type BigFix Action Script

prefetch Windows8-RT-KB2769165-x86.msu sha1:59965ce8134057c28081bbb6ae138feaaebe60dd size:83545622 http://download.microsoft.com/KB2769165-x86.msu sha256:34f3ca0b741389d6062078dc3569ebed62d61e1fd4acd6c0fbd398314672f3fa

// Is Windows Update service running?
continue if (exists running service "wuauaserv" OR NOT exists service "wuauaserv" whose (start type of it = "disabled"))

waithidden "{pathname of system folder & "\wusa.exe"}" "{pathname of client folder of current site & "\_Download\Windows8-RT-KB2769165-x86.msu}"

action requires restart "59965ce8134057c28081bbb6ae138feaaebe60dd"

```

Some Fixlets and Tasks contain a similar piece of action script, `action may require restart`. This action script can also result in the targeted endpoints entering a `Pending restart` state. If your Automation Plan contains steps or failure steps with Fixlets, Tasks, or Baselines that contain this action script, a warning icon is displayed on the **Settings** tab, indicating that one or more of the steps in the plan contain this action script. You can then move to the **Settings** tab to configure how you want to manage the `Pending restart` states. For example, you can choose to continue the plan and add a Fixlet to the plan to restart the endpoints.

Table 12. Pending restart settings

Use Fixlet 126 Restart All Endpoints and Wait for Restart to Complete or Fixlet 160 Restart Endpoint on Pending Restart and Wait for Restart to Complete to restart the endpoints.

Option	Description
Pause Plan until restart completes	This option pauses the Automation Plan until the targeted endpoints are restarted and report success or failure. You must manually restart the endpoints before the plan progresses. Any endpoints reporting <code>Pending Restart</code> status at the point at which a timeout occurs are treated as failures.
Continue Plan	When you select this option the step is regarded as successful upon entering the <code>Pending restart</code> state and the plan moves on to the next step, ignoring the actual step status after the endpoints are restarted. Any associated failure step will not run if the step

Table 12. Pending restart settings

Use Fixlet 126 Restart All Endpoints and Wait for Restart to Complete or Fixlet 160 Restart Endpoint on Pending Restart and Wait for Restart to Complete to restart the endpoints.

(continued)

Option	Description
	<p>fails after entering the <code>Pending restart</code> state because the step is regarded as successful. You must add a Fixlet to the plan after the step or steps that require a restart. The following list describes how the plan is executed, depending on which Fixlet you use to restart the endpoints when you have selected the Continue Plan option:</p>
	<p>Fixlet 126 Restart All Targeted Endpoints and Wait for Restart to Complete</p> <p>The system restarts all targeted endpoints, whether they are in a <code>Pending Restart</code> state or not, and waits for the restart to complete before moving on to the next step in the plan.</p>
	<p>Fixlet 160 Restart Endpoint on Pending Restart and Wait for Restart to Complete</p> <p>The system restarts only the endpoints that in a <code>Pending Restart</code> state and waits for the restart to complete before moving on to the next step in the plan.</p>
	<p>Fixlet 94 Restart Endpoint</p> <p>The system continues to the next step when this step enters a <code>Pending restart</code> state as the endpoints are being restarted. It attempts to execute the next step while the endpoints might still be restarting. Do not use this Fixlet to manage the <code>Pending restart</code> state and automate the restart of endpoints.</p>
	<p>No Fixlet</p> <p>The next step in the plan will be executed, while the pending restart endpoints from the previous step will remain in a <code>Pending restart</code> state until they are restarted.</p>

Successful `Pending Restart` steps remain in an `Open` state until the plan completes. This enables you to get a final status on the actual result of the step action after the restart completes.



Important: To safely restart the endpoints before moving on to the next step in the plan, the Fixlet that you must include in the plan to restart the endpoints is `126 Restart Endpoint and Wait for Restart to Complete` or `160 Restart Endpoint on Pending Restart and Wait for Restart to Complete`.

Pending Restart step actions and step failure behavior

When target endpoints report a `Pending Restart` status for a step action, the system does not automatically stop those `Pending Restart` step actions. If the `Pending Restart` step action was stopped, it would prevent the step action from being updated with the actual result of the action after the restart completed. Instead, the `Pending Restart` step action remains in an `Open` state, allowing any `Restart Endpoint and Wait for Restart to Complete` step added to update its status after the restart completes. This enables you to get the actual outcome of the step action once it becomes known.

This becomes more complex if the step that requires the restart fails. Steps in a `Pending Restart` state can fail if the step times out or if one or more endpoints report a failure status. If a step in a `Pending Restart` state fails, the Step failure behavior becomes more complex because the `Pending Restart` step action remains open. Here are two examples that illustrate how the `Pending Restart` state works with the step failure behavior settings.

Scenario 1: Failed Pending Restart Step and failure behavior set to Stop plan

In this scenario, step failure behavior is set to **Stop Plan**. A step fails but some endpoints report back a `Pending Restart` status. The step that fails has a failure step set. The failure step is `Restart Endpoints and Wait` step. The `Pending Restart` is then processed as follows:

- The system leaves the failed step in an `Open` state and runs the failure step.
- The targets that are in a `Pending Restart` state eventually report back with the actual result of the step action.
- The system then stops all actions - for the failed step, the failure step, and the plan.

Scenario 2: Failed Pending Restart Step and failure behavior set to Continue Plan

In this scenario, step failure behavior is set to **Continue Plan**. A step fails but some endpoints report back a `Pending Restart` status. The step that fails does not have a failure step set. The `Pending Restart` is processed as follows:

- The system leaves the failed step in an `Open` state and executes the subsequent step. The next step in the plan is a `Restart Endpoints and Wait` step.
- Next, the `Pending Restart` targets of the failed step report back the actual status of the step action.
- The system then stops the `Restart Endpoints and Wait` step and processes the remaining steps in the plan.
- Last, when all steps have been processed, the system stops all remaining open step actions, including the action for the failed step, and then stops the plan action.

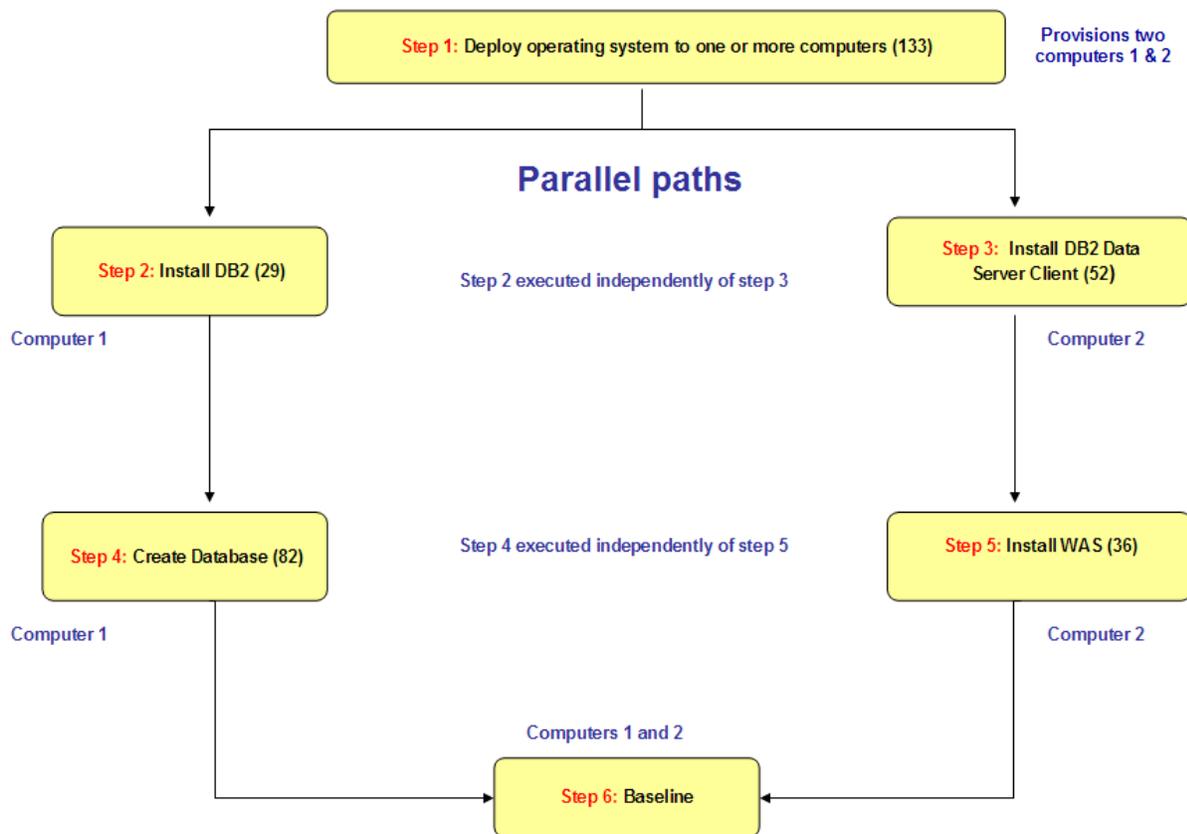
Parallel step processing

You can design your Automation Plan so that steps are executed concurrently. This is known as parallel processing. Rather than the plan running in a simple straight sequence where each step is executed one at a time, one after another, with parallel processing you can run steps that do not have a dependency on each other concurrently. To create a parallel type plan, you must select the parallel plan type and manually set the dependencies between the various steps in the plan. Parallel processing is generally more suitable for advanced automation scenarios.

Parallel processing allows you to speed up the execution of your plan by running steps that are not dependent on each at the same time. For example, suppose the first step in your plan deploys an operating system to two computers. You then want to configure each of these computers separately by installing software on them. You want

to install DB2 on one as step 2, and you want to install WAS on the other computer as step 3. Rather than step 3 wait for step 2 to complete, you can execute these steps concurrently because they do not depend on each other. They do, however, both depend on step 1 to complete.

The following graphic shows an example of a plan with two steps running in parallel. After step 1 runs, steps 2 and 3 can start concurrently on the different endpoints. When step 2 has completed, step 4 will begin and after step 3 has completed, step 5 will begin. These parallel paths are distinct configurations and are processed separately by the Automation Plan Engine.



Running steps in parallel and setting dependencies between steps

A step is dependent on another step if it cannot start until that step has completed. In a simple sequence plan, where steps run one by one, one after the other, each step is dependent on the previous step. For steps to run in parallel, there cannot be a dependency between the steps that are running in parallel. They must be independent of each other, even if they each have a dependency on the same prior step. When designing your plan to run steps in parallel and set dependencies between steps, use the **Flow** tab for a visual display of the relationship between the various steps and sequence of the plan. The **Flow** tab gives you a visual read-only representation of the processing flow of the plan. This

graphical view is essential for reviewing the dependencies that you have set between steps in the plan, and ultimately, the processing flow.

When setting dependencies between steps in your parallel plan, do not set circular dependencies. A circular dependency is a processing flow where a step depends on another step, which in turn has a dependency on a step that is itself dependent on the original step. For example, do not make step 6 dependent on step 4 if step 4 is dependent on 5, when step 5 is dependent on step 6. Review the **Flow** tab to see any circular dependencies. The following table lists some examples of circular dependencies.

Table 13. Circular dependencies

Illegal dependency type	Example
A step depends on itself. This is not possible to create in the application but illustrates the concept of a circular dependency.	Step 1 depends on step 1
Direct circular dependency.	Step 2 depends on Step 1 and Step 1 depends on Step 2
Indirect circular dependency.	<ul style="list-style-type: none"> • Step 2 depends on Step 1 • and Step 3 depends on Step 2 • and Step 1 depends on Step 3



Note: After you change dependencies in a plan, review the **Flow** tab to verify the changes before you save and run the plan.

Some additional points about dependencies:

- At least one step in a plan must have no dependency set. Otherwise the system has no starting point to begin processing the plan.
- A step in a plan is only available for execution when all of its dependencies have been completed.
- A step is not considered to be complete if a failure step must be run for that step, for example, if a failure step is running (or has yet to be run) for step 1, then step 1 is not considered complete until that failure step completes.



Warning: If you remove a step on which other steps were dependent, the system maintains dependencies where possible. When it is not possible to maintain the dependencies, you are notified with a message in the user interface that identifies which steps were dependent on the step that you deleted. After you delete



any step in a parallel plan, review the **Flow** tab to see how the dependencies have changed and make any adjustments as required by settings dependencies.

Complete the following steps to set dependencies.

1. Add steps to your Automation Plan.
2. For the **Plan type**, select the **Parallel** radio button. When you select a parallel plan type, the dependencies setting becomes available. Expand the twisty for each step to access the **Summary**, **Depends on**, and **Failure Behaviour** settings.
3. For a step that you want to make dependent on another step, expand **Depends on** for that step. For example, if you want step 5 to be dependent on step 2, expand **Depends on** for step 5.
4. Enable the check box for the step that you want this step to be dependent on. If you want step 5 to be dependent on step 2, enable the check box for step 2.
5. Repeat this process for each step in the plan for which you want to set dependencies, referring to the **Flow** tab to verify that you have designed the plan correctly.

In this example we have a scenario of an Automation Plan that contains parallel steps.

- Step 1 in the plan is `Deploy operating system to one or more computers (133)`, and you will use this step to deploy a Windows operating system on two computers, `Computer1` and `Computer2`.
- The next two steps will depend on Step 1 but will run in parallel because they will be processed on the two separate computers, as follows:
 - Step 2: `Install IBM DB2 UDB Enterprise Server Edition 9.x on Windows (29)` ON `Computer1`.
 - Step 3: `Install IBM DB2 Data Server Client 9.x on Windows (52)` ON `Computer2`.
- Steps 4 and 5 will continue along a parallel path, step 4 dependent on step 2 for further configuration on `Computer1`, and step 5 dependent on step 3 for `Computer2`:
 - Step 4: `Create Database for IBM DB2 UDB Enterprise Server Edition 9.x on Windows, RHEL, SLES, and IBM AIX (82)` to create the database for the DB2 installation in step 2.
 - Step 5: `Install IBM WebSphere Application Server Base (Distributed operating systems) 7.x on Windows (36)` to install WebSphere® Application Server on `Computer2`.
- Step 6 will be common to both steps 4 and steps 5 and will run a baseline to patch the operating system on both `Computer1` and `Computer2`.

The following table lists the dependencies for this plan.

Table 14. Plan dependencies in this example

Step	Depends on	Targets
1	Nothing.	<code>Computer1</code> , <code>Computer2</code>
2	1	<code>Computer1</code>

Table 14. Plan dependencies in this example

(continued)

Step	Depends on	Targets
3	1	Computer2
4	2	Computer1
5	3	Computer2
6	4 and 5	Computer1, Computer2

Converting a parallel plan to a sequential plan

You cannot convert a parallel plan type to a sequential plan type by selecting the **Sequential** radio button on the **Steps** tab. You can only convert a parallel plan type to a sequential plan type by manually changing the step dependencies so that the execution order of the plan is sequential. After manually changing the dependencies so that there are no steps running in parallel, you can then change the plan type to sequential and save the plan.

1. Open the parallel plan that you want to convert to a sequential plan and click **Edit**.
2. Change the dependencies so that the processing flow of the plan is sequential.
3. Review the **Flow** tab and ensure that there are no steps running in parallel.
4. Click the **Sequential** radio button.
5. Click **Save**.



Note: Saving reloads the plan so that the display order of the plan in the sequential view matches the actual processing flow. To enable you to successfully edit the plan and move steps in the sequential plan, the steps order on the **Steps** tab must match the actual processing flow as displayed on the **Flow** tab.

6. Edit the sequential plan as required.

Excluding non-reporting endpoints

You can define a non-reporting threshold to exclude endpoints that are unresponsive from the target list of your Automation Plans. For example, you might set a non-reporting threshold of one hour, and if some endpoints have been unresponsive for one hour before the point at which the first step in the plan is being processed, these endpoints are excluded from the target list. The exclude non-reporting feature differs from the timeout feature in that non-reporting endpoints are automatically excluded from the target list if they have been unresponsive before system begins processing actions. With timeout, endpoints are targeted and the action is deployed to the endpoints, but the action times out after the timeout period you configured elapses.

To streamline how your Automation Plans are processed, you can exclude endpoints that have been unresponsive for a period of time from the list of targets endpoints. You do this by setting a non-reporting threshold. To use

this feature, you must first configure a global value for the non-reporting threshold using Task 156 [Configure the Automation Plan Engine](#). For information about how to configure the non-reporting threshold, see [Configuring the Automation Plan Engine \(on page 28\)](#). Then for each individual plan, choose whether you want unresponsive endpoints to be excluded as targets.

Note the following behavior of exclude non-reporting endpoints feature:

- The non-reporting feature applies to targets for regular steps and failure steps, if a failure step is configured.
- Targets excluded from the targets list for a step can subsequently report back and thus be included as valid targets for subsequent steps in the plan.
- If an endpoint has been unresponsive but subsequently reports back as a subsequent step in the plan is being processed, the failure behavior options control if the targets that were excluded from the earlier step are included or excluded in later steps in the plan. If you want to exclude targets that were unresponsive from subsequent steps in the plan, enable the **Exclude from Future Steps** failure behavior option because the unresponsive targets are treated the same way as failures. For more information about failure behavior, see [Defining step failure behavior settings \(on page 43\)](#).
- If all target endpoints are unresponsive, the plan is stopped automatically.
- To view the list of endpoints that were unresponsive and excluded from the plan, check the engine log file. For Windows, the Automation Plan Engine log file, `pe_console.log`, is located in the `<BES Server Root Directory>\Applications\Logs` subdirectory of the installation directory, for example, `C:\Program Files (x86)\BigFix Enterprise\BES Server\Applications\Logs`. For Linux, the `pe_console.log` file is located in the `/var/opt/BESServer/Applications/Logs` directory.

1. If necessary, activate analysis 150 [Configure the Automation Plan Engine Analysis](#).
2. Open Server Automation Task 156 [Configure the Automation Plan Engine](#).
3. In the **Non-Reporting Time Threshold** section, enter a value for the non-reporting threshold. Enter a value in the form `HH:MM`, where `HH` are hours and `MM` are minutes. If you do not specify a value for the non-reporting threshold in Task 156 [Configure the Automation Plan Engine](#), the default value of 9,999 hours and 59 minutes is used.
4. Click **Take Action** and run the Task.
5. When the Task runs successfully, you can exclude non-reporting endpoints from processing for each individual plan, as follows:
 - a. Open an Automation Plan for which you want to exclude non-reporting endpoints.
 - b. From the **Settings** tab, check the **Exclude non-reporting endpoints** option.
 - c. Save the plan.
6. Run the plan.

Configuring email notification for Server Automation

You can configure Server Automation to automatically notify you by email when your Automation Plans have completed. After you have enabled email notification, you receive an email to the email addresses that you specified. The email notification includes details about the success or failure of the plan, and optionally provides

comprehensive execution details for each step in the plan. The notification service is disabled by default. To set up email notification, you must install and configure the notification service by running BigFix Tasks.

To install and set up the email notification feature, you must complete the following short configuration steps:

- Run a Task to download and install the notification service, which is the underlying component that Server Automation uses to send automatic email notification.
- After you have installed the notification service, you must then configure the notification service, and then configure notification for Server Automation and specify the email addresses to which you want the notifications to be sent.

Complete the following steps to set up email notification for Server Automation.

1. To install the notification service, from the **Notification** node of the navigation tree in Server Automation, run one of the following Tasks, depending on whether you are installing the notification service on Windows® or Linux®:

- Task 2238 `Install Latest Notification Service` to install the notification service on Microsoft® Windows®. When you run the Task, target the BigFix server and enter the port number on which you want the notification service to listen. This Task downloads and installs the notification service.
- Task 2241 `Install Latest Notification Service (RHEL)` to install the notification service on Linux®. When you run the Task, target the BigFix server and enter the port number on which you want the notification service to listen. This Task downloads and installs the notification service.

If the installation does not complete successfully, check to see if a Task has become relevant in the **Notification > Warnings** folder. If there is a Task that is relevant in the **Warnings** folder, run the relevant Task. After the Task has completed, run the installation Task again.

2. Activate analysis 159 `Notification Service Details for Server Automation` and the notification service analysis 2243 `Notification Service Details` from the **Notification > Activate Analyses** folder.
3. Run Task 2240 `Configure Settings for Notification Service` to configure the settings for the email notification service. Complete the form, as follows, and then click **Take Action**:
 - **Notification Service Port:** you can change the value here to update the port number that the notification service listens on, as set in Task 2238 `Install Latest Notification Service` or Task 2241 `Install Latest Notification Service (RHEL)`. If this port number is later changed, the notification service is restarted.
 - **From Email Address:** you can change the value here to update the default `From` email address that is displayed in the `From` field as configured in Task 2244 `Send an Email Notification`, which is the Task that you use to send email notifications. You can change this value at run time.
 - **SMTP Method:** select an SMTP method for the notification service, either **Plain** or **None**. If you select **None**, SMTP authentication is disabled and the **User name** and **Password** fields are disabled. If you select **Plain**, authentication with a user name and password is required.
 - **SMTP Host:** enter the IP address, host name or fully qualified domain name of the SMTP server. This is a required field.
 - **SMTP Port:** accept the default port number value of 25 or enter a different value for the port number of the SMTP server. This is a required field.

- **User name:** enter the user name for the email account. This is a required field if you selected `Plain` as the SMTP method.
 - **Password:** enter the password for the email account. This is a required field if you selected `Plain` as the SMTP method.
 - **Confirm Password:** confirm the password that you entered in the previous field. This is a required field if you selected `Plain` as the SMTP method.
4. From the **Notification** node of the navigation tree in Server Automation, select and run Task 153 `Configure Email Notification Settings for Server Automation`, as follows:
- **Enable global notification:** select an option to enable or disable email notification by default for all plans at a global, system-wide level. If you select `Yes` to enable notification, you must enter one or more email addresses in the `Globally defined email addresses` field.
 - **Globally defined email addresses:** enter an email address for each recipient that you want to receive email notification. Use a comma to separate email addresses. Do not press enter to place email addresses on separate lines.
 - **Sender Email Address:** you can add the value here to update the default `Sender Email Address` to send the email notifications.
 - **Include global recipients:** select an option to include or exclude global email recipients by default.
 - **Your message:** enter a message to send with all email notifications by default. For new plans, this is the default message that is displayed in the **Message** section on the **Settings** tab.
 - **Append plan execution detail:** select an option to include or exclude the system-generated execution details with the email notification by default. If you select `Yes`, details of name and ID of any timeouts, failures, and details of any excluded non-reporting endpoints for each step in the Automation Plan are included in the email notification.

**Note:**

- If the **Sender Email Address** is left blank, the default `From` email address of Task 153 will be set to `ServerAutomationPlanEngine@Bigfix.com`.
- Task 152 is superseded and all the actions including sender email information are managed by Task 153.



Note: You can override these global settings for individual Automation Plans from the **Notification** section in the **Settings** tab for each plan.

After you run Task 153 `Configure Email Notification Settings for Server Automation`, new, existing, and legacy plans are affected as follows:

New plans

New plans are populated with the global values. The **Use Global Settings** option is selected by default in each new plan. When you save a new plan, the plan is then treated as an existing plan and the rules for existing plans are applied.

Existing plans

For existing plans, only plans with **Use Global Settings** or **Send to global recipients** selected are affected by global value changes in Task 153 `Configure Email Notification Settings for Server Automation`. So when you change values using Task 153, the settings in the plan do not change, it is the values that the settings reference that are changed. This means the runtime behavior of the plan in relation to notification is also updated but the plan definition remains unchanged.

Legacy plans

Legacy plans are plans that were created before the notification feature was available. All global settings are applied until the next time the plan is saved. Legacy plans do not have any plan-specific settings until they are next saved.

5. To change any of the configuration settings for the plan, click **Settings** and from the **Notification** section, you can configure the plan-specific notification settings, as follows:
 - From the **Enable notification for this plan** section, select an option to enable or disable email notification. There are three options here and these options control whether email notification is enabled. One option is to use the default settings as configured globally and the global option displayed, one option to enable notification, and one to disable notification. This section controls only whether email notification is enabled, it does not control whether default settings are applied for the plan recipients and message content. So if you select **Use Global Settings**, you must set the recipients for the plan and message content separately.
 - In the **Recipients** section, you can enter email notification recipients for this specific plan. By expanding the **View Global Recipients** twisty, you can view the list of email notification recipients defined globally at the current time. If you want the email notification for this plan to be sent to the list of globally defined recipients, check the **Send to global recipients** box. When this option is checked, the email notification is sent to the global recipients as well as any email addresses you entered in the **Recipients** field.
 - In the **Sender Email Address** section, change the default `Sender Email Address` if needed. This overrides the information configured using Task 153.
 - In the **Message content** section, enter a plan-specific message that you want to be sent with the email notification. By default, the global default message is populated in this field as set in Task 153.
 - To send the system-generated plan execution details with the email notification, check the **Append Plan execution detail** check box. The system-generated plan execution detail includes detailed information of name and ID of any timeouts or failures in the plan.



Note:

- When Automation Plan settings are configured to use the global values, any subsequent updates to the global values as configured using Task 153 `Configure Email Notification Settings for Server Automation` are automatically applied to the values used in the Automation Plan. New plans and legacy plans default behavior is to use the global values.

6. Run the Automation Plan. When the plan action is stopped, an email notification is sent according to your settings.

Email notification is set up based on your configuration settings and email notifications are sent for Automation Plans for which notification is configured when the plans complete. If you want email notification to be sent during plan execution, you can add Task 2244 `Send an email notification` at the point in the plan at which you want the notification to be sent. For example, if you have a 10-step plan and you want a notification to be sent after step 5, add Task 165 as step 6 in the plan.

If you want to disable email notification at any point, use Server Automation Task 153 `Configure Email Notification Settings for Server Automation`. If you disable notification, legacy plans and plans that are configured to use the global settings will no longer send email notifications.

More information

If you want to change the list of global email addresses (Email Recipient List) or Sender email address, use Task 153 `Configure Email Notification Settings for Server Automation`. If you run Task 153 `Configure Email Notification Settings for Server Automation` entering a list of email addresses (Email Recipient List) or Sender email address, the global email addresses (Email Recipients and Sender Email Address) that you enter will replace any global email addresses that were configured previously. If you want to remove the notification service, run Task ID 2239 `Uninstall Notification Service` to uninstall the notification service on Microsoft® Windows®, and run Task ID 2242 `Uninstall Notification Service (RHEL)` to uninstall the service on Linux®.

Related information

[Customizing notification service Cipher - Windows \(on page 59\)](#)

[Customizing notification service Cipher - Linux \(on page 60\)](#)

[Uninstalling the notification service \(on page 61\)](#)

Customizing notification service Cipher - Windows

Learn how to add your custom Cipher in the notification service in a Windows system.

Notification service uses Cipher mechanism to encrypt or decrypt messages. If you do not want to use the default notification service Cipher, you can configure your custom cipher in the `nsConfig.json` file.

To add your Cipher in the `nsConfig.json` file in a Windows system, perform the following steps:

1. Navigate to `C:\Program Files (x86)\BigFix Enterprise\BES Server\Applications`, where notification service is installed.
2. If notification service is installed, navigate to `NotificationService\Resources\Config`
3. open the `nsConfig.json` file in a text editor. Sample content in `nsConfig.json` file looks as follows:

```
"port": 3000,
  "bes-server-host": "WIN-UTO6DQJ75BV",
  "bes-server-port": 52311,
  "from": "noreply@bigfix.com",
```

```
"monitorInterval": 30000,
  "ciphers": ""
}
```

4. By default, the value of `ciphers` is null. You can add your ciphers within double quotes.



Note: Do not modify any other existing information apart from adding Cipher, which might lead to unexpected errors.

5. Save and close the file.
6. Restart the notification service for the changes to take effect.

Now, you have successfully added your custom Cipher to the notification service.

Customizing notification service Cipher - Linux

Learn how to add your custom Cipher in the notification service in a Linux system.

Notification service uses Cipher mechanism to encrypt or decrypt messages. If you do not want to use the default notification service Cipher, you can configure your custom cipher in the `nsConfig.json` file.

To add your Cipher in the `nsConfig.json` file in a Linux system, perform the following steps:

1. Navigate to `rh-bigfixserver/var/opt/BESServer/Applications/`, where notification service is installed.
2. If the notification service is installed, you can view the folder `NotificationService`. To access this folder, open terminal, enter `su root`, and enter system password when prompted.
3. Enter the following commands to open `nsConfig.json`

```
cd NotificationService/
cd resources/
cd config/
vi nsConfig.json
```

The content in the `nsConfig.json` file is displayed. Sample content in `nsConfig.json` file looks as follows.

```
"port": 3000,
  "bes-server-host": "WIN-UTO6DQJ75BV",
  "bes-server-port": 52311,
  "from": "noreply@bigfix.com",
  "monitorInterval": 30000,
  "ciphers": ""
}
```

4. To edit the content, on your keyboard, press the letter `i`.

5. By default, the value of `ciphers` is null. You can add your ciphers within double quotes.



Note: Do not modify any other existing information apart from adding Cipher, which might lead to unexpected errors.

6. Restart the notification service for the changes to take effect.

Now, you have successfully added your custom Cipher to the notification service.

Uninstalling the notification service

To uninstall the notification service, you run a Task from the BigFix console.

1. From the Server Automation domain, expand the **Notification** node, then **Setup and Maintenance**, then **Fixlets and Tasks**.
2. Depending on your platform, select Task 155 `Uninstall Latest Notification Service` or Task 158 `Uninstall Latest Notification Service (RHEL)`.
3. Click **Take Action** to run the Task to uninstall the email notification service.

Shortly after the uninstallation Task has completed, the installation Task becomes relevant again.

Running baselines from a site

You can automatically execute all of the Baselines that are contained in a particular site against a set of endpoints. You do this by running an Automation Plan that contains a Server Automation Task designed to execute all of the Baselines in a site. Any new Baselines that you create in or add to that site are executed automatically every time that you re-use the Automation Plan.

This feature enables you to easily run all of the Baselines that are contained in a particular site against a set of endpoints. To run the Baselines contained in a site, you add a specific Server Automation Task to an Automation Plan. This feature is particularly useful for patching scenarios, for example, automating patching of Microsoft Windows® clusters.

Key points

Note the following key points:

- You can only run this Task as part of an Automation Plan. You cannot run the Task standalone.
- You cannot run Fixlet content from the site that you are targeting, only Baselines.
- If you schedule a plan and select the **Enable prefetching** option, the prefetch content is downloaded immediately, from the point at which you submit the scheduled plan. If the source content changes between the time the prefetch content is downloaded and the scheduled execution time, the updated source content is included at plan execution time but may not have been downloaded in advance. When the scheduled execution time arrives, the plan takes the content of the site at the point at which the plan is executed. For example, if you schedule a plan and prefetch downloads, the prefetch content for the Baselines in the site is

downloaded immediately as soon as you submit the scheduled plan. This prefetch content stays the same and is not updated if the source content contained in the Baselines changes. However, the plan takes the content of the site as it exists at plan execution time, so if any Baselines have been added or removed from the site, these changes are included in the plan that is executed.

- You cannot include the Task to run all Baselines from a site as a failure step.
- Parameters are not supported in Baselines, therefore you cannot include any parameterized Fixlets in Baselines that you want to run from a site.
- For performance reasons, the site from which you are executing Baselines cannot contain more than 10 Baselines. For information about performance, see the **Deployment Health Check** dashboard in the BigFix Management domain and review the information about **Open Actions**. More information about open actions and performance is available from [Enhancing the performance of Server Automation \(on page 159\)](#). For more information about BigFix performance, see [Performance Configurations](#).
- The Baselines from a site are dynamically included in a plan and are executed in parallel.

Complete the following steps to run Baselines from a site.

1. Add the Baselines to the site that you plan to target when you run the Automation Plan. Make sure that you have access to the site.
2. Create a new Automation Plan or modify a copy of an existing sample plan, adding Server Automation Task 137 `Dynamically Select Baselines from a Site` to the position in the plan where you want the Task to be processed. For example, if step 1 in your plan creates a new Windows virtual machine and you want to patch the operating system of the newly created virtual machine in step 2 by running all of the baselines contained in a site, add Task 137 `Dynamically Select Baselines from a Site` as the second step in the plan.
3. Save the plan.
4. Click **Take Action** to begin running the plan. For the step in the plan containing the `Dynamically Select Baselines from a Site` Task, target the set of endpoints against which you want to run all of the Baselines in the site.
5. On the **Parameters** tab for the step containing the `Dynamically Select Baselines from a Site` Task, select the site that contains the Baselines that you want to execute from the drop-down list. The system provides a read-only view of the site URL and provides a read-only site preview.
6. Add other steps to your plan, as required, making sure that all steps have targets assigned.
7. To begin running the plan, click **OK**.

In this scenario we have an Automation Plan that executes all of the Baselines contained in a site. The Automation Plan is a copy of a Microsoft® Windows® cluster patching sample plan, 143 `Sample Plan: Clustered Windows Server (2008 and newer versions) OS Patching`. We replace the placeholder Fixlet in the sample plan with Task 137 `Dynamically Select Baselines from a Site`. When running the plan, we then specify the site that contains the Baselines that we want to execute, as follows:

- Step 1 in the plan is `Pause Node (Windows 2008-2012)`. This step pauses the first node or set of nodes in the cluster.
- Step 2 `Move Groups from Node (Windows 2008-2012)`. This step moves groups from the node.

- Step 3 in the sample plan is a placeholder. The sample plan includes this placeholder step so that you can replace it with a Fixlet or Task of your choice. We will replace this step with Task 137 `Dynamically Select Baselines from a Site`. From the **Take Automation Plan Action** screen, target the first node or set of nodes in the cluster. When this step runs, all of the Baselines in the site that you specified will be executed against these targets.
- Step 4 will restart any endpoints that are in a `Pending Restart` state after the Baselines in the site that you specify in the previous step have been executed.
- Step 5 is `Resume Node (Windows 2008-2012)`. This step resumes the first node or set of nodes to the original state.
- The next five steps in the plan are repeats of steps 1 to 5. These steps repeat the same actions on the second node or set of nodes in the cluster.
- For step 8, replace the placeholder Fixlet with Task 137 `Dynamically Select Baselines from a Site`, targeting the second node or set of nodes in the cluster.

Plan-specific log files

You can access an individual log file specific to each Automation Plan that you run. This provides you with a useful tool to easily analyze or debug any issues that occurred during plan execution.

When the Server Automation system starts, it creates a custom site called `Server Automation Plan Log Files` (if this site was not created previously). Plan-specific log files are available from this site. As the number of plan-specific log files in the site expands over time, it is good practice to remove unwanted log files.

How it works

When you submit a plan for execution and the plan begins to run, a log file is generated in the `<BES Server>/Applications/Logs` directory. The plan name is `<Plan_Action_ID>.log.txt`. On plan completion, this file is automatically uploaded to the `Server Automation Plan Log Files` custom site. For information about using and viewing site files, see [Viewing site files](#).

Key points

- This feature is enabled by default and you do not need to perform any configuration to enable it.
- You can preview log files that are 200 KB or smaller.
- To view log files larger than 200 KB, you must use the REST API. If a log file is larger than 200 KB, you see a `The log file is too large to be previewed` message in the **Preview**.

Complete the following steps to download log files larger than 200 KB through the REST API:

1. Enter the following URL in a browser:

```
https://<server-host>:<server-port>/api/site/custom/Server%20Automation%20Plan%20Log%20Files/files
```

This returns something similar to the following, in this example there is one plan log in the site:

```
<BESAPI xsi:noNamespaceSchemaLocation="BESAPI.xsd">
  <SiteFile Resource="http://<server-host>:<server-port>/api/site/custom/Server%20Automation%20
    Plan%20Log%20Files/file/1215">
    <Name>1189.log.txt</Name>
    <ID>1215</ID>
    <LastModified>Mon, 23 Feb 2015 12:03:04 +0000</LastModified>
    <FileSize>322113</FileSize>
    <IsClientFile>0</IsClientFile>
  </SiteFile>
</BESAPI>
```

2. When prompted, enter your BigFix operator credentials.
3. Use the URL in the `Resource` attribute returned in the output to download the plan-specific log file, as follows:

```
http://<server-host>:<server-port>/api/site/custom/Server%20Automation%20Plan%20
Log%20Files/file/1215
```

Automation Plan processing

Your Automation Plan consists of a number of steps. When you run it from the **Automation Plans** dashboard in the Server Automation domain, your Automation Plan is processed by the Automation Plan Engine in the order you specified when creating the Automation Plan. If you run an Automation Plan from any other dashboard or panel, it will fail.

When you run an Automation Plan, the Automation Plan Engine processes it as follows:

1. Begins processing the Automation Plan action.
2. Opens a step action.
3. Processes the step action on the endpoints that you specify.
4. If the step action is successful, the Automation Plan Engine stops the step action and proceeds to the next step action.
5. If the status for a step action is `Failure` and the step has no failure step, the Automation Plan action is stopped.
6. If the Automation Plan contains a failure step for the failed step action, the Automation Plan Engine runs the failure step before the Automation Plan action is stopped.
7. If the prior step action is successful, the Automation Plan Engine opens the next step action and begins processing it.

To calculate the overall state of an Automation Plan step action, the Automation Plan Engine gets the individual results that are retrieved from each of the endpoints. The Automation Plan Engine uses these results to calculate the overall state of the step action. This state mapping information shows how that overall state of the step action is used by the Automation Plan Engine to control the running of the Automation Plan action. The Automation Plan

Engine runs each step action in the Automation Plan based on a wait, success, or failure status. For information about the states that map to the `wait`, `success`, or `failure` status, see [Running an Automation Plan \(on page 73\)](#).

 **Important:** Your Automation Plan actions are not visible to any other users, except users with `master operator` privileges, even if the **Show Other Operator's Actions** is set to **Yes** in the BigFix console.

Stopping an Automation Plan action

When you stop an Automation Plan action, the step action that is in process continues to run and its status does not change to stopped. This step action remains open.

You can stop the step action that is currently running by identifying it and stopping it. For information about how to stop Automation Plans and step actions, see [Stopping an Automation Plan \(on page 81\)](#).

Note the following important points about how the Automation Plan Engine handles step and Baseline actions that are in-process when the plan stop time occurs:

- After the point at which the plan stop time occurs, no more plan steps are issued by the Automation Plan Engine but the engine completes any actions that are still running.
- Target endpoints that are targeted by a step that is open at the time of exceeding the plan stop time continue to process the step action.
- The Automation Plan Engine stops issuing Baseline components when the stop time occurs. The Automation Plan Engine waits for currently in-process component to complete. The remaining components in the Baseline are set to not relevant and are not run. If there is a further step in the plan, it is reported as not run. A status in the dashboard shows that all components of the baseline might not have completed because the plan exceeded the stop time. In addition, the engine log file `pe_console.log`, includes an entry to indicate that all components in a Baseline might not have been processed if the plan exceeds the plan stop time.
- Any parallel steps being executed at plan stop time will run to completion. Fixlets or Tasks in parallel steps are handled the same way that sequential plan Fixlets or Tasks are handled. Baselines are handled according to how they processed in sequential plan steps, described in the previous bullet.
- The Automation Plan Engine does not restart any endpoints that are in a `Pending Restart` state after the stop time occurs.
- For parallel plans, the **Automation Plan Action Status** dashboard shows the next step that was due to be run for each branch in the parallel plan (if there were further steps to run). For sequential plans, the dashboard shows the next step that was due to run (assuming there were further steps in the plan).
- The **Automation Plan Action Status** dashboard displays a status of **Plan stop time exceeded** for any actions that was running when the plan stop time is exceeded. If the action is a Fixlet, the Fixlet runs to completion, which can be `Fixed` or `Failed`. If the action is for a Baseline, the Baseline component currently in flight runs to completion but any remaining components are not run. The Baseline percentage completion is set to `Partial`.
- If you are using the email notification service, email notifications include the plan step status at the point at which the plan stop time occurs.

Using failure steps in an Automation Plan

When you create an Automation Plan, you can optionally add a single corresponding failure step for each Automation Plan step. A failure step can include a Fixlet, Task, or Baseline. However, you cannot add a Baseline that contains Fixlets or Tasks with parameters as a failure step. (Note that you cannot add a Baseline that contains Fixlets or Tasks with parameters as a regular step in a plan either.) If a step action fails and the Automation Plan contains a failure step for the failed step, the Automation Plan Engine identifies and runs the failure step action. You can target a failure step to run on either all of the endpoints for the corresponding step action or only on the endpoints that returned a failed status for the step action. When a failure step action processing is complete, the Automation Plan Engine stops the failure step action and then the Automation Plan action, regardless of the overall final status of the failure step action.

Automation Plan Engine shutdown and recovery

The Automation Plan Engine detects particular conditions under which it can no longer function correctly. For example, if credentials become invalid, the Automation Plan Engine cannot function as normal. In these situations, the Automation Plan Engine automatically shuts itself down. The BigFix server plugin service is responsible for restarting the Automation Plan Engine after the period of time pre-configured in the `PlanEngine.xml` file in the `\BigFix Enterprise\BES Server\Applications\Config` directory for Windows® or `/var/opt/BESServer/Applications/Config/PlanEngine.xml` for Linux®. The default is 30 seconds, but you can change this by modifying the `PlanEngine.xml` file. On restart, the Automation Plan Engine resumes from the processing point at which it shut down. The Automation Plan Engine automatically recognizes any Automation Plans that have already started, the stage of processing at which the shutdown occurred, and then continues running these Automation Plans.

The Automation Plan Engine shutdown and recovery occurs in the following situations.

Table 15. Error conditions and recovery

Error conditions and recovery for Automation Plan Engine

Error condition	Recovery
The Automation Plan Engine fails to communicate with Web Reports.	Verify that the BigFix Web Reports service is running. Verify also that the URL to the Web Reports Service is valid by opening a browser and pasting the URL and checking that you can log in using a valid user name and password combination.
The Web Reports Service might be disabled.	An error is displayed if the Disable relevance evaluation option has been set on the datasource in Web Reports. To correct this, re-enable the Web Reports service by navigating to Administration -> Datasources -> DataSource Options and clear the Disable relevance evaluation check box.
Web Reports user credentials fail or become invalid.	An attempt is made to contact the Web Reports server using the Reports Username and Password set at the time the Automation Plan Engine was

Table 15. Error conditions and recovery**Error conditions and recovery for Automation Plan Engine**

(continued)

Error condition	Recovery
BigFix console user credentials fail or become invalid.	<p>started. If these credentials have since changed, an error is displayed to indicate that the credentials for Web Reports are invalid. To change the credentials for the Web Reports Service, log on to Web Reports, go to Administration and select User Management. You can change the credentials from this panel.</p> <p>The Automation Plan Engine attempts to run a simple function to contact the BigFix API Fixlet Message function using the Platform user name and password that were set at the time when the Automation Plan Engine was started. An error is displayed if the wrong credentials are used. To correct this, ensure that the user name and password credentials are correct.</p>

Editing an Automation Plan

You can change an Automation Plan by editing it in the **Automation Plans** dashboard. Typically, you might want to copy an existing plan or sample plan and then customize or update it for a different automation scenario by changing steps or by assigning different targets. You can make changes to a plan quickly and easily. You can easily replace an existing step with a new step, move a step to a new position in the plan, or add a new step before or after an existing step. If you replace an existing step with a new step, the replacement step maintains the targeting and failure step settings of the original step.

You must log on to the BigFix console as a master operator or a console operator. You must have Custom Content permissions to create or edit an Automation Plan.

When you edit an Automation Plan, the list of available Automation Plans in the **Automation Plans** dashboard is automatically refreshed. To manually refresh the list of available Automation Plans, click the **Refresh** icon in the dashboard.

Each Automation Plan step is a Fixlet, Task, or Baseline. The steps are run in the order that they are displayed in the **Flow** tab in the **Automation Plans** dashboard. You can view the BigFix console **Task**, **Fixlet** or **Baseline** panel for a step by clicking the **Go to source** icon for the step in the **Steps** tab. You can view the BigFix console **Task** or **Fixlet** panel for a Component in a Baseline by clicking the Component name in the **Steps** tab. To return to the **Steps** tab, click **Back** in the menu bar.



Important: When you add a step to an Automation Plan, you are adding a copy of a Fixlet, Task, or Baseline to the plan. If the Fixlet, Task, or Baseline changes after it is added to the Automation Plan, the changes are not reflected in the copy in the Automation Plan. When the source content has changed, an icon is displayed in Server Automation to indicate that the source content has changed. You must then update your Automation



Plan to include the latest changes. If you have access to the source content, you can update the Automation Plan by clicking the update content icon that is displayed when source content has changed. You must be in edit mode to update the Automation Plan and you must click **Save** to save the updates.

Complete the following steps to edit an Automation Plan.

1. Open the **Server Automation domain** and from the navigation tree in the **Domain Panel**, click **Automation Plans**. The **Automation Plans** dashboard is opened. A list of available Automation Plans is displayed in the dashboard. To sort the list, click any column title. To filter all columns in the list, use the **filter** field.
2. Select an Automation Plan from the list. The Automation Plan data is displayed as read-only with the **Steps** tab selected by default.
3. Click **Edit** to edit the selected Automation Plan. The plan pane displays the selected Automation Plan data as editable fields.
4. To change the Automation Plan name and description, click the **Details** tab and update the **Name** and **Description** fields. From the **Details** tab you can also change the **Domain**, **Category**, **Source**, **Source Release Date**, and **Category Source Severity** fields.
5. Click the **Steps** tab. If the plan type is a sequential plan, you can change the plan to a parallel plan by selecting the **Parallel** radio button for **Plan type**. You then need to set the dependencies between the steps to control the processing flow of the plan. For information about how to set the dependencies, see [Parallel step processing \(on page 50\)](#). If the plan type is a parallel plan, you cannot automatically change it to a sequential plan type by changing the **Plan type** radio button. If you want to change a parallel plan type to a sequential plan, you must manually change the dependencies so that there are no parallel steps in the plan. Complete the following procedure to edit the steps in the Automation Plan:

- a. If the plan is a parallel plan type, to change the dependencies for a step, expand **Depends on** for the step. Then check the box for each step on which you want this step to depend. Review the **Flow** tab to verify that the plan processing flow.
- b. To remove a step from an Automation Plan, click the **Remove Step** icon for the step. If the plan is a parallel plan and if you remove a step on which other steps were dependent, you are notified with a message in the user interface. Review the **Flow** tab and check if you need to make changes to dependencies before running the plan.
- c. To remove a failure step from a step, click the **Remove Failure Step** icon for the step.
- d. To change the action for a step that is a Fixlet or a Task, select one action from the **Action** list. An action with a Script Type of URL is not displayed in the **Action** list.

6. Click **Add Step** to add new steps to the end of the Automation Plan. If you want to move existing steps or insert new steps into the plan or replace existing step, see step 7 below. Complete the following procedure to add steps:

- a. In the **Add Step** panel, select **Fixlets**, **Tasks**, or **Baselines** from the **Include** list to view Fixlets, Tasks or Baselines. The default value, **All**, displays Fixlets, Tasks and Baselines.
 - b. To filter the list of Fixlets, Tasks and Baselines, use the lists and the input box. To add or remove filters, use **+ -**.
 - c. After you add the relevant search criteria, press Enter to search for Fixlets, Tasks and Baselines.
 - d. From the list of Fixlets, Tasks and Baselines, select one or more to add to the Automation Plan.
 - e. When you finish selecting Fixlets, Tasks and Baselines, click **Add**. The name and summary of each step in the Automation Plan is shown in the **Steps** tab. For sequential plans, the sequence is shown.
7. You can easily change the order and sequence of steps by moving steps up or down in the **Steps** list. You can also replace an existing step with a new step, whereby the new step is included in the same location as the replaced step and maintains the targets and settings of the replaced step. You can also insert a new step before or after an existing step. The following table describes the expected behavior.

Table 16. Editing a step and associated rules and behavior

Option	Expected outcome
Move step	There are two move options, you can move the currently selected step before another step or after another step by selecting either Move Before... or Move After... . When you move a step, the step you move keeps all of its default targets, parameters, failure steps, and associated criteria if these have been set. The step that you move is effectively deleted from its original position in the plan. For parallel plans, any steps that are dependent on the step you are moving will have the moved steps dependencies added to their existing dependencies. Any circular dependencies are ignored. The Move Before... and Move After... options follow exactly the same rules for Insert New Step Before and Insert New Step After .
Insert step	When you insert a step, the newly inserted step does not have any targets set. The expected outcome is essentially the same as when you add a new step to a plan. However, for parallel plans, if a step is inserted before a reference step, the step you are inserting gains the reference steps dependencies and the reference step becomes dependent on the new step. If a step is inserted after a reference step, the new step will depend on the reference step and any step dependent on the reference step will now be dependent on the inserted step. When multiple steps are inserted, each one is sequentially inserted before or after the same reference step.
Replace step	When you replace a step, the replacement step keeps the original step ID, default targeting, failure step (if set) and associated criteria. Any parameters set are not maintained. For parallel plans, the replacement step maintains the dependencies of the original step.

To modify a step, select the step and click the **Move Insert or Replace this Step** icon. Make sure to click **Save** to save the plan after making your changes. From the pop-up menu that appears, select one of the following options:

- **Move Before...**: select this option to move the currently selected step immediately before another step in the Automation Plan. The **Move Before...** dialog box is displayed. Select the step before which you want the step that you are moving to be positioned. Then click **OK**.
 - **Move After...**: select this option to move the currently selected step immediately after another step in the Automation Plan. The **Move After...** dialog box is displayed. Select the step after which you want the step that you are moving to be positioned. Then click **OK**.
 - **Insert New Step Before**: select this option to insert a new step immediately before the currently selected step. The **Insert New Step Before** dialog is displayed. Search for and select a Fixlet, Task, or Baseline that you want to include before the currently selected step. Click **Insert** to add the new step.
 - **Insert New Step After**: select this option to insert a new step immediately after the currently selected step. The **Insert New After Step** dialog is displayed. Search for and select a Fixlet, Task, or Baseline that you want to include after the currently selected step. Click **Insert** to add the new step.
 - **Replace**: select this option to replace the currently selected step with a new step. The **Replace Step** dialog is displayed. Search for and select a Fixlet, Task, or Baseline that you want to include in place of the currently selected step. Click **Replace** to add the replacement step. The replacement step maintains any original step targets and failure step, if configured. It does not maintain any parameters that were set for the original step because the parameters might be different. If the plan is a parallel plan, the replacement step maintains any dependencies set on the original step.
 - **Cancel**: select this option to back out of the pop-up menu.
8. Optional: To save a set of default targets, default parameters, and filters for the step:
- a. Click the **Default Settings** icon for the **Action** drop-down menu for the step.
 - b. From the **Targets** tab, search for and select the computers that you want to save as default targets for the step and add them to the **Selected Targets** list. You can also save default targets using the **The same computers targeted by step** or **The computers specified in the list of names** options. If computers that you save as default targets do not exist when you are running the Automation Plan, the **Selected Targets** list in the **Take Automation Plan Action** dialog box is updated to reflect this. Depending on security settings, users running the Automation Plan might not be able to see all of the default targets that you set if they do not have sufficient permissions.
 - c. If there are parameters that are associated with the action for the step, you can set and save default parameters. However, you cannot save parameters from virtualization or middleware Fixlets. From the **Parameters** tab, enter the parameters that you want to save as default parameters. You can enter some or all of the parameters associated with the action for the step. Note the parameters that you set as defaults are not validated when you create the Automation Plan, they are validated when you run the Automation Plan. The **Parameters** tab is displayed only if there are parameters associated with the action for the step. When you move your mouse over the **Default Settings** icon after you have saved default parameters, a tooltip is displayed providing information that default parameters have been set. This tooltip provides this information for any Fixlet that has default parameters, not just for

default parameters that you have saved. If a default parameter was set for the Fixlet when the Fixlet was created, the tooltip displays information that default parameters are set.

- d. You can set and save filter criteria, including custom properties, for targets for the step. To save filters, select the filters that you want displayed in the **Take Automation Plan Action** dialog box when you are running the Automation Plan.



Note: If you are saving custom properties as filters, these properties must not be reserved or default properties, and they cannot come from an analysis. The custom properties must have been reported by at least one computer. If you export an Automation Plan containing custom properties and then import it on another server, and the custom properties are not specified on the server to which you import the Automation Plan, the custom properties are automatically deleted. If you delete the custom properties, they are also deleted from the Automation Plan.

- e. Click **OK** and then **Save** to save the default targets, default parameters, and filters.
 - f. Repeat this process for each step in the Automation Plan for which you want to save default targets or default parameters. If you delete the Automation Plan, default targets, default parameters, and filters are also deleted.
9. To add a failure step to a step, click the **Add Failure Step** icon for the step. A failure step is optional and can be a Fixlet, Task, or Baseline. A step can have only one failure step. Complete the following to add a failure step to a step:
 - a. In the **Add Step** panel, select **Fixlets**, or **Tasks**, or **Baselines** from the **Include** list.
 - b. To filter, use the lists and the input box. To add or remove filters, use **+ -**.
 - c. After you add the relevant search criteria, press Enter to search for Fixlets, Tasks, or **Baselines**.
 - d. Make your selection to add to the step and click **Add**. The failure step is shown in the step in the **Steps** tab.
 - e. To change the targeting for the failure step, expand **Failure Step:** for the step. To target all endpoints that are targeted by the step action, select **All** from the **Targeting** list. The default option is **Failed Only**. This option targets only the endpoints that return a failure status in the corresponding step action.
 - f. To choose one action in the failure step, expand **Failure Step:** for the step. You can select an action from the **Action** list if you have selected a Task or Fixlet. An action with a Script Type of URL is not displayed in the **Action** list. If you selected a Baseline, and a component in the Baseline does not have an action selected, you are notified in the user interface. You cannot select an action for the Baseline. To select an action for the component, go to the **All Content** domain, search for the Baseline and select an action for the component. An out-of-sync icon will be displayed in Server Automation,

indicating that the Baseline content in the failure step is different from the source Baseline. Click the out-of-sync icon to re-sync the Baseline in Server Automation.



Note: If any of the components in the Baseline you added as a failure step contain steps that require a restart, an icon is displayed to notify you of this. When you see this icon, review the Pending Restart settings for the step.

10. Click **Save** to save all of the changes to the Automation Plan.

The changes that you made are added to the Automation Plan. The list of available Automation Plans in the **Automation Plans** dashboard is refreshed to display the changes to the Automation Plan. You can run, edit, copy, or delete this Automation Plan.

Copying an Automation Plan

You can create an Automation Plan by copying an existing Automation Plan. You can then edit the data in the Automation Plan that you copied.

You must log on to the BigFix console as a master operator or a console operator. You must have Custom Content permissions to copy an Automation Plan.

When you create an Automation Plan by copying an existing Automation Plan, all of the data in the original Automation Plan is copied into the new Automation Plan. You can change the data in the new Automation Plan by using the Automation Plan Editor in the **Automation Plans** dashboard. The new Automation Plan can have the same name as the original Automation Plan. A unique ID is assigned to the new Automation Plan.



Important: You need Custom Content permissions to copy an Automation Plan. If you do not have Custom Content permissions, **Copy** is disabled.



Note: When you copy an Automation Plan, the list of available Automation Plans in the **Automation Plans** dashboard is automatically refreshed. To manually refresh the list of available Automation Plans, you must click the **Refresh** icon in the dashboard.

Complete the following steps to copy an Automation Plan. For information about editing an Automation Plan, see [Editing an Automation Plan \(on page 67\)](#).

1. Open the **Server Automation domain**.
2. From the navigation tree in the **Domain Panel**, click **Automation Plans**. The **Automation Plans** dashboard is opened. A list of available Automation Plans is displayed in the dashboard. To sort the list, click any column title. To filter all columns in the list, use the **filter** field.
3. Select an Automation Plan from the list. The plan pane displays the selected Automation Plan data as read-only.

4. Click **Copy** to copy the selected Automation Plan. A copy of the selected Automation Plan data is displayed in the plan pane as editable fields.
5. Click **Save** to save the changes to the new Automation Plan.

You created an Automation Plan. The list of available Automation Plans in the **Automation Plans** dashboard is refreshed to display the new Automation Plan. You can run, edit, copy, or delete this Automation Plan.

Deleting an Automation Plan

You can delete Automation Plans in the **Automation Plans** dashboard. If you want to delete several Automation Plans, you must delete each Automation Plan individually. When an Automation Plan is deleted, the Automation Plan actions and step actions are not deleted.

You must log on to the BigFix console as a master operator or a console operator. You must have Custom Content permissions to delete an Automation Plan.

When you delete an Automation Plan, the list of available Automation Plans in the **Automation Plans** dashboard is automatically refreshed. To manually refresh the list of available Automation Plans, click the **Refresh** icon in the dashboard.



Important: Deleting an Automation Plan does not delete or stop any Automation Plan actions or step actions for the deleted Automation Plan.

To delete an Automation Plan, complete the following steps:

1. Open the Server Automation domain.
2. From the navigation tree in the **Domain Panel**, click **Automation Plans**. The **Automation Plans** dashboard is opened. A list of available Automation Plans is displayed in the dashboard. Click any column title to sort the list. Use the **filter** field to filter all columns in the list.
3. Select an Automation Plan.
4. To delete the selected Automation Plan, click **Remove**.

You deleted an Automation Plan. The list of available Automation Plans in the **Automation Plans** dashboard is refreshed to remove the deleted Automation Plan.

Running an Automation Plan

You run or schedule your Automation Plan from the **Automation Plans** dashboard in the Server Automation domain. If you run or schedule an Automation Plan from any other dashboard or panel, it will fail. The Automation Plan Engine runs the Automation Plan, one step at a time, by opening, processing, and then stopping each step in the order that you specify when you create the Automation Plan. The Automation Plan Engine calculates the state of each step and uses these states to control the execution of the Automation Plan. In the **Automation Plans** dashboard, you must specify one or more endpoints for each step in an Automation Plan. You must specify the correct value for each

parameter in a step or a failure step to ensure that the step or failure step can run successfully. Only steps that are Fixlets or Tasks can have parameters.

You must log on to the BigFix console as a master operator or console operator. If you log on as a console operator, you must have permission to target each endpoint that you select. You must have Custom Content and Can Create Actions permissions set to Yes to run an Automation Plan. For more information about BigFix permissions, see [Operator's Permissions](#). You must run the Automation Plan in the **Automation Plans** dashboard in the Server Automation domain. If you run an Automation Plan in any other dashboard or panel, it will fail.

To schedule an Automation Plan, ensure that the latest version of the Automation Plan Engine is installed on your BigFix console. If the latest version is not installed, the `Install Latest Automation Plan Engine` Task is relevant. To upgrade to the latest version of the Automation Plan Engine, see [Upgrade the Automation Plan Engine \(on page 30\)](#).

The Automation Plan Engine opens a step as it begins to process it. When the step processing is complete, the Automation Plan Engine stops the step. If the step is successful, the Automation Plan Engine then opens and processes the next step. If the step fails, the Automation Plan Engine then opens the associated failure step, if one exists, and processes it. To understand how the Automation Plan Engine calculates if a step is complete or not, review the state mapping information that is described here. To calculate the overall state of an Automation Plan step, the Automation Plan Engine gets the individual results that are retrieved from each of the endpoints. The Automation Plan Engine uses these results to calculate the overall state of the step. This state mapping information shows how that overall state of the step is used by the Automation Plan Engine to control the running of the Automation Plan. The Automation Plan Engine runs each step in the Automation Plan based on a wait, success, or failure status. The following table outlines the states that map to the `wait`, `success`, or `failure` status.

Table 17. Automation Plan state mapping

Status of action	Outcome of action status	Description
<ul style="list-style-type: none"> • Running • Evaluating • Waiting • Pending Downloads • Postponed • Pending Restart • Pending Message • Pending Login • Not Reported 	Wait	The action is still in progress or waiting for user input. The Automation Plan Engine waits for this status to change.
<ul style="list-style-type: none"> • <Error> • Failed • Canceled 	Failure	The action cannot proceed. There might be an error or problem with the targeted endpoint. The Automation Plan Engine stops the Automation Plan.

Table 17. Automation Plan state mapping

(continued)

Status of action	Outcome of action status	Description
<ul style="list-style-type: none"> • Download Failed • Invalid Signature • Expired • Completed • Locked • Constrained 		
<ul style="list-style-type: none"> • Fixed • Not Relevant 	Success	The action completed successfully. The Automation Plan Engine proceeds to the next step.

A final state for the Automation Plan step is not calculated until all of the targeted endpoints report a state that maps to either a `success` or `failure` decision. Until that happens, the overall state of the Automation Plan step is `wait`. This includes the scenario where one or more targeted endpoints do not exist or are unavailable for some other reason, for example, if the endpoint is powered off, or if you do not have permission to target the endpoint. Unless all of the targeted endpoints report a status that maps to either a `success` or `failure` decision, the Automation Plan stays in a `wait` state. In the case of non-existent or unavailable endpoints, this results in an infinite `wait` state, and causes the Automation Plan to wait indefinitely.

When you run an Automation Plan, you must specify one or more endpoints for each step. You can assign endpoints to a step by using one of the following approaches:

- Select one or more computers from the list of computers that are managed by the BigFix server.
- Select one or more computer groups from the list of computers groups that are managed by the BigFix server.
- Type the names of one or more computers.
- Specify the same endpoints as another step in the Automation Plan.



Important: You must not add a Baseline as a step if it contains any Component that prompts for parameter values when run. You cannot specify the values of the parameters in a step that is a Baseline. If you run an Automation Plan containing a Baseline that has a Component with an unspecified parameter, the Automation Plan might fail or result in some other unexpected behavior. Only steps that are Fixlets or Tasks can have parameters that prompt for values when run.

Scheduling an Automation Plan, setting a stop time, and prefetching downloads

You can schedule an Automation Plan to run at a specific date and time. The date and time that you specify in the **Take Automation Plan Action** panel is the BigFix console local time. The BigFix console converts the specified time to Coordinated Universal Time (UTC) and the Automation Plan Engine runs the Automation Plan at the specified UTC

time. If the scheduled UTC time and date are less than or equal to the current UTC time and date, the Automation Plan Engine runs the Automation Plan immediately.

When you are scheduling an Automation Plan, you can specify a plan stop time as well as a scheduled start time. This helps you to set a limit on the length of time for which the plan runs. You can only set the plan stop time in the **Take Automation Plan Action** screen. You cannot set the plan stop time in the plan definition in **Default Settings**. You can only set the plan stop time if you have set a plan start time. The plan stop time is the console local time.

Note the following important points about how the Automation Plan Engine handles step and Baseline actions that are in-process when the plan stop time occurs:

- After the point at which the plan stop time occurs, no more plan steps are issued by the Automation Plan Engine but the engine completes any actions that are still running.
- Target endpoints that are targeted by a step that is open at the time of exceeding the plan stop time continue to process the step action.
- The Automation Plan Engine stops issuing Baseline components when the stop time occurs. The Automation Plan Engine waits for currently in-process component to complete. The remaining components in the Baseline are set to not relevant and are not run. If there is a further step in the plan, it is reported as not run. A status in the dashboard shows that all components of the baseline might not have completed because the plan exceeded the stop time. In addition, the engine log file `pe_console.log`, includes an entry to indicate that all components in a Baseline might not have been processed if the plan exceeds the plan stop time.
- Any parallel steps being executed at plan stop time will run to completion. Fixlets or Tasks in parallel steps are handled the same way that sequential plan Fixlets or Tasks are handled. Baselines are handled according to how they processed in sequential plan steps, described in the previous bullet.
- The Automation Plan Engine does not restart any endpoints that are in a `Pending Restart` state after the stop time occurs.
- For parallel plans, the **Automation Plan Action Status** dashboard shows the next step that was due to be run for each branch in the parallel plan (if there were further steps to run). For sequential plans, the dashboard shows the next step that was due to run (assuming there were further steps in the plan).
- The **Automation Plan Action Status** dashboard displays a status of **Plan stop time exceeded** for any actions that was running when the plan stop time is exceeded. If the action is a Fixlet, the Fixlet runs to completion,

which can be `Fixed` or `Failed`. If the action is for a Baseline, the Baseline component currently in flight runs to completion but any remaining components are not run. The Baseline percentage completion is set to `Partial`.

- If you are using the email notification service, email notifications include the plan step status at the point at which the plan stop time occurs.

If you are scheduling your Automation Plan, you can prefetch the content that needs to be downloaded and you can specify a start time for the prefetch. This allows you to download the content required as part of the Automation Plan in advance of the execution of the plan. This speeds up the execution of the Automation Plan so that when the plan runs, the content has been downloaded in advance and the plan runs much faster. The system evaluates the relevance of each step in the plan on the target endpoints and downloads only content that is relevant and required for the execution of the plan at the point of the plan submission. This helps minimize network traffic. If there are steps in the plan with download content that is not relevant until an earlier step has run, the content in these steps is not be prefetched and is downloaded at run-time. To prefetch downloads, select the **Enable prefetching** check box when you are scheduling your Automation Plan. To run the prefetch immediately, select the **Starts immediately** option. To schedule the prefetch, select the **Starts on** button and select a start date and time. If you select the **Enable prefetching** option, an open action is created for each step in your Automation Plan that has a prefetch or download statement. You can view these actions from the **Automation Plan Action Status** dashboard.

 **Important:** If **Enable prefetching** actions run in parallel with Automation Plan steps to the same endpoints, the step waits until all prefetch download steps are completed. Because the step action and the step download action share the same download, the BigFix client detects this and waits for it to complete.

 **Important:** There is a potential performance impact associated with using the **Enable prefetching** option because an additional action is created for each step that requires software downloads. The recommended maximum number of open actions on the system is 2,500. For any given Automation Plan, an action is open for the Automation Plan and also for each individual step in the Automation Plan. If you use the **Enable prefetching** option, additional actions are created and opened for each step that requires software downloads.

 **Note:** If an endpoint does not yet exist, the Automation Plan Engine waits until the endpoint is created before executing the step.

Complete the following steps to run or schedule an Automation Plan.

1. Open the Server Automation domain.
2. From the navigation tree in the **Domain Panel**, click **Automation Plans**. The **Automation Plans** dashboard is opened. A list of available Automation Plans is displayed in the dashboard. To sort the list, click any column title. To filter all columns in the list, use the **filter** field.
3. Select an Automation Plan from the list.
4. Click **Take Action**. The **Take Automation Plan Action** panel is opened. To schedule the plan, specify a stop time, and prefetch downloads:

- To schedule the Automation Plan, click **Configure Plan**, enable the check box under **Execution** and specify the start time and date for the Automation Plan by selecting a date and time from the **Starts on** menu. You can also type values for the date and time in the **Start Time** field and the **Start Date** field. The time and date that you specify is the console local time. The default values of the **Start Date** list and the **Start Time** list are the current BigFix console local time and date.
 - To specify a stop time for the plan, check the **Stops on** button and select the time and data on which you want the plan to stop. You can only specify a stop time if you have scheduled a start time.
 - You can select the **Enable prefetching** option to download the relevant content required for each step in the Automation Plan in advance of the execution of the Automation Plan. If you select this option, an open action is created for each step in your Automation Plan.
5. Select a step from the **Steps** list. By default, targets are not automatically loaded in the **Available Targets** list. If you want to load all available targets, click the search icon or press Enter. To view only the applicable endpoints for the selected step, select the **Use applicability** check box. To view all the endpoints that are managed by the BigFix server, clear the **Use applicability** check box. If there are no applicable endpoints for the selected step, the **Use applicability** check box is disabled.
 6. To filter computers or computer groups that you want to target based on their properties, use the lists and the input box. To add or remove filters, click **+** or **-**. After you enter the relevant criteria to search, click the search icon or press Enter to search.
 7. To assign one or more endpoints as targets for the step, use one of the following methods:
 - Click **Specific computers selected in the list below** to select one or more computer names as endpoints for the step:
 - a. From the **Include** list, select **Computers** and use the property filters as necessary to help you find the targets.
 - b. Click the search icon or press Enter to search for the target computers.
 - c. To add all of the computers in the **Available Targets** list to the **Selected Targets** list, click **Add All Displayed Targets**.
 - d. To add selected computers to the **Selected Targets** list, select one or more computers in the **Available Targets** list and click **Add Highlighted Targets**.
 - Click **Specific computers selected in the list below** to select one or more computer groups as endpoints for a step:
 - a. From the **Include** list, select **Computer Group**.
 - b. Click the search icon or press Enter to search for the target computers.
 - c. To add all the computer groups in the **Available Targets** list to the **Selected Targets** list, click **Add All Displayed Targets**.
 - d. To add selected computer groups to the **Selected Targets** list, select one or more computer groups in the **Available Targets** list and click **Add Highlighted Targets**.
 - Click **The computers specified in the list below (one per line)** to specify one or more computers as endpoints for a step:
 - a. Type or copy and paste the names of the computers that you want to target.
 - b. Enter one computer name per line.
 - Select a step name from the **Use same targets as** list to specify the same endpoints as another step in the Automation Plan.



Note: If the step has a set of default targets saved when the Automation Plan is created, these targets are displayed in the **Selected Targets** list.

8. Repeat steps 5, 6, 7, and 8 for each step in the Automation Plan.
9. To specify parameters for a step, select the step from the list and click the **Parameters** tab. For each parameter required by the step, a description and an entry field are displayed. If the parameter has a default value, the entry field contains the default. If the step has a saved default set of parameters, an icon is displayed to indicate this. To ensure the step runs successfully, each parameter displayed on the tab must have a valid value.
10. To specify parameters for a failure step, select the step from the list and click the **Failure Step Parameters** tab. If the selected step has a failure step that requires parameters, a description and entry field is displayed for each parameter. If a parameter has a default value, the entry field contains the default. To ensure the failure step runs successfully, each parameter displayed on the tab must have a valid value. The failure step parameters are independent of the step parameters.
11. To run or schedule the Automation Plan, ensure that all steps have one or more endpoints selected as targets and that all step parameters have values, then click **OK**. The following graphic shows an example of the **Take Automation Plan Action** screen.

Take Automation Plan Action

Plan name: Baselines from site

Plan Settings: Configure Plan

Steps:

- 101 - Stop Service
- 102 - IBM for Datacenter: Dynamically select Baselines from a Site
- 103 - Start Service

Targets: Parameters Execution

Specific computers selected in the list below
 The computers specified in the list of names below (one per line)

Use same target as step: [v]

Include: Computers [v] with: All [v] of the following properties

Computer Name: [v] contains [v] [v] [v]

Use applicability (1/10276)

Available Targets:

Name	OS
Calvin-193528	OS Win2
Ayer-073331	OS Win2
Erasmus-064842	OS Win2
Jerome-901010	OS Win2
Locke-618740	OS Win2
Newton-882186	OS Win2
Antisthenes-805746	OS Win2
Thales-283295	OS Win2
Machiavelli-323295	OS Win2
Hegel-688234	OS Win2
Spinoza-325357	OS Win2

1 - 25 of 10276 items

Selected Targets:

OK Cancel

The Automation Plan runs and the **Automation Plan Action Status** dashboard is opened. In this panel, you can view the Automation Plan action and the corresponding step actions for the Automation Plan.

Viewing Automation Plan actions

You can view a list of all the Automation Plan actions and the corresponding step actions in the **Automation Plan Action Status** panel. This list includes all schedules Automation Plan actions.

You must log on to the BigFix console as a master operator or a console operator. You must have Custom Content permissions to view Automation Plan actions.

To refresh the Automation Plan action and step action information, click the **Refresh** icon.

To view pending Automation Plan actions only, select the **Show only pending Automation Plan Actions** check box. Pending Automation Plan actions do not have step actions.

 **Tip:** You can also view pending Automation Plans actions in **All Automation Plan Actions > Pending Automation Plan Actions** in the Server Automation domain.

 **Important:** All Automation Plan action and step action information in this panel is read-only. You cannot delete, stop, or restart an action in the **Automation Plan Action Status** panel.

Complete the following steps to view an Automation Plan action.

1. Open the Server Automation domain.
2. From the navigation tree in the **Domain Panel**, click **Automation Plan Action Status**. The **Automation Plan Action Status** panel is opened. A list of all Automation Plan actions, with the most recent Automation Plan action first, is displayed. To sort the list, click any column title. To filter all columns in the list, use the **filter** field.
3. To view the BigFix console **Action** panel for an Automation Plan action, click the **Details** value of the Automation Plan action in the list. To return to the **Automation Plan Action Status** panel, click **Back** in the menu bar.
4. To display the step actions in an Automation Plan action, select the Automation Plan action in the list. The **Step Actions** pane displays the step actions for the selected Automation Plan action.

5. To view the BigFix console **Action** panel for a step action, click the **Details** value of the step action in the list. To return to the **Automation Plan Action Status** panel, click **Back** in the menu bar. The following graphic shows an example of the **Automation Plan Action Status** dashboard.

The screenshot shows the 'Automation Plan Action Status' dashboard. It features a table of automation plan actions and a section for step actions.

ID	Name	State	Time Issued	Start Time	Details	Issued By	Site
698	Patch Web Server Cluster using baseline	Stopped	30 May 2013 16:12:43	30 May 2013 16:05:48		besadmin	ActionSite
680	Provision RHEL Apache Web Server	Expired	10 April 2013 11:13:52			besadmin	ActionSite
677	Reimage a Server	Expired	09 April 2013 16:28:57			besadmin	ActionSite
660	Provision RHEL Apache Web Server	Expired	09 April 2013 12:45:12			besadmin	ActionSite
655	Reimage a Server	Expired	05 April 2013 17:48:35			besadmin	ActionSite
651	Reimage a Server	Expired	05 April 2013 16:44:40			besadmin	ActionSite
646	Reimage a Server	Expired	05 April 2013 13:34:01			besadmin	ActionSite
636	Provision RHEL Apache Web Server	Expired	05 April 2013 13:05:06			besadmin	ActionSite

1 - 11 of 11 items 5 | 10 | 25 | 50 | 100 | All

ID	Name	Status	% Complete	State	Time Issued	Details
699	#(IEMPlan 698,1,O) RHEL Apache Patch Baseline	Fixed	100%	Stopped	30 May 2013 16:13:16	
706	#(IEMPlan 698,2,O) RHEL Apache Patch Baseline	Fixed	100%	Stopped	30 May 2013 16:17:45	

Stopping an Automation Plan

When you run an Automation Plan, an Automation Plan action is generated to process the Automation Plan. The Automation Plan action then generates step actions, when required, when the preceding step is complete. If you want to stop an Automation Plan that is running, you must stop the Automation Plan action before you stop the step action. To stop a pending Automation Plan action, you must stop the Automation Plan action only.

To stop an Automation Plan that is running, you must first stop the Automation Plan action, and then stop the open step action. Only one step action is open at any one time.

If you stop an Automation Plan step action without first stopping the Automation Plan action, the Automation Plan Engine continues to process the Automation Plan action, generating new step actions as it does so.

The **All Automation Plan Actions** dashboard displays all Automation Plan actions, including all scheduled and pending Automation Plan actions, and all Automation Plan step actions. The **Automation Plan Actions** dashboard displays all Automation Plan actions including all scheduled and pending Automation Plan actions. The **Pending Automation Plan Actions** dashboard displays pending Automation Plan actions only. The **All Automation Plan Step Actions** dashboard displays Automation Plan step actions only. From each dashboard, you can stop the displayed actions.

If you stop a pending Automation Plan action, the state of the Automation Plan action is set to stopped and the Automation Plan action will not run at the scheduled time. The stopped Automation Plan action is not displayed on the **Pending Automation Plan Actions** dashboard. A pending Automation Plan action has no step actions.

Complete the following steps to stop an Automation Plan.

1. To find the Automation Plan action, expand **All Automation Plan Actions** in the Server Automation domain. Search for and select an Automation Plan action in the **All Automation Plan Actions** or the **Automation Plan Actions** dashboards. If you want to stop a pending Automation Plan action, you can search for and select the Automation Plan action in the **Pending Automation Plan Actions** dashboard.
2. Right-click the Automation Plan action and click **stop**. The step action that is in process continues to run and its status does not change to stop. This step action remains open.
3. To identify an open Automation Plan step action in the stopped Automation Plan:
 - a. Open the **Automation Plan Actions Status** dashboard. Search for the Automation Plan action that you stopped. Make a note of the Automation Plan action **ID** value, in the first column.
 - b. From the Server Automation domain, expand the **All Automation Plan Actions** node and click **All Automation Plan Step Actions**.
 - c. In the search field on the **All Automation Plan Step Actions** dashboard, enter the **ID** value that you noted for the stopped Automation Plan action. The list of steps in the Automation Plan is displayed.
4. Identify the step action that is open, right-click the action, and click **Stop Action**.

The Automation Plan and all of the Automation Plan steps are stopped.

Exporting an Automation Plan

You can export an Automation Plan from the **All Content** domain in the BigFix console. You can edit an exported Automation Plan in an external editor and then import the Automation Plan into a different console or deployment. Other console operators can edit and import Automation Plans that you export.

You must log on to the BigFix console.

When you export an Automation Plan, references or links to any custom Fixlets, Tasks, or Baselines in the Automation Plan are not exported. The Fixlets, Tasks, or Baselines in the exported Automation Plan execute correctly, but the link to their source from the exported Automation Plan does not display the action script. When you click the Task, Fixlet, or Baselines source, you are returned to the Automation Plan action.

For information about how to import content such as Automation Plans, see [Import content](#).

Complete the following steps to export an Automation Plan.

1. Open the **All Content** domain.
2. From the navigation tree in the **Domain Panel**, click **Fixlets and Tasks**. A list of Fixlets, Tasks, and Automation Plans is displayed.
3. To display all the Fixlets, Tasks, and Automation Plans, click **Show Non-Relevant Content** in the menu bar. To sort the list, click any column title. To filter all columns in the list, use the **Search Fixlets and Tasks** field.
4. Select an Automation Plan from the list. The plan pane displays the selected Automation Plan data.
5. Click **Export** to export the selected Automation Plan.
6. In the **Save As** window, specify **File name** and click **Save**.

The Automation Plan is exported to a `.BES` file. You can edit the Automation Plan in an external editor or copy it to another console or deployment.

Setting or changing the default values of parameters

You can set or change default values of parameters that are not displayed when you are editing an Automation Plan from the Automation Plans dashboard. When you are editing an Automation Plan, you might not be able to change parameter values using the user interface. However, you can change the default values of parameters by changing the action script for the Automation Plan in the **All Content** domain.

Complete the following steps to change the default values of parameters.

1. Open the **All Content** domain.
2. In the **Fixlets and Tasks** tree, search for and select the Automation Plan for which you want to change the default parameters.
3. Click the **Edit** button.
4. Click the **Actions** tab to view the action script.
5. In the action script section, search for the `action parameter query` string and locate the parameter for which you want to change the default value.
6. To set the default value, change the `with default` value for the parameter to the value that you want to specify as the default.
7. Save the action script.

Chapter 3. Virtualization

Virtualization is a software technology that allows multiple operating systems to run on the same host computer at the same time. Additional uses of virtualization include the quick creation of new systems for testing, training, and demonstration. Using virtualized computers saves the cost of hardware, management, and administration of the server infrastructure.

A virtual server is composed of software and acts like a complete hardware system from processor to network card in a self-contained, isolated software environment, enabling the simultaneous operation of otherwise incompatible systems. A virtual server has no hardware components. Virtual servers are based on host platforms. A host platform is a physical computer that has hosting capabilities and can host many virtual servers.

In Server Automation, you manage your virtualization infrastructure using Tasks.

VMware

You can deploy and configure a management extender plug-in for VMware. You can then manage VMware virtual machines from within BigFix the console.

Setup and maintenance

This section provides documentation about setup and maintenance tasks that you can complete for VMware virtualization.

Use the information in this section for instructions and important information about how to set up the virtualization environment for VMware.

Installing the management extender for VMware

Using the : Deploy Management Extender for VMware vCenter Task, you can install a management extender plug-in on a BigFix server.

Before you work with BigFix Lifecycle Server Automation virtualization features, you must install a management extender to communicate with the VMware vCenter or ESX host. Before you install the management extender, you must enable the license for Virtual Endpoint Manager.

You can install the management extender plug-in on a server that is running Windows™ 2008, Windows™ Server 2008, Windows™ Server 2008 R2, Windows™ 8, Windows™ 2012 and Windows™ 2012 R2.

You must have a relay server or a root server Version 9.0 or later. A VMware management extender must not be already installed on the server. Because of the workload that the management extender imposes on the system, it is recommended that you install the management extender on a relay server and not a root server.

! **Important:** Before you install the management extender plug-in, you must install the latest version of the proxy agent with a separate Fixlet®. In the BES Support site, run the latest version of the **Install Proxy Agent** Fixlet® to install the proxy agent.

! **Important:** You must ensure that the license for Virtual Endpoint Manager is enabled. To enable the Virtual Endpoint Manager license, go to the **Bigfix Management** domain, navigate to **License Overview > Lifecycle Management**. From the list of **Available Sites**, enable **Virtual Endpoint Manager**. When **Virtual Endpoint Manager** is enabled, it disappears from the **Available Sites** list and is displayed in the **Enabled Sites** list.

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Setup and Maintenance > Deploy VMware Components**.
3. In the **Deploy VMware Components** window, select the **Deploy Management Extender for VMware vCenter** Task.
4. In the **Task: Deploy Management Extender for VMware vCenter** window, click **Take Action**.
5. In the **Take Action** dialog box, ensure **Specific computers selected in the list below** is selected.
6. In the **Computer Name** list, select a relay server or a root server and click **OK**.

In the **Action: Deploy Management Extender for VMware vCenter** window, you can check the status of the installation. When the status changes to **Completed**, the management extender for VMware is installed.

After you install the management extender for VMware, you must configure the management extender with your VMware system details. For more information about configuring the management extender, see [Configuring management extenders \(on page 85\)](#).

Configuring management extenders

Before you can begin working with the different Virtualization features, you must configure a relay server or a root server to communicate with a specific VMware vCenter or ESX host. You can use ESX version 5.5 or lower.

Before you can configure the management extender, you must install the management extender for VMware. The VMware credentials that are used to log in must be part of the Administrator group in VMware. If you have Read Only permissions, you cannot correctly configure the management extender and cannot use any of the Virtualization capabilities.

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Setup and Configuration Wizard** to open the **Configure Management Extenders** list.
3. In the **Configure Management Extenders** pane, select a relay server or a root server from the **Deployed Extenders** list and click **Configure**.
4. In the **Configure Extender** area, enter the **Server name**. You can enter either a complete URL or the server address. If you enter the server name, a URL `https://<servername>:<port>/sdk/webservice/`

is generated. This URL can cause problems if you want to manage a single ESX host virtual environment because a single ESX host requires a URL with an ending: `https://<servername>:<port>/sdk/vimService`. If you want to manage a single ESX host virtual environment, ensure that you tick the **Enter vCenter's web service URL** box in the **Configure Extender** window and enter the correct version of the URL.

5. In the **Configure Extender** area, enter the **Admin user** and **Password** of the specific VMware system that you want to configure with a relay server or a root server and click **Configure VMware vCenter Management Extender...**
6. In the **Take Action** dialog box, select a relay server or a root server that you want to target from the **Computer Name** list and click **OK**.

When the management extender is completed, the **Status** changes to **Completed** in the **Action: Configure VMware vCenter Management Extender** window.

Upgrading the management extender plug-in

Using the **VMware Upgrade vCenter Plugin** Task, you can upgrade the VMware vCenter plug-in component of the management extender for VMware vCenter.



Important: You cannot use this Task to upgrade the management extender proxy agent. You must upgrade the proxy agent with a separate Fixlet. In the BES Support site, run the latest version of the **Update Windows Proxy Agent** Fixlet to upgrade the proxy agent.

The **VMware Upgrade vCenter Plugin** Task checks if the process `vCenter plugin.exe` is running and waits for this process to finish before it takes action.

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Setup and Maintenance > Upgrade VMware Components**.
3. From the **Upgrade VMware Components** list, select **VMware Upgrade vCenter Plugin**.
4. In the **VMware Upgrade vCenter Plugin** window, click **Take Action**.
5. In the **Take Action** dialog box, ensure **Specific computers selected in the list below** is selected and from the list of **Computer Names**, select the computer name which is configured with the management extender and click **OK**.

When the management extender plug-in is upgraded, the **Status** changes to **Completed** in the **Action: VMware Upgrade vCenter Plugin** window.

Removing the management extender for VMware

Using the **Remove Management Extender for VMware vCenter** Task, you can remove the management extender for VMware.

This Task removes the management extender plug-in only. You must first remove the management extender plug-in, then uninstall the proxy agent with a separate Fixlet. In the BES Support site, run the latest version of the **Uninstall Windows Proxy Agent** Fixlet to remove the proxy agent.

The **Remove Management Extender for VMware vCenter** Task removes the management extender but does not remove the list of computers that are associated with a relay server or a root server. If you reconfigure the management extender at a later stage, the reconfiguration might cause computers with duplicate names to be displayed within the BigFix console. To remove unwanted computers from the database of the BigFix console, navigate to the **All Content** domain, select **Computers** and from the **Computers** list, select the computers that you want to remove, right-click, and select **Remove from Database**.

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Setup and Maintenance > Remove VMware Components**.
3. In the **Remove VMware Components** window, select the **Remove Management Extender for VMware vCenter** Task.
4. In the **Task: Remove Management Extender for VMware vCenter** window, click **Take Action**.
5. In the **Take Action** dialog box, ensure **Specific computers selected in the list below** is selected.
6. In the **Computer Name** list, select the computer from which you want to remove the management extender and click **OK**.

In the **Action: Remove Management Extender for VMware vCenter** window, you can check the status of the uninstall. When the status changes to **Completed**, the management extender for VMware is uninstalled from the root server or the relay server.

Virtual server overview

The **Virtual Server Overview** dashboard lists the hosts and virtual machines reported by the management extender through the VMware API. You can use the **Virtual Server Overview** to view the attributes of each host and virtual machine. You can also filter the lists of hosts and virtual machines by their attributes. To view the Virtual Server Overview, in the Server Automation domain, select **Virtualization > Virtual Server Overview**.

To view the **Virtual Server Overview**, you must ensure that the analyses **VMware Host Overview** and **VMware VM Overview** are active. If these analyses are not activated, a warning message is displayed in the **Virtual Server Overview** list. You cannot proceed to view the overview without activating the analyses. After you activate the analyses, it can take a few minutes to gather. To check the status of the analyses, from the navigation tree in the Server Automation domain, click **Virtualization > Setup and Maintenance > Activate Analyses**. In the **Activate Analysis** list, ensure that the **Status** changes from **Not Activated** to **Activated Globally**. In the **Activate Analyses** list, click both **VMware Host Overview** and **VMware VM Overview** individually. In the **Analysis: VMware Host Overview** and the **VMware VM Overview** window, click the **Results** tab. When the **Results** window is populated with one or more computer names, the analysis is activated. If any of the computer names displays the message "not reported", the analysis is not gathered.

To view hosts, click the **Hosts** tab in the **Virtual Server Overview**. In the **Hosts** tab, you can view the following host attributes.

Table 18. Virtual Server Overview - Hosts

Virtual Server Overview - Hosts

Requirement	Description
Link to Host	Contains a link to a page with full specifications of the host.
Name	Displays the host name.
Operating System	Displays the operating system of the host.
CPU count	Displays the logical processor count of the host.
Datacenter	Displays the datacenter that contains the host.
Status	Displays the status of the host.
Memory size	Displays the memory size of the host.
NIC Count	Displays the number of network interface cards.
VM and Template Count	Displays the number of virtual machines and templates that are on the host.
Last Refresh Time	Displays the last time the management extender provided updated information from VMware.

In the **Virtual Machines** tab in the **Virtual Server Overview**, you can also view the following attributes of the virtual machines.

Table 19. Virtual Server Overview - Virtual Machines

Virtual Server Overview - Virtual Machines

Requirement	Description
Link to VM	Contains a link to a page with full specifications of the virtual machine.
Name	Displays the virtual machine name.
Status	Displays the status of the virtual machine.
State	Displays the power state of the virtual machine.
Link to Host	Contains a link that leads to a page with full specifications of the host of the virtual machine.
Host	Displays the name of the host on which the virtual machine is running.
CPU Count	Displays the logical processor number allocated to the virtual machine.

Table 19. Virtual Server Overview - Virtual Machines**Virtual Server Overview - Virtual Machines**

(continued)

Requirement	Description
Memory Size (MB)	Displays the memory size that is allocated to the virtual machine.
Provisioned Storage	Displays the amount of storage that is allocated to the virtual machine.
Used Storage	Displays the amount of provisioned storage which is being used by the virtual machine.
Last Refresh Time	Displays the last time the management extender provided updated information from VMware.

Filtering the virtual server overview

You can filter the Virtual Server Overview to list the hosts and virtual machines according to their attributes. Click the title of each column to order the list by that attribute. For example, in the **State** column, click the **State** heading to order the virtual machines and hosts by their power state. Repeat this action for the other attributes.

Host management tasks

Using these tasks, you can create, modify, and delete virtual machines that are on a VMware host that is configured with a management extender. You can also refresh a datastore to update the BigFix console with a list of ISO image files.

Creating a VMware virtual machine from ISO

Using the **VMware Create Virtual Machine from ISO** Task, you can create VMware virtual machines from within the BigFix console.

Before you can create a virtual machine, you must install and configure the management extender. You must ensure that the analysis **Host Overview** is active. If this analysis is not active, a warning message is displayed in the **VMware Create Virtual Machine from ISO** Task. You cannot proceed to create the virtual machine without activating the analysis **Host Overview**. After you activate the analysis, it can take a few minutes to gather. To check the status of the analysis, from the navigation tree in the Server Automation domain, click **Virtualization > Setup and Maintenance > Activate Analyses**. In the **Activate Analysis** list, click the **Host Overview** analysis, in the **Analysis: Host Overview** window, click the **Results** tab. When the **Results** window is populated with one or more computer names, the analysis is activated. If any of the computer names displays the message "not reported", the analysis is not gathered.

This Task is automatically populated with data from VMware. To work with other data, you must turn off validation and enter your own values into the parameter field. To override the data that is provided in the form, check whether a button exists in the **Validation** column for the parameter that you want to disable and select **OFF**. For more information, see [Turning off validation in a task \(on page 155\)](#).

Complete the following steps to create a virtual machine from ISO.

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Host Management > Host Configuration** to open the list of **Host Configuration** Tasks.
3. From the **Host Configuration** list, select **VMware Create Virtual Machine from ISO**. In the **Task: VMware Create Virtual Machine from ISO** window, you must complete the form to take action.

Table 20. Parameter list for creating a virtual machine

You must complete the following list of parameters to create a virtual machine.

Requirement	Description
Virtual Machine Name	Enter the name of the new virtual machine to be created. Ensure that you give your virtual machine a unique name to avoid any future confusion with duplicate names.
Host	Select the host on which you want the virtual machine to run.
Datacenter Name	Select the datacenter on which you want your virtual machine to be stored.
Guest OS Name	Select the operating system that you want to run on your virtual machine.
Datastore Name	Select the datastore in which you want the virtual machine configuration to be stored.
SCSI Controller Type	Select the disk controller type that you want to allocate to your disk.
Provisioned Disk size	Enter the disk size that you want to allocate to your virtual machine. The disk size cannot exceed the free space available on the datastore. The disk size cannot be greater than the file size that is configured for the datastore. If you want to enter a value that is greater than the disk size that is available, select OFF on the validation button for Provisioned Disk Size in the Validation column. For example, if you know that virtual machines on the datastore are scheduled to be deleted and free disk capacity will become available, you can enter a greater disk size than the capacity that is available. You can then schedule the task to run at a time when the greater disk size is available. You must ensure that this data is correct.
Memory size	Select the memory size that you want to allocate to your virtual machine.
Number of Virtual Processors	Select the number of processors that you want to allocate to your virtual machine. You must enter a number of processors greater than zero.
Associated Network	Select the network that you want assigned to your virtual machine.
Connect NIC at power on	Select whether you want your network interface card that is powered on or off when the virtual machine is created.

Requirement	Description
ISO Image Name	Select the name of the ISO image that you want to use to create your virtual machine. If you want to work with an ISO image that is not in the ISO Image Name list, select OFF on the validation button for ISO Image Name in the Validation column. You must ensure that this data is correct.

- When you complete the form, click **Take Action**.
- In the **Take Action** dialog box, ensure **Specific computers selected in the list below** is selected and from the list of **Computer Names**, select the host computer on which you want to run the virtual machine. Click **OK**.

When your virtual machine is created, the status changes to **Completed** in the **Action: VMware Create Virtual Machine from ISO** window. The new virtual machine is also displayed in the **Device List** of the **Virtualization Device Inventory**.

Modifying a VMware virtual machine

Using the **VMware Modify Virtual Machine** Task, you can modify the disk size, memory size, and number of processors of existing virtual machines from the BigFix console.

You cannot modify templates using this procedure. Ensure that the analysis **VMware Host Overview** is active. If you need to activate this analysis, a warning message is displayed in the **VMware Modify Virtual Machine** Task. You cannot proceed without activating the analysis. After you activate the analysis, it can take a few minutes for the results to gather.

To check the status of the analyses, from the navigation tree in the Server Automation domain, click **Virtualization > Setup and Maintenance > Activate Analyses**. Ensure that the **Status** changes from **Not Activated** to **Activated Globally**. In the **Activate Analyses** list, click **Host Overview**. In the **Analysis: VMware Host Overview** window, click the **Results** tab. When the **Results** window is populated with one or more computer names, the analysis is activated. If any of the computer names displays the message "not reported", the analysis is not gathered.

For non-English users: VMware vCenter supports only Simplified Chinese, Japanese, German and French. You can use this Task only if the console language that you selected in BigFix console is identical to the console language selected in VMware.

This Task is automatically populated with data from VMware. To work with other data, you need to turn off validation and enter your own values into the parameter field. To override the data that is provided in the form, check whether a button exists in the **Validation** column for the parameter that you want to disable and select **OFF**. For more information, see [Turning off validation in a task \(on page 155\)](#).

Complete the following steps to modify a virtual machine.

- Open the Server Automation domain
- From the navigation tree in the Server Automation domain, click **Virtualization > Host Management > Host Configuration**. This opens the list of **Host Configuration** Tasks.
- From the **Host Configuration** list, select **VMware Modify Virtual Machine**.

4. In the **Task: VMware Modify Virtual Machine** window, from the **Host** list, select the host on which the virtual machine that you want to modify is running.
5. From the **Virtual Machine Name** list, select the name of the virtual machine that you want to modify. If the virtual machine name that you want to modify is displayed more than once in the **Virtual Machine Name** list, you can verify that the virtual machine that you select is correct by viewing the **Virtual Machine UUID** and the **IP Address** field. If you want to modify a virtual machine that does not display in the **Virtual Machine Name** list, select **OFF** on the validation button for **Virtual Machine Name** in the **Validation** column. For example, if you want to modify a virtual machine that does not exist, but is scheduled to be created, you can turn off validation and enter the name of the virtual machine to be modified. You can then schedule the Task to take action when the virtual machine exists. If you disable validation for **Virtual Machine Name**, the validation for the **Power State** and **Disk Size** is also disabled. The validation for **Power State** and **Disk Size** is disabled because the BigFix console cannot validate that the power state or disk size of a virtual machine name that has been entered while validation is disabled. You must ensure that the virtual machine name that you enter is correct or the Task fails in VMware.
6. You can use the **Power State** field to view whether the virtual machine that you want to work with is powered on or off. VMware only allows you to modify virtual machines that are powered off. However, if you want to modify a virtual machine that is currently powered on, but is scheduled to be powered off at a later stage, select **OFF** on the validation button for Power State in the **Validation** column. You can then schedule the Task to take action when the virtual machine is powered off.
7. From the **Disk Name** list, select the disk that you want to modify. You can use the **Maximum Size** field to view the maximum size that you can configure a virtual machine.
8. In the **Maximum file Size** field, you can view the maximum file size that can be allocated to a virtual machine that is created on the datastore. You cannot modify the disk size of the virtual machine to be greater than the maximum file size allowed for the datastore.
9. In the **Datastore free space** field, you can view the free space available on the datastore. You can add the value that is displayed in the **Datastore free space** field to the value that is displayed in the **Disk Size** field.
10. In the **Disk Size** field, enter the disk size that you want to allocate to your virtual machine. In VMware, you can only increase the disk size, you cannot decrease it. You cannot exceed the maximum file size configured for the datastore. You cannot exceed the free space available on the datastore. If you want to enter a value for the disk size that is greater than the size that is currently available on the datastore, select **OFF** on the validation button for the **Disk Size** in the **Validation** list. For example, if you know that virtual machines on the datastore are scheduled to be deleted and free disk capacity will become available, you can enter a greater disk size than that which is currently available. You can schedule the Task to take action when more disk space becomes available. You must ensure that this information is correct. You cannot modify a virtual machine with a provisioned disk size greater than the **Maximum file size** for the datastore even if you disable validation.
11. From the **Memory Size** list, select the memory size that you want to allocate to your virtual machine.
12. In the **Number of Virtual Processors** list, select the number of processors that you want to allocate to your virtual machine. You must enter a number greater than zero.
13. In the **Take Action** dialog box, ensure that **Specific computers selected in the list below** is selected and from the list of **Computer Names**, select the host of the virtual machine that you want to modify and click **OK**.

When your virtual machine is modified, the **Status** changes to **Completed** in the **Action: VMware Modify Virtual Machine** window.

Deleting a virtual machine

Using the **VMware Delete Virtual Machine** Task, you can delete VMware virtual machines from within the BigFix console.

Ensure that the analysis **VMware Host Overview** is active. If this analysis must be activated, a warning message is displayed in the **VMware Delete Virtual Machine** Task. You cannot proceed without activating the analysis. Activating the analysis can take a few minutes.

To check the status of the analysis, from the navigation tree in the Server Automation domain, click **Virtualization > Setup and Maintenance > Activate Analyses**. In the **Activate Analyses** list, ensure that the **VMware Host Overview** analysis changes from **Not Activated** to **Activated Globally** and click the **VMware Host Overview** analysis. In the **Analysis: VMware Host Overview** window, click the **Results** tab. When the **Results** window is populated with one or more computer names, the analysis is activated. If any of the computer names displays the message "not reported", the analysis is not gathered.

For non-English users: VMware vCenter supports only Simplified Chinese, Japanese, German and French. You can use this Task only if the console language that you selected in BigFix console is identical to the console language selected in VMware.

This Task is automatically populated with data from VMware. To work with other data, you must turn off validation and enter your own values into the parameter field. To override the data that is provided in the form, check whether a button exists in the **Validation** column to the left of the parameter that you want to disable and select **OFF**. For more information, see [Turning off validation in a task \(on page 155\)](#).

Complete the following steps to delete a virtual machine.

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Host Management > Host Configuration**.
3. From the **Host Configuration** list, select the **VMware Delete Virtual Machine** Task.
4. In the **Task: VMware Delete Virtual Machine** window, from the **Host** menu, select the host on which the virtual machine is running.
5. From the **Virtual Machine Name** list, select the name of the virtual machine that you want to delete. If the virtual machine name that you want to delete is displayed more than once in the **Virtual Machine Name** list, you can verify that the virtual machine that you select is correct by viewing the **Virtual Machine UUID** and the **IP Address** fields. If you want to delete a virtual machine whose name does not display in the **Virtual Machine Name** list, select **OFF** on the validation button for **Virtual Machine Name** in the **Validation** column. If you disable validation for the **Virtual Machine Name** list, the validation for the **Power State** is also disabled and the **Virtual Machine UUID** is cleared. You must ensure that the virtual machine name that you enter is correct or the Task fails in VMware.

6. You can use the **Power State** field to view whether the virtual machine that you want to work with is powered on or off. You can delete virtual machines that are powered off. However, if you want to delete a virtual machine that is powered on, but is scheduled to be powered off at a later stage, select **OFF** on the validation button for **Power State** in the **Validation** column. You can then schedule the Task to take action when the virtual machine is powered off.
7. In the **Take Action** dialog box, ensure **Specific computers selected in the list below** is selected and from the list of **Computer Names**, select the host on which the virtual machine that you want to delete is running and click **OK**.

When your virtual machine is deleted, the **Status** changes to **Completed** in the **Action: VMware Delete Virtual Machine Fixlet** window. In the **Device List** of the **Virtualization Device Inventory** and in the BigFix console the virtual machine is still visible but is grayed-out.

Creating a Windows virtual machine from a template

Using the **VMware Create Windows Virtual Machine from Template** Task, you can create VMware virtual machines from a VMware template from within the BigFix console.

You must activate the following analyses

- VMware Host Overview
- SSL Encryption Analysis for Windows Administrator Password

For non-English users: VMware vCenter supports only Simplified Chinese, Japanese, German, and French. You can use this Task only if the console language that you selected in BigFix console is identical to the console language selected in VMware.

If you configured the VMware Management Extender with an ESX host, you cannot use this Task.

To create a virtual machine from a template, you must install VMware tools on the template that you want to use.

This Task is automatically populated with data from VMware. To work with other data, you must turn off validation and enter your own values in the parameter field. To override the data that is provided in the form, check whether a button exists in the **Validation** column for the parameter that you want to disable and select **OFF**. For more information, see [Turning off validation in a task \(on page 155\)](#).

Complete the following steps to create a virtual machine from template.

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Host Management > Host Configuration** to open the list of **Host Configuration** Tasks.
3. From the **Host Configuration** list, select **VMware Create Windows Virtual Machine from Template** To create a virtual machine from a template, you must complete the following parameters. in the **Task: VMware Create Windows Virtual Machine from Template** window.
4. In the **Specification** section, enter values for the following parameters.

Host containing the Template

Select the host that contains the template that you want to use to create a virtual machine.

Template

Select the name of the template to be cloned. If the template that you want to work with is not listed, select `OFF` on the button in the **Validation** column. You must ensure that the template name that you enter is correct.

VMware Tools Installed

You can view whether VMware tools is installed. You can create virtual machines only from templates that have installed.

Virtual Machine Name

Enter the name of the new virtual machine to be created. Ensure that you use a unique name to avoid any confusion with duplicate names in the future.

Virtual Machine Host

Enter the name of the host on which you want the virtual machine to be located.

Datastore Name

Enter the name of the datastore in which you want to store the virtual machine configuration files.

Maximum file size (GB)

You can view the maximum file size, in gigabytes, that can be allocated to a virtual machine that is created on the datastore. You cannot create a virtual machine with a disk size that is larger than the maximum file size allowed for the datastore. If you select a template that has more than one hard disk, you must ensure that each hard disk has a provisioned disk size that does not exceed the maximum file size for the datastore.

Datastore free space (GB)

You can view the free space, in gigabytes, that is available on the datastore. The virtual machine provisioned disk size cannot exceed the free space size that is available on the datastore.

Provisioned Disk size (GB)

You can view the disk size, in gigabytes, that is provisioned for the template that you selected. If you want to use a template that has a greater disk size than the free space on the datastore, select **OFF** on the validation button in the **Validation** column for **Provisioned Disk size (GB)**. For example, if you know that virtual machines on the datastore are scheduled to be deleted and free disk capacity becomes available, you can disable validation and use the template with a greater disk size than that that is available. You can schedule the Task to take action when more disk space becomes available. You must ensure that the data that you provide is correct. You cannot create a virtual machine with a provisioned disk size greater than the **Maximum file size** for the datastore even if you disable validation. You cannot create a virtual machine with

a provisioned disk size greater than the Maximum file size for the datastore even if you disable validation.

Memory Size (MB)

You can view the memory size, in megabytes, that are available for your virtual machine.

Number of Virtual Processors

You can view the number of processors that are allocated to your virtual machine.

Power On VM

Select whether you want the new virtual machine to be powered on or off on creation. The default power setting for the new virtual machine is off.

5. In the **Registration Information** section, enter values for the following parameters.

Owner Name

Enter the name of the owner of the new virtual machine.

Organization Name

Enter the organization name of the new virtual machine.

6. In the **Computer Name** section, enter values for the following parameter.

NetBIOS Name

Enter the computer name for the new virtual machine when it is shown on the network. Ensure that you give the computer a slightly different name than the virtual machine name to distinguish them in a list.

7. In the **Windows License**, enter values for the following parameter.

Product Key

Enter the product license key for the Windows operating system for the new virtual machine. You are not required to enter the license key before you create the virtual machine from template. You can also enter the product key after the virtual machine is created.

8. In the **Administrator Password** section, enter values for the following parameters.

Windows administrator Password

Enter a Windows administrator password. The password can contain only alphanumeric characters.

Confirm Windows administrator Password

Reenter the administrator password to confirm.

Auto Login Attempts

Enter the number of times that you want to allow the computer to restart without entering the password. The default value is 1.

9. In the **Time Zone** section, select a timezone with the following parameter.

TimeZone

Select the time zone that you want to set for the new virtual machine.

10. From the **Network Configuration** list, select whether you want a typical or custom configuration.

a. Select **Typical** for DHCP configuration.

b. If you select **Custom**, you must enter information into the following parameters.

Network Adapter

Select the network adapter that you want to configure with your custom configurations.

Network Adaptor Configuration

Select whether you want DHCP or static IP configuration. If you select static IP configuration, the parameters for the `Network Adaptor Configuration` list become editable and you must complete the following parameters.

IP Address

Enter the fixed IP address for your new virtual machine. Only IPv4 is supported.

Subnet Mask

Enter the subnet mask of the network that you want to use for your new virtual machine.

Default Gateway

Enter the default gateway for your new virtual machine.

Alternative Gateway

Enter an alternative gateway for your new virtual machine.

Preferred DNS

Enter the preferred DNS for your new virtual machine.

Alternative DNS

Enter an alternative DNS for your new virtual machine.

11. In the **Workgroup or Domain** section, enter values for the following parameters.

Join Domain or Workgroup

Select whether you want to assign the new virtual machine to a Windows workgroup or a domain. If you select `Workgroup`, enter a value in the **Workgroup** parameter. If you select `Domain`, enter values in the **Domain Domain user name** and **Domain Password parameters**.

WorkGroup

Enter the Windows workgroup to which you want to assign the new virtual machine.

Domain

Enter the domain name to which you want to assign the new virtual machine.

Domain user name

Enter the user name with to associate with the new virtual machine in the domain.

Domain Password

Enter the password that corresponds with the domain user name.

12. Click **Take Action**. In the **Take Action** dialog box, ensure **Specific computers selected in the list below** is selected and from the list of **Computer Names**, select the host computer on which you want to create the virtual machine. Click **OK**.

In the **Action: VMware Create Windows Virtual Machine from Template** window, when the **Status** changes to **Complete** the virtual machine is created. The new virtual machine is also visible in the **Device List** of the **Virtualization Device Inventory**.

For information about how to create a template with a preinstalled BigFix client, see HCL Software support article [KB0023280](#).

Creating a Linux virtual machine from template

Using the **VMware Create Linux Virtual Machine from Template** Task, you can create a new Linux virtual machine using a VMware template within the BigFix console.

You must ensure that the analysis **Host Overview** is active. If this analysis is not activated, a warning message is displayed in the **VMware Create Linux Virtual Machine from Template** Task. You cannot create the virtual machine from template without activating this analysis. After you activate the analysis, it can take a few minutes to gather. To check the status of the analysis, from the navigation tree in the Server Automation domain, click **Virtualization > Setup and Maintenance > Activate Analyses**. In the **Activate Analysis** list, check that the **Status** of the analysis changes from **Not Activated** to **Activated Globally**. In the **Activate Analysis** list, you must select **Host Overview** and click the **Results** tab. When the **Results** window is populated with one or more computer names, the analysis is gathered. If any of the computer names displays the message "not reported", the analysis is not gathered.

To create a virtual machine from a template, you must install VMware tools on the template that you want to use.

For non-English users: VMware vCenter supports only Simplified Chinese, Japanese, German and French. You can use this Task only if the console language that you selected in BigFix console is identical to the console language selected in VMware.

If you configured the VMware Management Extender with an ESX host, you cannot use this Task.

This Task is automatically populated with data from VMware. To work with other data, you must turn off validation and enter your own values in the parameter field. To override the data that is provided in the form, check whether a button exists in the **Validation** column for the parameter that you want to disable and select **OFF**. For more information, see [Turning off validation in a task \(on page 155\)](#).

Complete the following steps to create a Linux virtual machine from template.

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Host Management > Host Configuration** to open the list of **Host Configuration** Tasks.
3. From the **Host Configuration** list, select the **VMware Create Linux Virtual Machine from Template** Task. To create a virtual machine from a template, you must complete the following parameters in the **Task: VMware Create Linux Virtual Machine from Template** window. If you are working with a copied Task, click Take Action and enter the required information when you are prompted by the alert boxes.

Table 21. Create Linux Virtual Machine from Template parameters

To create a virtual machine from a template, you must complete the following parameters in the Task: VMware Create Linux Virtual Machine from Template.

Parameter name	Description
Host containing the Template	Select the host that contains the template that you want to use to create a virtual machine.
Template	Select the name of the template that you want to use to create a virtual machine. If the template that you want to work with is not listed, select OFF on the button in the Validation column and enter the name of the template that you want to use. You must ensure that the template name that you enter is correct.
VMware Tools Installed	You can view whether or not VMware tools is installed. You can only create virtual machines from templates which have VMware tools installed.
Virtual Machine Name	Enter the name of the new virtual machine to be created. Ensure that you use a unique name to avoid any confusion with duplicate names in the future.
Virtual Machine Host	Enter the name of the host on which you want the virtual machine to run.
Datastore Name	Enter the name of the datastore in which you want to store the virtual machine configuration files.
Maximum file size	You can view the maximum file size, in gigabytes, that can be allocated to a virtual machine that is created on the datastore. You cannot create a virtual machine with a disk size that is larger than the maximum file size allowed for the datastore. If you select a template which has more than one hard disk, you must ensure that each hard disk has a provisioned disk size that does not exceed the maximum file size for the datastore.
Datastore free space	You can view the free space, in gigabytes, that is available on the datastore. The virtual machine provisioned disk size cannot exceed the free space size that is available on the datastore.
Power On VM	Select whether you want the new virtual machine to be powered on or off on creation. The default power setting for the new virtual machine is off.

Parameter name	Description
Provisioned Disk size (GB)	You can view the disk size, in gigabytes, that is provisioned for the template that you selected. If you want to use a template that has a greater disk size than the free space on the datastore, select OFF on the validation button in the Validation column for Provisioned Disk size (GB) . For example, if you know that virtual machines on the datastore are scheduled to be deleted and free disk capacity will become available, you can disable validation and use the template with a greater disk size than that which is available. You can schedule the Task to take action when more disk space becomes available. You must ensure that the data that you provide is correct. You cannot create a virtual machine with a provisioned disk size greater than the Maximum file size for the datastore even if you disable validation.
Memory Size (MB)	You can view the memory size, in megabytes, that is allocated for your virtual machine.
Number of Virtual Processors	You can view the number of processors that are allocated to your virtual machine.
Computer Name	Enter the computer name for the new virtual machine as it would appear on the network.
Domain Name	Enter the domain name for the new virtual machine.
Timezone Area	Select a region which contains the time zone that you want to use for the virtual machine. For more information on time zones, see the following VMware documentation: http://www.vmware.com/support/developer/vc-sdk/visdk400pubs/Reference-Guide/timezone.html
Timezone location	Enter the location of the time zone that you want to use for the virtual machine.
Hardware Clock Setting	Select whether the Hardware clock should be set to UTC or local time.

4. From the **Network Configuration** list, select whether you want a typical or custom configuration. Whether you choose typical or custom configuration, you must enter the DNS search path for your new virtual machine in the **DNSSearchPath** field.
 - a. Select **Typical** if you want all network adaptors to be configured with DHCP configuration.
 - b. Select **Custom** to manually configure one network adaptor. If you select **Custom**, you must enter information into the following parameters.

Table 22. Custom Network Configuration requirements

Parameter name	Description
Network Adaptor	Select the network adaptor that you want to configure with your custom configurations.
Network Adaptor Configuration	Select whether you want DHCP or static IP configuration. If you select static IP configuration, the parameters for the Network Adaptor Configuration list become editable and you must complete the following parameters.
IP address (Static IP configuration only)	Enter the fixed IP address for your new virtual machine. Only IPv4 is supported.
Subnet Mask (Static IP configuration only)	Enter the subnet mask of the network that you want to use for your new virtual machine. Only IPv4 is supported.
Default Gateway (Static IP configuration only)	Enter the preferred gateway for your new virtual machine. This field is optional.
Alternative Gateway (Static IP configuration only)	Enter an alternative gateway for your new virtual machine. This field is optional.

- For both static and custom network configuration, you can enter a **Primary DNS**, **Secondary DNS** and **Tertiary DNS** for your new virtual machine. These fields are optional.
- When you complete the form, click **Take Action**.
- In the **Take Action** dialog box, ensure **Specific computers selected in the list below** is selected and from the list of **Computer Names**, select the host computer on which you want to create the virtual machine. To schedule a task to run at a specific time, select the **Execution** tab in the **Take Action** dialog box and enter the scheduling information in the **Constraints** menu. Click **OK**.

When the new virtual machine is created, the **Status** changes to **Completed** in the **Action: VMware Create Linux Virtual Machine from Template** window. The new virtual machine is also visible in the **Device List** of the **Virtualization Device Inventory**

Refreshing the ISO images

Using the **VMware ISO Image Refresh** Task, you can refresh the list of ISO images in the VMware datastore and update the list in the BigFix console. You can work with your ISO images in BigFix console faster than having to wait for an automatic refresh which occurs every 24 hours.

You must ensure that the analysis **Host Overview** is active. If this analysis is not activated, a warning message is displayed in the **VMware ISO Image Refresh** Task. You cannot proceed without activating the analysis **Host Overview**. After you activate the analysis, it can take a few minutes to gather. To check the status of the analysis, from the

navigation tree in the Domain Panel, click **Virtualization > Setup and Maintenance > Activate Analyses**. In the **Activate Analysis** list, ensure that the **Status** changes from **Not Activated** to **Activated Globally**. From the **Activate Analysis** list, select the **Host Overview** analysis. In the **Analysis: VMware Host Overview** window, click the **Results** tab. When the **Results** window is populated with one or more computer names, the analysis is activated. If any of the computer names displays the message "not reported", the analysis is not gathered.

This Task refreshes the ISO images list from a single datastore. You must run this Task on every datastore that has ISO images that you want to view.

For non-English users: VMware vCenter supports only Simplified Chinese, Japanese, German and French. You can use this Task only if the console language that you selected in BigFix console is identical to the console language selected in VMware.

Complete the following steps to refresh ISO images in a datastore.

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Host Management > Host Configuration**.
3. From the **Host Configuration** list, select the **VMware ISO Image Refresh** Task.
4. In the **Task: VMware ISO Images Refresh** window, select the **Host** and **Datastore** name that contains the list of ISO files that you want to refresh is stored and click **Take Action**.
5. In the **Take Action** dialog box, target the host on which your ISO images are stored and click **OK**.

When the list of ISO images is refreshed and the updated list of ISO images is available in the BigFix console, the **Status** changes to **Complete** in the **Action: VMware ISO Images Refresh** window.

Converting a virtual machine to a template

Using the **VMware Convert Virtual Machine to Template** Task, you can convert a VMware virtual machine to a template from the BigFix console.

Ensure that the analysis **VMware Host Overview** is active. If this analysis must be activated, a warning message is displayed in the **VMware Convert Virtual Machine to Template** Task. You cannot proceed without activating the analysis. Activating the analysis can take a few minutes.

To check the status of the analysis, from the navigation tree in the Server Automation domain, click **Virtualization > Setup and Maintenance > Activate Analyses**. In the **Activate Analyses** list, ensure that the **VMware Host Overview** analysis changes from **Not Activated** to **Activated Globally** and click the **VMware Host Overview** analysis. In the **Analysis: VMware Host Overview** window, click the **Results** tab. When the **Results** window is populated with one or more computer names, the analysis is gathered. If any of the computer names display the message "not reported", the analysis is not gathered.

For non-English users: VMware vCenter supports only Simplified Chinese, Japanese, German and French. You can use this Task only if the console language that you selected in BigFix console is identical to the console language selected in VMware.

If you configured the VMware Management Extender with an ESX host, you cannot use this Task.

This Task is automatically populated with data from VMware. To work with other data, you must turn off validation and enter your own values into the parameter field. To override the data that is provided in the form, check whether a button exists in the **Validation** column to for the parameter that you want to disable and select **OFF**. For more information, see [Turning off validation in a task \(on page 155\)](#).

Complete the following steps to convert a virtual machine to a template.

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Host Management > Host Configuration**.
3. From the **Host Configuration** list, select the **VMware Convert Virtual Machine to Template** Task. If you are working with a copied Task, click **Take Action** and enter the required information when you are prompted by the alert boxes.
4. In the **Task: VMware Convert Virtual Machine to Template** window, from the **Host** list, select the host on which the virtual machine is running.
5. From the **Virtual Machine Name** list, select the name of the virtual machine that you want to convert. If the virtual machine name that you want to convert is displayed more than once in the **Virtual Machine Name** list, you can verify that the virtual machine that you select is correct by viewing the **Virtual Machine UUID** field and the **IP Address** field. If you want to convert a virtual machine whose name is not displayed in the **Virtual Machine Name** list, select **OFF** on the validation button for **Virtual Machine Name** in the **Validation** column. If you disable validation for the **Virtual Machine Name** list, the **Virtual Machine UUID** field is cleared. You must ensure that the virtual machine name that you enter is correct or the Task fails in VMware. For more information, see [Turning off validation in a Task](#)
6. You can use the **Power State** field to view whether the virtual machine that you want to convert is powered on or off. VMware allows you to convert only virtual machines that are powered off. However, if you want to convert a virtual machine that is powered on, but is scheduled to be powered off at a later stage, select **OFF** on the validation button for **Power State** in the **Validation** column. You can then schedule the Task to take action when the virtual machine is powered off.
7. When the form is completed, click **Take Action**.
8. In the **Take Action** dialog box, ensure **Specific computers selected in the list below** is selected and from the list of **Computer Names**, select the host on which the virtual machine is stored and click **OK**.

When your virtual machine is converted, the **Status** changes to **Completed** in the **Action: VMware Convert Virtual Machine to Template** window. The new template is visible in the **Device List** window of the **Virtualization Device Inventory** and in the **Computers** window in the All Content domain.

Cloning a virtual machine to a template

Using the **VMware Clone Virtual Machine to Template** Task, you can clone a VMware virtual machine to a template from within the BigFix console.

Ensure that the analysis **VMware Host Overview** is active. If this analysis must be activated, a warning message is displayed in the **VMware Clone Virtual Machine to Template** Task. You cannot proceed without activating the analysis. Activating the analysis can take a few minutes.

To check the status of the analysis, from the navigation tree in the Server Automation domain, click **Virtualization > Setup and Maintenance > Activate Analyses**. In the **Activate Analyses** list, ensure that the **VMware Host Overview** analysis changes from **Not Activated** to **Activated Globally** and click the **VMware Host Overview** analysis. In the **Analysis: VMware Host Overview** window, click the **Results** tab. When the **Results** window is populated with one or more computer names, the analysis is gathered. If any of the computer names display the message "not reported", the analysis is not gathered.

For non-English users, VMware vCenter only supports, Simplified Chinese, Japanese, German and French. You can only use this Task if the console language that you selected in BigFix console is identical to the console language selected in VMware.

For non-English users: VMware vCenter supports only Simplified Chinese, Japanese, German and French. You can use this Task only if the console language that you selected in BigFix console is identical to the console language selected in VMware.

If you configured the VMware Management Extender with an ESX host, you cannot use this Task.

This Task is automatically populated with data from VMware. To work with other data, you must turn off validation and enter your own values into the parameter field. To override the data that is provided in the form, check whether a button exists in the **Validation** column for the parameter that you want to disable and select **OFF**. For more information, see [Turning off validation in a task \(on page 155\)](#).

Complete the following steps to clone a virtual machine to a template.

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Host Management > Host Configuration**.
3. From the **Host Configuration** list, select the **VMware Clone Virtual Machine to Template** Task. If you are working with a copied Task, click **Take Action** and enter the required information when you are prompted by the alert boxes.
4. In the **Task: VMware Clone Virtual Machine to Template** window, from the **Virtual Machine Host** list, select the host on which the virtual machine that you want to clone is running.
5. From the **Virtual Machine Name** list, select the name of the virtual machine that you want to clone. If the virtual machine name that you want to clone is displayed more than once in the **Virtual Machine Name** list, you can verify that the virtual machine that you select is correct by viewing the **Virtual Machine UUID** field and the **IP Address** field. If you want to clone a virtual machine whose name is not displayed in the **Virtual Machine Name** list, select **OFF** on the validation button for **Virtual Machine Name** in the **Validation** column. If you disable validation for the **Virtual Machine Name** list, the validation for the **Provisioned Disk size** is also disabled and the **Virtual Machine UUID** field is cleared. You must ensure that the virtual machine name that you enter is correct or the Task fails in VMware. For more information, see [Turning off validation in a Task](#)

6. In the **Template Name** field, enter the name of the new template.
7. From the **Template Host** list, select a host for the new template.
8. From the **Datastore Name** list, select a datastore for the new template.
9. In the **Maximum file size** field, you can view the maximum file size that can be allocated to a virtual machine that is created on the datastore. You cannot clone a virtual machine that is larger than the maximum file size allowed for the datastore. If you select a template which has more than one hard disk, you must ensure that each hard disk has a provisioned disk size that does not exceed the maximum file size for the datastore.
10. In the **Datastore free space** field, you can view the free space available on the datastore. The virtual machine provisioned disk size cannot exceed the freespace size that is available on the datastore.
11. In the **Provisioned Disk size** field, you can view the disk space that is allocated to the new template. If you want to clone a virtual machine to template that has a greater provisioned disk size than the maximum size available in the **Datastore free space** field, select **OFF** on the validation button for **Provisioned Disk size** in the **Validation** column and enter a higher value.
For example, if you know that virtual machines on the datastore are scheduled to be deleted and free disk capacity will become available, you can clone a new template that has a disk size greater than the maximum free space that is available. You can then schedule the task to run at a time when the greater disk size is available. You must ensure that this data is correct or the tasks fails in VMware. You cannot create a virtual machine with a provisioned disk size greater than the Maximum file size for the datastore even if you disable validation.
12. When you complete the form, click **Take Action**.
13. In the **Take Action** dialog box, ensure **Specific computers selected in the list below** is selected and from the list of **Computer Names**, select the host on which you want the new template to be created and click **OK**.

When your virtual machine is cloned, the **Status** changes to **Completed** in the **Action: VMware Clone Virtual Machine to Template** window. The new template is visible in the **Device List** window of the **Virtualization Device Inventory** and in the **Computers** window in the All Content domain.

Snapshot management tasks

Using these tasks you can create and manage VMware snapshots from the BigFix console.

Creating a snapshot

Using the **Create Snapshot** Task, you can create a snapshot of a virtual machine from within the BigFix console. Creating a snapshot captures an image of a virtual machine at a certain time. This snapshot can contain the disk, memory, and device state of a virtual machine at the time of creation.

Ensure that each snapshot that you create has a unique name.

Complete the following steps to create a snapshot.

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Virtual Machine Management > Snapshot Configuration**.

3. From the **Snapshot Configuration** list, select **Create Snapshot**.
4. In the **Task: Create a Snapshot** window, click **Take Action**.
5. In the **Action Parameter** window, enter the name that you want to give your snapshot and click **OK**. Ensure that you give the snapshot a unique name.
6. From the **Computer Name** list, select the virtual machine of which you want to create a snapshot.

When you successfully create a snapshot of a virtual machine, the **Status** changes to **Completed** in the **Action: Create Snapshot** window.

Renaming a snapshot

Using the **Rename Snapshot** Task, you can rename a snapshot of a virtual machine from the BigFix console.

You must have at least one snapshot of a VMware virtual machine.

Complete the following steps to rename a snapshot.

1. Open the **Automation** domain.
2. From the navigation tree in the **Automation** domain, click **Virtualization > Virtual Machine Management > Snapshot Configuration**.
3. From the **Snapshot Configuration** list, select **Rename Snapshot**.
4. In the **Task: Rename Snapshot** window, click **Take Action**.
5. In the **Action Parameter** window, enter the name of the snapshot that you want to rename and click **OK**.
6. In the **Action Parameter** window, enter the new snapshot name and click **OK**.
7. From the **Computer Name** list, target the virtual machine of which the snapshot was taken and click **OK**.

When the snapshot is renamed, the **Status** changes to **Completed** in the **Action: Rename Snapshot** window.

Removing a snapshot

Using the **Remove Snapshot** Task, you can remove an individual snapshot of a virtual machine. This Task does not support the removal of hierarchical snapshots.

You must have at least one snapshot of a virtual machine.

Complete the following steps to remove a snapshot.

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Virtual Machine Management > Snapshot Configuration**.
3. From the **Snapshot Configuration** list, select **Remove Snapshot**.
4. In the **Task: Remove Snapshot** window, click **Take Action**.
5. In the **Action Parameter** window, enter the name of the snapshot that you want to remove and click **OK**.
6. From the **Computer Name** list, select the computer of which the snapshot is taken and click **OK**.

When the snapshot is removed, the **Status** changes to **Completed** in the **Action: Remove Snapshot** window.

Removing all snapshots

Using the **Remove All Snapshots** Task, you can remove all the snapshots of a virtual machine from the BigFix console.

You must have one or more existing snapshots of a virtual machine.

Complete the following steps to remove all snapshots of a virtual machine.

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Virtual Machine Management > Snapshot Configuration**.
3. From the **Snapshot Configuration** list, select **Remove All Snapshots**.
4. In the **Task: Remove All Snapshots** window, click **Take Action**.
5. In the **Take Action** dialog box, target the computer of which the snapshots were created and click **OK**.

When the snapshots are removed, the **Status** changes to **Completed** in the **Action: Remove All Snapshots** window.

Go to Snapshot

Using the **Go To Snapshot** Task, you can go to a user-defined snapshot of a VMware virtual machine from within the BigFix console.

You must have one or more existing snapshots for the VMware virtual machine to use this Task.

Complete the following steps to go to a snapshot.

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Virtual Machine Management > Snapshot Configuration**.
3. From the **Snapshot Configuration** list, select **Go To Snapshot**.
4. In the **Action Parameter** window, enter the name of the snapshot that you want to go to and click **OK**.
5. In the **Take Action** dialog box, target the computer of which the snapshot that you want to work with was created and click **OK**.

When you successfully move to a different snapshot, the **Status** changes to **Completed** in the **Action: Go To Snapshot** window.

Reverting a Snapshot

Using the **Revert Snapshot** Task, you can revert to the current snapshot of the VMware virtual machine from the BigFix console.

You must have at least one snapshot of the VMware virtual machine.

This Task does not create a snapshot before it reverts to the original snapshot of a VMware virtual machine.

Complete the following steps to revert a snapshot.

1. Open the Server Automation domain
2. From the navigation tree in the Server Automation domain, click **Virtualization > Virtual Machine Management > Snapshot Configuration**.
3. From the **Snapshot Configuration** list, select **Revert Snapshot**.
4. In the **Take Action** dialog box, target the computer of which the snapshot is created and click **OK**.

When the snapshot is reverted, the **Status** changes to **Completed** in the **Action: Revert Snapshot** window.

Power management tasks

Using these tasks you can manage the power state of your VMware virtual machines. You can power off, suspend, and restart your virtual machines in two different ways: soft and hard. When you perform a power operation on a virtual machine with VMware Tools that are installed on the virtual machine, it is referred to as soft. When you perform a power operation by immediately stopping the virtual machine, it is referred to as hard. You can perform both hard and soft power operations on VMware virtual machines from within the BigFix console.

Powering on a VMware virtual machine

Using the **Power On VM** Task, you can power on VMware virtual machines from the BigFix console.

Complete the following steps to power on a VMware virtual machine.

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Virtual Machine Management > Power Configuration**.
3. From the **Power Configuration** list, select **Power On VM**.
4. In the **Task: Power On VM** window, click **Take Action**.
5. In the **Take Action** dialog box, ensure **Specific computers selected in the list below** is selected.
6. From the **Computer Name** list, select the virtual machine that you want to power on and click **OK**.

When you successfully power on the virtual machine, the status changes to **Completed** in the **Action: VMware Power On Virtual Machine** window.

Powering off a VMware virtual machine (hard)

Using VMware, you can power off your virtual machines in two different ways: power off (soft) and power off (hard). When a virtual machine is powered off using VMware tools that are installed on the virtual machine, it is referred to in VMware as power off (soft). When a virtual machine is powered off by immediately stopping it, it is referred to in VMware as a power off (hard). You can power off VMware virtual machines from within the BigFix console.

Complete the following steps to power off a virtual machine (hard).

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Virtual Machine Management > Power Configuration** to open the list of **Power Configuration** Tasks.
3. From the **Power Configuration** list, select **Power Off VM (hard)**.
4. In the **Task: Power Off VM (hard)** window, click **Take Action**.
5. In the **Take Action** dialog box, ensure **Specific computers selected in the list below** is selected.
6. To target a virtual machine to power off, select a virtual machine from the **Computer Name** list and click **OK**.

When the virtual machine is powered off, the **Status** changes to **Completed** in the **Action: Power Off VM (hard)** window.

Powering off a VMware virtual machine (soft)

Using VMware, you can power off your virtual machines in two different ways: power off (soft) and power off (hard). When you power off a virtual machine with VMware tools that are installed on the virtual machine, it is referred to as power off (soft). When a virtual machine is powered off by immediately stopping it, it is referred to as a power off (hard). You can perform both hard and soft power off operations on VMware virtual machines from within the BigFix console.

To power off (soft) a virtual machine, you must have VMware tools installed on the guest operating system of the virtual machine.

Complete the following steps to power off a VMware virtual machine (soft).

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Virtual Machine Management > Power Configuration** to open the list of **Power Configuration** Tasks.
3. From the **Power Configuration** list, select the **Power Off VM (soft)** Task.
4. In the **Task: Power Off VM (soft)** window, click **Take Action**.
5. In the **Take Action** dialog box, ensure **Specific computers selected in the list below** is selected.
6. To target a virtual machine to power off, select a virtual machine from the **Computer Name** list and click **OK**.

When the virtual machine is powered off, the **Status** changes to **Completed** in the **Action: Power Off VM (soft)** window.

Restarting a VMware virtual machine (hard)

Using VMware, you can restart your virtual machines in two different ways: restart (soft) and restart (hard). When you restart a virtual machine with VMware tools that are installed on the virtual machine, it is referred to in VMware as restart (soft). When you restart a virtual machine by immediately restarting it, it is referred to in VMware as a restart (hard). You can perform both hard and soft restart operations on VMware virtual machines from the BigFix console.

Complete the following steps to restart a virtual machine (hard).

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Virtual Machine Management > Power Configuration** to open the list of **Power Configuration** Tasks.
3. From the **Power Configuration** list, select **Restart VM (hard)**.
4. In the **Task: Restart VM (hard)** window, click **Take Action**.
5. In the **Take Action** dialog box, ensure **Specific computers selected in the list below** is selected.
6. To target a virtual machine to restart, select a virtual machine from the **Computer Name** list and click **OK**.

When the virtual machine is restarted the **Status** changes to **Completed** in the **Action: Restart VM (hard)** window.

Restarting a VMware virtual machine (soft)

Using VMware, you can restart your virtual machines in two different ways: restart (soft) and restart (hard). When you restart a virtual machine with VMware tools that are installed on the virtual machine, it is referred to as restart (soft). When you restart a virtual machine by immediately restarting it, it is referred to as a restart (hard). You can perform both hard and soft restart operations on VMware virtual machines from the BigFix console.

To restart (soft) a virtual machine, you must have VMware tools installed on the guest operating system of the virtual machine.

Complete the following steps to restart a VMware virtual machine (soft)

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Virtual Machine Management > Power Configuration** to open the list of **Power Configuration** Tasks.
3. From the **Power Configuration** list, select **Restart VM (soft)**.
4. In the **Task: Restart VM (soft)** window, click **Take Action**.
5. In the **Take Action** dialog box, ensure **Specific computers selected in the list below** is selected.
6. To target a virtual machine to restart, select a virtual machine from the **Computer Name** list and click **OK**.

When the virtual machine is restarted, the **Status** changes to **Completed** in the **Action: Restart VM (soft)** window.

Suspending a VMware virtual machine (hard)

Using VMware, you can suspend your virtual machines in two different ways: suspend (soft) and suspend (hard). When you suspend a virtual machine with VMware tools that are installed on the virtual machine, it is referred to in VMware as suspend (soft). When you suspend a virtual machine by immediately suspending it, it is referred to in VMware as a suspend (hard). You can perform both hard and soft suspend operations on VMware virtual machines from the BigFix console.

Complete the following steps to suspend a VMware virtual machine (hard).

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Virtual Machine Management > Power Configuration** to open the list of **Power Configuration** Tasks.

3. From the **Tasks** list, select **Suspend VM (hard)**.
4. In the **Task: Suspend VM (hard)** window, click **Take Action**.
5. In the **Take Action** dialog box, ensure **Specific computers selected in the list below** is selected.
6. To target a virtual machine to suspend, select a virtual machine from the **Computer Name** list and click **OK**.

When the virtual machine is suspended, the **Status** changes to **Completed** in the **Action: Suspend VM (hard)** window.

Suspending a VMware virtual machine (soft)

Using VMware, you can suspend your virtual machines in two different ways: suspend (soft) and suspend (hard). When you suspend a virtual machine with VMware tools that are installed on the VMware virtual machine, it is referred to in VMware as suspend (soft). When you suspend a virtual machine by immediately suspending it, it is referred to in VMware as a suspend (hard). You can perform both hard and soft suspend operations on VMware virtual machines from the BigFix console.

To suspend (soft) a virtual machine, you must have VMware tools installed on the guest operating system of the virtual machine.

Complete the following steps to suspend a VMware virtual machine (soft)

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > Virtual Machine Management > Power Configuration** to open the list of **Power Configuration** Tasks.
3. From the **Power Configuration** list, select **Suspend VM (soft)**.
4. In the **Task: Suspend VM (soft)** window, click **Take Action**.
5. In the **Take Action** dialog box, ensure **Specific computers selected in the list below** is selected.
6. To target a virtual machine to suspend, select a virtual machine from the **Computer Name** list and click **OK**.

When the virtual machine is suspended, the status changes to **Completed** in the **Action: Suspend VM (soft)** window.

AIX® NIM

You can setup and configure management extender plug-in for AIX® NIM. You can then create and remove NIM Clients and Mksysb images on a NIM master server from within the BigFix console.

Setup and Maintenance

Use the information in this section for instructions and important information about how to set up the virtualization environment for AIX® NIM.

Before you begin the setup, you must activate the **Management Extender Status** analysis. To activate the analysis, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > Management Extender Analyses**. In the **Management Extender Analyses** list, select **Management Extender Status** and click **Activate**.

To use the AIX® NIM tasks, you must activate the **AIX NIM Overview** analysis. To activate the analysis, in the Domain Panel of the Server Automation domain, select **> Virtualization > AIX NIM > Setup and Configuration > Activate**

Analyses. Select **AIX NIM Overview** and click **Activate**. It is good practise to activate the analysis before you begin to work with the AIX® NIM tasks.

Deploying an AIX® NIM management extender

Using the **Deploy Management Extender for AIX NIM** task, you can deploy the management extender plug-in for AIX® NIM.

 **Important:** Before you install the management extender plug-in, you must install the latest version of the proxy agent with a separate Fixlet®. In the BES Support site, run the latest version of the **Install Proxy Agent** Fixlet® to install the proxy agent.

You must activate the following analysis:

- Management Extender Status

To activate the analysis, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > Management Extender Analyses**. In the **Management Extender Analyses** list, select **Management Extender Status** and click **Activate**.

If you want to create or remove NIM Clients, netboot logical partitions (LPARs), or create a Mksysb image, you must deploy and configure the management extender plug-in for AIX® NIM.

1. Open the Server Automation domain.
2. In the Domain Panel of the Server Automation domain, select **Virtualization > > AIX NIM > Setup and Maintenance > Deploy AIX NIM Components** and select the **Deploy Management Extender for AIX NIM** task.
3. From the **Management Extender Host** list, select the host on which you want to deploy the management extender.
4. In the **Management Extender Plug-in Name** field, enter a name for the AIX® NIM management extender that is 32 characters or less. You cannot create a name with the following characters *?<>\:/| or enter spaces. You must enter a unique name for every plug-in that you deploy to the BigFix server.
5. Click **Take action**. In the **Take Action** dialog box, select the management extender host on which you want to deploy a management extender plug-in for AIX® NIM and click **OK**.

In the **Action: Management Extender for AIX NIM** window, you can view the progress of the action. When the **Status** changes to **Complete**, the management extender plug-in for AIX® NIM is deployed.

Configuring an AIX® NIM management extender

Using the **Configure Management Extender for AIX NIM** task, you can configure a management extender plug-in for AIX® NIM.

To configure the management extender plug-in with an AIX® NIM system, you must use the root credentials.

You must activate the following analysis:

- Management Extender Status

To activate the analysis, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > Management Extender Analyses**. In the **Management Extender Analyses** list, select **Management Extender Status** and click **Activate**.

1. Open the Server Automation domain.
2. In the Domain Panel of the Server Automation domain, select **Virtualization > Setup and Maintenance > AIX NIM > Configure Management Extender** and select the **Configure Management Extender for AIX NIM** task.
3. In the **Connection Details** section, enter values for the following parameters

▼ Connection Details		
Validation	Parameter name	Parameter value
	Management Extender Host:	----- Select ----- ▼
	Filter AIX NIM Plug-ins	Display All ▼
	*Management Extender Name:	----- Select ----- ▼
	Discovery refresh interval:	45 (Minutes) ▼
<input checked="" type="checkbox"/> On	*NIM Server:	<input type="text"/>
	*NIM User Name:	<input type="text"/>
	*NIM Password:	<input type="text"/>
	*Confirm NIM Password:	<input type="text"/>

Management Extender Host

Select the host that contains the management extender that you want to configure with an AIX® NIM system.

Filter AIX® NIM Plug-ins

Select whether you want to filter the list to display only unconfigured management extender plug-ins.

Management Extender Name

Select the management extender that you want to configure with an AIX® NIM system.

Discovery refresh interval

Enter the frequency, in minutes, in which a full discovery is performed. You must enter a frequency of 45 minutes or longer.

NIM Server

Enter the IP address or DNS name of the NIM server with which you want to configure the management extender. The default SSH port is 22. To control which SSH port is used to contact the server, add a colon to the end of the IP address or DNS name and enter the port number. Valid port numbers are 1 - 65534. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).

NIM User Name

Enter the user name with which you want to connect to the NIM server. You must use the root credentials to configure the management extender plug-in with a NIM server.

NIM Password

Enter the password that corresponds with the user name that you entered.

4. In the **Command Execution Options** section, if the NIM user name that you entered does not have the permissions to run scripts on the NIM server, enter your root credentials to the following parameters.

▼ Command Execution Options		
Validation	Parameter name	Parameter value
	Enable SU:	<input type="text" value="true"/>
	*Root Password:	<input type="text"/>
	*Confirm Root Password:	<input type="text"/>

Enable SU

Select whether you want to enter a root password to run all scripts on the NIM server with SU. If the user name and password that you entered cannot connect to the NIM with SSH, you must select `True` to enable SU. If you select `True`, you can enter a root password in the **Root Password** field.

Root Password

Enter the root password for the NIM server.

Confirm Root Password

Enter the root password again to confirm.

5. Click **Take Action**. In the **Take Action** dialog box, select the BigFix server on which the management extender that you want to configure is located

In the **Action: Configure Management Extender for AIX NIM** window, you can view the progress of the action. When the **Status** changes to **Complete**, the management extender plug-in is configured with the AIX® NIM system.



Note: If this task fails to complete, check the log files. If the log file contains information about the corruption of the signed XML, or a mismatch between the stored checksum and the script checksum, you must remove and redeploy the management extender.

Upgrading an AIX® NIM management extender

Using the **Upgrade Management Extender for AIX NIM Plugin** task, you can upgrade a management extender plug-in for AIX® NIM.



Important: You cannot use this task to upgrade the proxy agent. You must upgrade the proxy agent with a separate Fixlet®. In the BES Support site, run the latest version of the **Update Windows Proxy Agent** Fixlet® to upgrade the proxy agent.

Before you can run the **Upgrade Management Extender for AIX NIM Plugin** task, you must configure the management extender that you want to upgrade.

You must activate the following analysis:

- Management Extender Status

To activate the analysis, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > Management Extender Analyses**. In the **Management Extender Analyses** list, select **Management Extender Status** and click **Activate**.

1. Open the Server Automation domain.
2. In the Domain Panel of the Server Automation domain, select **Virtualization > AIX NIM > Setup and Maintenance > Upgrade AIX NIM Components** and select the **Upgrade Management Extender for AIX NIM Plugin** task.
3. From the **Management Extender Host** list, select the BigFix server on which the management extender plug-in that you want to upgrade is located.
4. From the **Management Extender Name** list, select the management extender that you want to upgrade.
5. Click **Take Action**. In the **Take Action** dialog box, select the BigFix server on which the management extender that you want to upgrade is located.

In the **Action: Upgrade Management Extender for AIX NIM Plugin** window, you can view the progress of the action. When the **Status** changes to **Complete**, the management extender plug-in is upgraded.

Removing an AIX® NIM management extender

Using the **Remove Management Extender for AIX NIM** task, you can remove the management extender plug-in for AIX® NIM.



Important: This task removes the management extender plug-in. The proxy agent is not removed as part of this task. In the BES Support site, run the latest version of the **Uninstall Windows Proxy Agent Fixlet®** to remove the proxy agent.

You must activate the following analysis

- **Management Extender Status**

To activate the analysis, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > Management Extender Analyses**. In the **Management Extender Analyses** list, select **Management Extender Status** and click **Activate**.

1. Open the Server Automation domain.
2. In the Domain Panel of the Server Automation domain, select **Virtualization > AIX NIM > Setup and Maintenance > Remove AIX NIM Components** and select the **Remove Management Extender for AIX NIM** task.
3. From the **Management Extender Host** list, select the host from which you want to remove the management extender.
4. From the **Management Extender Plug-in Name** list, select the management extender that you want to remove.
5. Click **Take Action**. In the **Take Action** dialog box, select the BigFix server from which you want to remove the management extender plug-in and click **OK**.

In the **Action: Remove Management Extender for AIX NIM** window, you can view the progress of the action. When the **Status** changes to **Complete**, the management extender plug-in is removed from the BigFix server.

AIX® NIM Tasks

Use the following section to find information about how to create and remote NIM Clients on a NIM master server. You can also create a Mksysb image on a NIM server. These tasks are run on the AIX® NIM server.

Creating a NIM client for an LPAR on a NIM server

Using the **AIX NIM Create a Client for a Logical Partition (LPAR) on a NIM Master Server** task, you can create a NIM client on a NIM server. The client that you create is associated to an operating system image on the NIM server. When a new client is created, the client copies the image and any required start information that is defined on the client. When you netboot the LPAR, the operating system image is deployed to the LPAR at this stage.

You must activate the following analysis:

- **AIX® NIM Overview**

To activate the analysis, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > AIX NIM > Setup and Maintenance** and select **AIX NIM Overview**. In the **Analysis: AIX NIM Overview** pane, select **Activate**.

1. Open the Server Automation domain
2. In the Domain Panel, click **Virtualization > AIX NIM > NIM Operations** and select the **AIX NIM Create a NIM client for a Logical Partition (LPAR) on a NIM Master Server** task.
3. From the **NIM Server** list, select the NIM server on which you want to create a client.
4. In the **NIM Client Name** field, enter a name by which you want the LPAR to be known on the NIM client server.
5. In the **LPAR Host/DNS Name** field, enter a name for the new client. You can enter either a fully qualified DNS host name or a short host name.
6. In the **LPAR IP** field, enter the IP address that corresponds to the DNS name, or the entry in the host file on the NIM master server.
7. From the **PowerVM OS Image Type** list, select whether you want to use an LPP Source or a Mksysb image.
8. If you selected **LPP Source** from the **PowerVM OS Image Type** list, select the LPP sources that you want to use from the **LPP Source** list.
9. If you selected **Mksysb**, from the **PowerVM OS Image Type** list, select the Mksysb image that you want to use from the **Mksysb** list. Make sure that the image name does not exceed 34 characters. If the image name is longer than 34 characters, the Task will fail.
10. Click **Take Action**, and in the **Take Action** dialog box, select the NIM server on which you want to create a NIM client, and click **OK**.

In the **Action: AIX NIM Create a Client for an LPAR on a NIM server** window, you can view the progress of the action. When the **Status** changes to **Complete**, the NIM client is created.

Creating a Mksysb Image

Using the **AIX NIM Create a mksysb image** task, you can create a Mksysb image from a NIM master server. You can then use the Mksysb image to create a NIM client.

You must activate the AIX® NIM Overview analysis. To activate the analysis, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > AIX NIM > Setup and Maintenance** and select **AIX NIM Overview**. In the **Analysis: AIX NIM Overview** pane, select **Activate**.

1. Open the Server Automation domain.
2. In the Domain Panel, select **Virtualization > AIX NIM > NIM Operations** and select the **AIX NIM Create a mksysb image** task.
3. From the **NIM Server** list, select the NIM master server that contains the NIM client that you want to use.
4. From the **NIM Client** list, select the NIM client that you want to use to generate a Mksysb image file.
5. In the **NIM Client State**, you can view the state of the selected NIM client. To create a Mksysb image, ensure that the NIM client state is "Currently running". To override the data that is provided in the form, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).
6. In the **Image Name** field, enter a name for the new Mksysb image. The name can contain alphanumeric characters and the following special characters: @%._~!#{ }-. The maximum number of characters that you can enter in the **Image Name** field is 34.

7. In the **Image Location** field, enter a location for the image on the NIM master server. The file path can contain alphanumeric characters and the following special characters: @%/,._~!#*^:+=(){}[]-.
8. Click **Take Action**, select the NIM client server that you want to use to generate the Mksysb image and click **OK**.

In the **Action: AIX NIM Create a mksysb image** window, you can view the progress of the action. When the **Status** changes to **Complete**, the new Mksysb image is created.

Removing a NIM client

Using the **AIX NIM Remove NIM Client** task, you can remove a NIM client from a NIM master server.

You must activate the following analysis

- AIX® NIM Overview

To activate the analysis, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > AIX NIM > Setup and Maintenance** and select **AIX NIM Overview**. In the **Analysis: AIX NIM Overview** pane, select **Activate**.

1. Open the Server Automation domain.
2. In the Domain Panel, select **Virtualization > AIX NIM > NIM Operations** and select the **AIX NIM Remove NIM Client** task.
3. From the **NIM Server** list, select the NIM master server that contains the NIM client that you want to remove.
4. From the **NIM Client Name** list, select the NIM client that you want to remove and click **Take Action**.
5. In the **Take Action** dialog box, select the NIM master server from which you want to remove the NIM client and click **OK**.

In the **Action: AIX NIM Remove NIM Client** window, you can view the progress of the action. When the **Status** changes to **Complete**, the NIM client is removed from the NIM master server.

PowerVM®

You can deploy and configure a management extender plug-in for PowerVM®. You can then manage PowerVM® logical partitions (LPARs) from within the BigFix console.

Setup and Maintenance

Use the information in this section for instructions and important information about how to set up the virtualization environment for PowerVM®.

Before you begin the setup, you must activate the **Management Extender Status** analysis. To activate the analysis, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > Management Extender Analyses**. In the **Management Extender Analyses** list, select **Management Extender Status** and click **Activate**.

To use the PowerVM® tasks, you must activate several analyses. To activate the analyses, in the Domain Panel of the Server Automation domain, select **> Virtualization > PowerVM > Setup and Configuration > Activate Analyses** . Select each analysis and click **Activate**. It is good practise to activate the analyses before you begin to work with the PowerVM® tasks.

Deploying a PowerVM® Management Extender

Using the **Deploy Management Extender for PowerVM** task, you can deploy a management extender to a BigFix server. You can then configure the Management Extender to communicate with a PowerVM® system.

 **Important:** Before you install the management extender plug-in, you must install the latest version of the proxy agent with a separate Fixlet. In the BES Support site, run the latest version of the **Install Proxy Agent** Fixlet to install the proxy agent.

You must activate the following analysis:

- Management Extender Status

To activate the analysis, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > Management Extender Analyses**. In the **Management Extender Analyses** list, select **Management Extender Status** and click **Activate**.

1. Open the Server Automation domain.
2. In the Domain Panel, select **Virtualization > PowerVM > Setup and Maintenance > Deploy PowerVM Components** and select the **Deploy Management Extender for PowerVM** task.
3. From the **Management Extender Host** list, select the host on which you want to deploy the management extender.
4. In the **Management Extender Plugin Name** field, enter a name that you want to associate to this PowerVM® managed system plug-in instance. You cannot use the following characters: *?<>\/:|. The name can be up to 32 characters in length and cannot include any spaces. You must enter a unique name for any plug-in deployed to a relay.
5. Click **Take Action**. In the **Take Action** dialog box, target the host on which you want to deploy the management extender and click **OK**.

In the **Action: Deploy Management Extender for PowerVM** window, you can view the progress of the action. When the **Status** changes to **Complete**, the management extender for PowerVM® is deployed.

To work with the management extender plug-in for PowerVM®, you must configure the plug-in with a PowerVM® Hardware Management Console. For more information, see [Configuring a PowerVM management extender \(on page 120\)](#).

Configuring a PowerVM® management extender

Using the **Configure Management Extender for PowerVM** task, you can configure a selected management extender to connect to a Hardware Management Console (HMC). You can use this task also to modify existing management extender connections to a PowerVM® environment.

Ensure that all managed systems, LPAR, and profile names contain only valid characters. The management extender cannot discover any resources with names that the following special characters: !@#\$%^&*()+\=|{};:'",.<>\/?~` or spaces.

You must install a management extender for a PowerVM® system before you can configure a management extender. To install a management extender for PowerVM®, use the **Deploy Management Extender for PowerVM** task. For more information, see [Deploying a PowerVM Management Extender \(on page 119\)](#)

To configure the management extender plug-in with the PowerVM® HMC, you must enter credentials that are part of the HMC Administrator's group.

Ensure that your HMC credentials are valid. You can validate your credentials by logging in to the HMC servers.

If you enter an HMC IP address, ensure that the address is IPv4. IPv6 is not supported.

You must activate the following analysis:

- Management Extender Status

To activate the analysis, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > Management Extender Analyses**. In the **Management Extender Analyses** list, select **Management Extender Status** and click **Activate** in the panel.

1. Open the Server Automation domain.
2. In the navigation tree of the **Domain Panel**, select **Virtualization > PowerVM > Setup and Maintenance > Configure Management Extender** and select the **Configure Management Extender for PowerVM** task.
3. In the **Connection Details** section, enter values for the following parameters.

▼ Connection Details		
Validation	Parameter name	Parameter value
	Management Extender Host:	----- Select ----- ▼
	Filter PowerVM Plug-ins:	Display All ▼
	*Management Extender Name:	----- Select ----- ▼
	Discovery refresh interval:	45 (Minutes) ▼
On <input checked="" type="checkbox"/>	*HMC Server:	<input type="text"/>
	*HMC User Name:	<input type="text"/>
	*HMC Password:	<input type="text"/>
	*Confirm HMC Password:	<input type="text"/>

Management Extender Host

Select the host that contains the management extender that you want to configure.

Filter PowerVM® Plug-ins

Select whether you want to filter the list of management extenders to display only unconfigured PowerVM® management extenders in the **Management Extender Name** list.

Management Extender Name

Select the management extender that you want to configure with a PowerVM® system.

Discovery refresh interval

Select the frequency, in minutes, in which a full discovery is performed. You must enter a frequency of 45 minutes or longer.

HMC Server

Enter the IP address or DNS name of the HMC server with which you want to configure the management extender. The default SSH port is 22. To control which SSH port is used to contact the server, add a colon (:) to the end of the IP address or DNS name and enter the port number. Valid port numbers are 1 - 65534.

HMC User Name

Enter the user name with which you want to connect to the HMC server. The user name that you enter must be part of the HMC Administrator's group. Valid HMC user names begin with a letter and contain up to 32 characters. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter that you want to disable. For more information, see [Turning off validation in a task \(on page 155\)](#).

HMC password

Enter the password that corresponds to the HMC user name that you entered. Valid passwords contain at least 7 characters.

Confirm HMC password.

Enter the password again to confirm.

4. In the **Redundant Connection Details**, enter values for the following parameters. The redundancy model is an 'active standby' model rather than 'active active'. The management extender plug-in uses only one HMC server at a time to manage the PowerVM® environment.

▼ Redundant Connection Details		
Validation	Parameter name	Parameter value
	Enable HMC Connection Redundancy:	false ▾
On <input type="checkbox"/>	Redundant HMC Server:	<input type="text"/>
	Redundant HMC User Name:	<input type="text"/>
	Redundant HMC Password:	<input type="text"/>
	Confirm Redundant HMC Password:	<input type="text"/>

Enable HMC Connection Redundancy

Select whether you want to setup a redundant HMC connection to the management extender plug-in. If you select `true`, you must enter values for the **Redundant HMC Server**, **Redundant HMC User Name**, **Redundant HMC Password**, and **Confirm Redundant HMC Password** parameters.

Redundant HMC Server

Enter the IP address or DNS name of the redundant HMC server with which you want to configure the management extender. The default SSH port is 22. To control which SSH port is used to contact the server, add a colon (:) to the end of the IP address or DNS name and enter the port number. Valid port numbers are 1 - 65534.



Important: This HMC must be available at the time of configuring.

Redundant HMC User Name

Enter the user name with which you want to connect to the redundant HMC server. The user name that you enter must be part of the HMCAdministrator's group. Valid user names begin with a letter and contain up to 32 characters.

Redundant HMC Password

Enter the password that corresponds to the user name that you entered. Valid passwords contain at least 7 characters.

Confirm Redundant HMC Password

Enter the password again to confirm.

5. Click **Take Action** and in the **Take Action** dialog box, target the host on which the management extender that you want to configure is located, and click **OK**.

In the **Action: Configure Management Extender for PowerVM** window, you can view the progress of the action. When the **Status** changes to **Complete**, the manager extender is configured.

Upgrading a PowerVM® management extender

Using the **Upgrade Management Extender for PowerVM Plugin** task, you can upgrade the plug-in component of the management extender for PowerVM®.



Important: You cannot use this task to upgrade the proxy agent. You must upgrade the proxy agent with a separate Fixlet®. In the BES Support site, run the latest version of the **Update Windows Proxy Agent** Fixlet® to upgrade the proxy agent.

Before you can run the **Upgrade Management Extender for PowerVM Plugin** task, you must configure the management extender that you want to upgrade. For more information, see [Configuring a PowerVM management extender \(on page 120\)](#).

You must activate the following analysis:

- Management Extender Status

To activate the analysis, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > Management Extender Analyses**. In the **Management Extender Analyses** list, select **Management Extender Status** and click **Activate**.

1. Open the Server Automation domain.
2. In Domain Panel, select **Virtualization > PowerVM > Setup and Maintenance > Upgrade PowerVM Components**.
3. From the **Upgrade PowerVM Components** list, select **Upgrade Management Extender for PowerVM Plugin**.
4. From the **Management Extender Host** list, select the host on which the management extender that you want to upgrade is located.
5. From the **Management Extender Name** list, select the management extender that you want to upgrade and click **Take Action**.
6. In the **Take Action** dialog box, select the management extender host on which the management extender that you want to upgrade is located and click **OK**.

In the **Action: Upgrade Management Extender for PowerVM Plugin** window, you can view the progress of the action. When the **Status** changes to **Complete**, the management extender is upgraded.

Removing a PowerVM® management extender

Using the **Remove Management Extender for PowerVM** task, you can remove a selected management extender plug-in from a BigFix server.

 **Important:** You must first remove the management extender plug-in, then uninstall the proxy agent with a separate Fixlet®. In the BES Support site, run the latest version of the **Uninstall Windows Proxy Agent** Fixlet® to remove the proxy agent.

You must activate the following analysis

- **Management Extender Status**

To activate the analysis, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > Management Extender Analyses**. In the **Management Extender Analyses** list, select **Management Extender Status** and click **Activate**.

The **Remove Management Extender for PowerVM** task removes the management extender plug-in for PowerVM® from the BigFix server that you target.

1. Open the Server Automation domain.
2. In the Domain Panel, select **Virtualization > PowerVM > Setup and Maintenance > Remove PowerVM Components**.
3. From the **Remove PowerVM Components** list, select **Remove Management Extender for PowerVM**.
4. From the **Management Extender Host** list, select the host on which the management extender plug-in that you want to remove is located.
5. From the **Management Extender Name** list, select the name of the management extender that you want to remove.
6. Click **Take Action**. In the **Take Action** dialog box, target the host from which you want to remove the management extender plug-in, and click **OK**.

In the **Action: Remove Management Extender for PowerVM** window, you can view the progress of the action. When the **Status** changes to **Complete**, the management extender plug-in is removed.

Managed System Tasks

Use the information in this section to create and delete logical partitions on a PowerVM® Managed System that is configured with a management extender for PowerVM®

Creating a Logical Partition (LPAR)

Using the **PowerVM Create a logical partition (LPAR)** task, you can create a new logical partition (LPAR) on a PowerVM® Managed System.

You must deploy and configure a management extender for PowerVM® on a BigFix server. For more information, see [Deploying a PowerVM Management Extender \(on page 119\)](#) and [Configuring a PowerVM management extender \(on page 120\)](#).

You must activate the following analyses:

- PowerVM® HMC Overview
- PowerVM® LPAR Overview
- PowerVM® Managed System Overview
- PowerVM® VIOS Overview

To activate the analyses, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > PowerVM > Setup and Maintenance** and select **PowerVM HMC Overview**. In the **Analysis: PowerVM HMC Overview** pane, select **Activate**. Repeat this action for the PowerVM® Managed System Overview, PowerVM® LPAR Overview, and PowerVM® VIOS Overview analyses.

For information about how to disable validation on certain parameters in the task, see [Turning off validation in a task \(on page 155\)](#).

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, click **Virtualization > PowerVM > Managed System Operations > Configuration Management** and select **PowerVM Create a logical partition (LPAR)**.
3. In the **Partition** section, add the name, ID, and profile details of the new LPAR.

HMC

Select the hardware management console on which you want to create the LPAR.

Managed System

Select a PowerVM® managed system on which you want to create the LPAR.

Partition Name

Enter a name for the new LPAR. Ensure that the name that you enter is unique on the Managed System that you select. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).

Partition ID

Enter an ID for the new LPAR. Ensure that the ID that you enter is unique on the Managed System that you select. To override the validation that is provided on the parameter, in the **Validation**

column for the parameter and select **OFF**. For more information, see [Turning off validation in a task \(on page 155\)](#).

Profile Name

Enter a profile name for the new LPAR. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).

- From the **Processing Mode** list, select whether you want to add `shared` or `dedicated` processors to the new LPAR. If you select `shared`, the managed system assigns partial processor units from the shared processor pool to the new LPAR. If you select `dedicated`, the managed system reserves entire physical processors that can be used only by the new LPAR.
- In the **Processing Settings** section, you can configure the processing settings for the new LPAR. From the **Processing Mode** list, if you select `shared`, the task displays the following parameters: **Minimum Processing Units**, **Desired Processing Units**, and **Maximum Processing Units**. If you select `dedicated`, the task removes these parameters. Use the **Total Processors available** field to view how many processors are available on the managed system that you selected.

Minimum Processing Units

Enter the minimum number of processing units that you want to use to create virtual processors for the new LPAR. Each processing unit is equivalent to the processing power of one processor. You can enter whole numbers or decimal numbers. For example, 2 or 2.5 processor units can be assigned to the partition.

Desired Processing Units

Enter the number of processing units that you want to use to create virtual processors for the new LPAR. Each processing unit is equivalent to the processing power of one processor. You can enter whole numbers or decimal numbers. For example, 2 or 2.5 processor units can be assigned to the partition.

Maximum Processing Units

Enter the maximum number of physical processors that you want to use to create virtual processors for the new LPAR. Each processing unit is equivalent to the processing power of one processor. You can enter whole numbers or decimal numbers. For example, 2 or 2.5 processor units can be assigned to the partition.

Minimum Processing Units required

View the minimum processing units to ensure that you enter valid values in the **Minimum Processors** field.

Minimum Processors

Enter the minimum number of processors that you want to assign to the new LPAR. Enter a value that is greater than the minimum processing units. If you select Shared, these processors are virtual. If you select Dedicated, these processors are physical.

Desired Processors

Enter the number of virtual processors that you want to assign to the new LPAR. If you select Shared, these processors are virtual. If you select Dedicated, these processors are physical.

Maximum Processors

Enter the maximum number of virtual processors that you want to assign to the new LPAR. If you select Shared, these processors are virtual. If you select Dedicated, these processors are physical.

6. In the **Memory Settings** section, enter the memory values for the new LPAR. Use the **Installed Memory** field and **Current Memory Available** field to determine how much memory is available to assign.

Minimum Memory

Select a minimum memory size that you want to set for the selected LPAR.

Desired Memory

Select a memory size that you want to set for the selected LPAR.

Maximum Memory

Select a maximum memory size that you want to set for the selected LPAR.

7. In the **General Virtual Adapter Settings** section, enter the maximum virtual adapter values for the new LPAR.

Maximum Virtual Adapters

Enter the maximum number of virtual adapters that you want to connect to the new LPAR.

8. In the **Virtual Ethernet Settings** section, enter values for the Ethernet parameters.

Virtual Ethernet Adapter ID

Enter the virtual Ethernet adapter ID.

VLAN

Enter the ID of the (Virtual Local Area Network) VLAN that you want to configure with the Ethernet adapter. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).

9. In the **Storage Settings** section, enter the storage values for the new LPAR. From the **Storage Type** list, select whether you want Virtual Small Computer System Interface (**vscsi**) or Node Port ID Virtualization (**NPiV**) storage type for the new LPAR.

a. If you select `vSCSI`, enter the following parameters.

▼ Storage Settings		
Validation	Parameter name	Parameter value
	*Storage Type:	vSCSI ▼
	*vSCSI Type:	Hard Disk ▼
	*Client Adapter ID:	3
	*VIO Server Partition:	testvios2 ▼
On <input type="checkbox"/>	*VIO Server Adapter ID:	24
	Configure Redundant IO:	No ▼
	Hard Disk:	hdisk0 (000867f41136ec2f) ▼
	Disk Unique ID:	26080001EF140AST373455LC08II
	Disk Description:	16 Bit LVD SCSI Disk Drive
	*Device Name:	

	Configure Redundant IO:	Yes ▼
	*Redundant Client Adapter ID:	4
	Redundant Server Partition:	No data retrieved ▼
On <input type="checkbox"/>	Redundant Server Adapter ID:	11
	Redundant WWPN 1:	
	Redundant WWPN 2:	
On <input type="checkbox"/>	*Secondary FC Port:	No data retrieved ▼

vSCSI Type

Select whether you want to add a `Hard Disk` OR `Logical Volume` storage to be the root disk of the new LPAR. Depending on your selection, the task displays different parameters.

If you select `Hard Disk`, you must enter values for the following parameters: **Configure Redundant IO**, **Hard Disk**, parameters. If you select `Logical volume`, you must enter the values for the following parameters: **Logical Volume Group**, **Logical Volume Size (GB)**, and **Logical Volume Name**.

Client Adapter ID

Enter the ID of the LPAR client adapter that you want to use for the root disk of the new LPAR.

VIO Server Partition

Select the name of the virtual input/output server (VIOS) to which you want to add the adapter to the disk of the new LPAR.

VIO Server Adapter ID

Enter the adapter ID of the VIOS that you want to use on the VIOS for the disk of the new LPAR. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).

Configure Redundant IO

Select whether you want to configure an alternative path for multi path input output (MPIO) redundancy. If you select **YES**, you must enter the values for the following parameters: **Redundant Client Adapter ID**, **Redundant Server Partition**, and **Redundant Server Adapter ID**. The **Hard Disk** list is filtered and displays only hard disks that are configured for MPIO.

Redundant Client Adapter ID

Enter the ID of the redundant LPAR client adapter that you want to use for the root disk of the new LPAR.

Redundant Server Partition

Select the Redundant VIO Server that you want to configure to enable multi-path for the root disk of the new LPAR.

Redundant Server Adapter ID

Enter the redundant VIO server adapter ID that you want to use on the redundant VIO server for the root disk of the new LPAR.

Hard Disk

Select the physical disk to which you want to attach the vSCSI adapter. Hard disks that are associated to volume groups or LPARs are not listed. Hard disks without a valid physical volume ID (PVID) are not listed.

Disk Unique ID

View the unique ID of the hard disk that you selected.

Disk Description

View the description of the hard disk.

Logical Volume Group

Select the logical volume group from which you want to create storage for the new SCSI disk.

Logical Volume Size (GB)

Enter the size, in gigabytes, that you want to allocate to the new SCSI disk.

Logical Volume Name

Enter a name for the logical volume.

Device Name

Enter a virtual target name that the VIO server associates with the hard disk.

b. If you select **NPIV**, enter the values for following parameters:

▼ Storage Settings		
Validation	Parameter name	Parameter value
	*Storage Type:	NPIV ▼
	*Client Adapter ID:	3
	*VIO Server Partition:	testvios2 ▼
On <input type="checkbox"/>	*VIO Server Adapter ID:	24
	Autogenerate WWPNs:	Yes ▼
	WWPN 1:	
	WWPN 2:	
On <input type="checkbox"/>	*Primary FC Port:	No data retrieved ▼
	Configure Redundant IO:	No ▼

	Configure Redundant IO:	Yes ▼
	*Redundant Client Adapter ID:	4
	Redundant Server Partition:	No data retrieved ▼
On <input type="checkbox"/>	Redundant Server Adapter ID:	11
	Redundant WWPN 1:	
	Redundant WWPN 2:	
On <input type="checkbox"/>	*Secondary FC Port:	No data retrieved ▼

Client Adapter ID

Enter the ID of the LPAR client adapter that you want to use for the root disk of the new LPAR.

VIO Server Partition

Select the name of the (VIOS) to which you want to add the adapter for the root disk of the new LPAR.

VIO Server Adapter ID

Enter the adapter ID of the VIO server that you want to use on the VIOS for the root disk of the new LPAR.

Autogenerate WWPNs

Select whether you want to automatically generate worldwide port names (WWPN) for the client adapter. The default setting is `YES`. If you select `NO`, you must enter port name in the **WWPN 1** and **WWPN 2** fields. If you select `NO` and are configuring MPIO, you must also enter the **Redundant WWPN 1** and **Redundant WWPN 2** fields.

WWPN 1

Enter the first WWPN for the client adapter.

WWPN 2

Enter the second WWPN for the client adapter.

Primary FC Port

Select the Fibre Channel port that you want to use as the primary port.

Configure Redundant IO

Select whether you want to configure an alternative path for multi-path input/output (MPIO) redundancy. If you select `YES`, the following parameters become visible:

Redundant Client Adapter ID, Redundant Server Partition, Redundant Server Adapter ID, Redundant WWPN 1, Redundant WWPN 2, and Secondary FC Port, .

Redundant Client Adapter ID

Enter the unique ID of the redundant LPAR client adapter that you want to use.

Redundant Server Partition

Select the name of the redundant server to which you want to add the redundant client adapter ID.

Redundant Server Adapter ID

Enter the redundant adapter ID of the Virtual I/O Server that you want to use.

Redundant WWPN 1

Enter the first redundant WWPN for the client adapter.

Redundant WWPN 2

Enter the second redundant WWPN for the client adapter.

Secondary FC Port

Select a secondary Fibre Channel port.

10. When you enter all the mandatory parameters, click **Take Action**.
11. In the **Take Action** dialog box, select the PowerVM® managed system on which you want to create the new LPAR, and click **OK**.

In the **Action: PowerVM Create a logical partition (LPAR)** window, you can view the progress of the action. When the **Status** changes to **Complete**, the new LPAR is created. In the **Computers** list in the **All Content** domain, you can view the new LPAR. You can distinguish an LPAR from other computers by using the **Device Type** column in the **Computers** list. The **Device Type** of the new LPAR is **PowerVM LPAR**.

To work with the new LPAR, you must create a client for the LPAR on a NIM server and then netboot the LPAR. For more information, see [Creating a NIM client for an LPAR on a NIM server \(on page 116\)](#) and [Netbooting a logical partition \(on page 148\)](#).

Deleting an LPAR

Using the **PowerVM Delete a Logical Partition (LPAR)** task, you can delete an LPAR from a PowerVM® managed system. The LPAR is deleted together with the hard disk, logical volume, physical volume, virtual host, virtual target, vSCSI adapter, Fibre Channel host, and Fibre Channel adapter ID.

You must activate the following analyses:

- PowerVM® HMC Overview
- PowerVM® LPAR Overview
- PowerVM® Managed System Overview

To activate the analyses, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > PowerVM > Setup and Maintenance** and select **PowerVM HMC Overview**. In the **Analysis: PowerVM HMC Overview** pane, select **Activate**. Repeat this action for the PowerVM® Managed System Overview, and PowerVM® LPAR Overview analyses.

For information about how to disable validation on certain parameters in the task, see [Turning off validation in a task \(on page 155\)](#).

1. Open the Server Automation domain.
2. From the Domain Panel, select **Virtualization > PowerVM > Managed System Operations > Configuration Management**.
3. From the **Configuration Management** list, select **PowerVM Delete a Logical Partition (LPAR)**.
4. From the **HMC** list, select the Hardware Management Console on which the LPAR that you want to delete is located.

5. From the **Managed System** list, select the PowerVM® managed system on which the LPAR that you want to delete is located.
6. From the **LPAR Name** list, select the LPAR that you want to delete. To override the validation that is provided on the parameter, in the **Validation** column for the parameter, select **OFF**. For more information, see [Turning off validation in a task \(on page 155\)](#).
7. In the **LPAR State** field, you can view whether the LPAR that you select is running or not activated. You cannot delete an LPAR that is running. To override the validation that is provided on the parameter, in the **Validation** column for the parameter, select **OFF**. For more information, see [Turning off validation in a task \(on page 155\)](#).
8. From the **Delete Disk** list, select **No** if you want to delete the LPAR but retain the Logical Volume. Select **Yes** if you want to delete LPAR and also the hard disk, logical volume, physical volume, virtual host, virtual target, vSCSI adapter, Fibre Channel host, and Fibre Channel adapter ID.
9. Click **Take Action**, and in the **Take Action** dialog box, select the PowerVM® managed system from which you want to delete an LPAR, and click **OK**.

In the **Action: PowerVM Delete a Logical Partition (LPAR)** window, you can view the progress of the action. When the **Status** changes to **Complete**, the LPAR is deleted.

LPAR Tasks

Using these tasks, you can modify, add disks, and create profiles for existing logical partitions (LPARs).

Creating an LPAR Profile

Using the **PowerVM Create a logical partition (LPAR) Profile** task, you can create an LPAR Profile for an existing LPAR from within the BigFix console.

You must activate the following analyses:

- PowerVM® HMC Overview
- PowerVM® LPAR Overview
- PowerVM® Managed System Overview
- PowerVM® VIOS Overview

To activate the analyses, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > PowerVM > Setup and Maintenance** and select **PowerVM HMC Overview**. In the **Analysis: PowerVM HMC Overview** pane, select **Activate**. Repeat this action for the PowerVM® Managed System Overview, PowerVM® LPAR Overview, and PowerVM® VIOS Overview analyses.

For information about how to disable validation on certain parameters in the task, see [Turning off validation in a task \(on page 155\)](#).

1. Open the Server Automation domain.
2. From the Domain Panel, select **Virtualization > PowerVM > LPAR Operations > Configuration Management**, and select **PowerVM Create a logical partition (LPAR) Profile**.

- In the **Partition** section, add the name, ID, and profile details of the new LPAR profile.

HMC

Select the Hardware Management Console on which the LPAR that you want to use is located.

Managed System

Select the PowerVM® managed system on which the LPAR that you want to use is located.

Partition Name

Select the LPAR on which you want to create a profile. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).

Profile Name

Enter the name of the new profile. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).

- From the **Processing Mode** list, select whether you want to add `shared` or `dedicated` processors to the new LPAR profile. If you select `shared`, the managed system assigns partial processor units from the shared processor pool to the new LPAR profile. If you select `dedicated`, the managed system reserves entire physical processors that can be used only by the new LPAR profile.
- In the **Processing Settings** section, you can configure the processing settings for the new LPAR profile. If you select `shared` from the **Processing Mode** list, the task displays the following parameters: **Minimum Processing Units**, **Desired Processing Units**, and **Maximum Processing Units**. If you select `dedicated`, the task removes these parameters. Use the **Total Processors available** field to view how many processors are available on the managed system that you selected.

Minimum Processing Units

Enter the minimum number of physical processors that you want to use to create virtual processors for the new LPAR profile. Each processing unit is equivalent to the processing power of one processor. You can enter whole numbers or decimal numbers. For example, 2 or 2.5 processor units can be assigned to the partition.

Desired Processing Units

Enter the number of physical processors that you want to use to create virtual processors for the new LPAR profile. Each processing unit is equivalent to the processing power of one processor. You can enter whole numbers or decimal numbers. For example, 2 or 2.5 processor units can be assigned to the partition.

Maximum Processing Units

Enter the maximum number of physical processors that you want to use to create virtual processors for the new LPAR profile. Each processing unit is equivalent to the processing power of one processor. You can enter whole numbers or decimal numbers. For example, 2 or 2.5 processor units can be assigned to the partition.

Minimum Processing Units required

View the minimum processing units to ensure that you enter valid values in the **Minimum Processors** field.

Minimum Processors

Enter the minimum number of processors that you want to assign to the new LPAR profile. Enter a value that is greater than the minimum processing unit.

Desired Processors

Enter the number of processors that you want to assign to the new LPAR profile.

Maximum Processors

Enter the maximum number of processors that you want to assign to the new LPAR profile.

- In the **Memory Settings** section, enter the memory values for the new LPAR profile. Use the **Installed Memory** field and **Current Memory Available** field to determine how much memory is available to assign.

Minimum Memory

Select the minimum memory size that you want to set for the selected LPAR profile.

Desired Memory

Select the memory size that you want to set for the selected LPAR profile.

Maximum Memory

Select the maximum memory size that you want to set for the selected LPAR profile.

- In the **General Virtual Adapter Settings** section, enter the maximum virtual adapter values for the new LPAR.

Maximum Virtual Adapters

Enter the maximum number of virtual adapters that you want to connect to the new LPAR.

- In the **Virtual Ethernet Settings** section, enter values for the parameters in the Ethernet settings of the new profile.

Virtual Ethernet Adapter ID

Enter the virtual Ethernet adapter ID. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).

VLAN

Enter the ID of the (Virtual Local Area Network) VLAN that you want to configure with the Ethernet adapter.

- In the **Storage Settings** section, enter the storage values for the new LPAR. From the **Storage Type** list, select whether you want Virtual Small Computer System Interface (**vSCSI**) or Node Port ID Virtualization (**NPIV**) storage for the new LPAR profile.

a. If you select `vSCSI`, enter the following parameters.

▼ Storage Settings		
Validation	Parameter name	Parameter value
	*Storage Type:	vSCSI ▼
On <input type="checkbox"/>	*Client Adapter ID:	<input type="text"/>
	*VIO Server Partition:	gwccs-01 ▼
On <input type="checkbox"/>	*Server Adapter ID:	84
	Configure Redundant IO:	No ▼

	Configure Redundant IO:	Yes ▼
On <input type="checkbox"/>	*Redundant Client Adapter ID:	<input type="text"/>
	Redundant Server Partition:	No data retrieved ▼
On <input type="checkbox"/>	Redundant Server Adapter ID:	11

Client Adapter ID

Enter the ID of the LPAR client adapter that you want to use for the AIX® root disk of the new LPAR. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).

VIO Server Partition

Select the name of the virtual input/output server (VIOS) to which you want to add the adapter ID.

Server Adapter ID

Enter the adapter ID that you want to use on the VIOS for the root disk of the new LPAR. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).

Configure Redundant IO

Select whether you want to configure an alternative path for multi-path input/output (MPIO) redundancy. If you select `YES`, you must enter the values for the following parameters: **Redundant Client Adapter ID**, **Redundant Server Partition**, and **Redundant**

Server Adapter ID. The **Hard Disk** list is filtered and displays only hard disks that are configured for MPIO.

Redundant Client Adapter ID

Enter the ID of the redundant LPAR client adapter that you want to use for the root disk of the new LPAR.

Redundant Server Partition

Select the Redundant VIO Server that you want to configure to enable multi-path for the root disk of the new LPAR.

Redundant Server Adapter ID

Enter the redundant VIO server adapter ID that you want to use on the redundant VIO server for the root disk of the new LPAR.

b. If you select `NPIV`, enter the values for following parameters:

▼ Storage Settings		
Validation	Parameter name	Parameter value
	*Storage Type:	NPIV ▼
On <input type="checkbox"/>	*Client Adapter ID:	<input type="text"/>
	*VIO Server Partition:	gwccs-01 ▼
On <input type="checkbox"/>	*Server Adapter ID:	84
	Autogenerate WWPNs:	Yes ▼
	WWPN 1:	<input type="text"/>
	WWPN 2:	<input type="text"/>
	Configure Redundant IO:	No ▼

	Configure Redundant IO:	Yes ▼
On <input type="checkbox"/>	*Redundant Client Adapter ID:	<input type="text"/>
	Redundant Server Partition:	No data retrieved ▼
On <input type="checkbox"/>	Redundant Server Adapter ID:	11
	Redundant WWPN 1:	<input type="text"/>
	Redundant WWPN 2:	<input type="text"/>

Client Adapter ID

Enter the ID of the LPAR client adapter that you want to use for the root disk of the new LPAR.

VIO Server Partition

Select the name of the (VIOs) to which you want to add the adapter for the root disk of the new LPAR.

VIO Server Adapter ID

Enter the adapter ID that you want to use on the VIOS for the root disk of the new LPAR.

Autogenerate WWPNs

Select whether you want to automatically generate worldwide port names (WWPN) for the client adapter. The default setting is `YES`. If you select `NO`, you must enter port name in the **WWPN 1** and **WWPN 2** fields. If you select `NO` and you are configuring MPIO, you must also enter the **Redundant WWPN 1** and **Redundant WWPN 2** fields.

WWPN 1

Enter the first WWPN for the client adapter.

WWPN 2

Enter the second WWPN for the client adapter.

Configure Redundant IO

Select whether you want to configure an alternative path for multi-path input/output (MPIO) redundancy. If you select `YES`, the following parameters become visible:

Redundant Client Adapter ID, Redundant Server Partition, Redundant Server Adapter ID, Redundant WWPN 1, Redundant WWPN 2.

Redundant Client Adapter ID

Enter the unique ID of the redundant LPAR client adapter that you want to use.

Redundant Server Partition

Select the name of the redundant server to which you want to add the redundant client adapter ID.

Redundant Server Adapter ID

Enter the redundant adapter ID of the Virtual I/O Server that you want to use.

Redundant WWPN 1

Enter the first redundant WWPN for the client adapter.

Redundant WWPN 2

Enter the second redundant WWPN for the client adapter.

10. Click **Take Action**, and in the **Take Action** dialog box, target the LPAR on which you want to create a profile, and click **OK**.

In the **Action: Power VM Create LPAR Profile** window, you can view the progress of the action. When the **Status** changes to **Complete**, the new LPAR profile is created.

Modifying an LPAR Profile

Using the **PowerVM Modify a Logical Partition (LPAR) Profile** task, you can modify the profile name, the processing settings, and the memory settings of a logical partition (LPAR) profile.

You must activate the following analysis:

- PowerVM® HMC Overview
- PowerVM® LPAR Overview
- PowerVM® Managed System Overview

To activate the analysis, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > PowerVM > Setup and Maintenance** and select **PowerVM HMC Overview**. In the **Analysis: PowerVM HMC Overview** pane, select **Activate**. Repeat this action for the PowerVM® Managed System Overview and PowerVM® LPAR Overview analyses.

For information about how to disable validation on certain parameters in the task, see [Turning off validation in a task \(on page 155\)](#).

1. Open the Server Automation domain.
2. From the Domain Panel, select **Virtualization > PowerVM > LPAR Operations > Configuration Management** and select **PowerVM Modify a Logical Partition (LPAR) Profile**.
3. In the **Partition** section, select the LPAR that you want to modify and enter any changes to the following parameters:

HMC

Select the Hardware Management Console on which the LPAR that you want to modify is located.

Managed System

Select the PowerVM® managed system on which the LPAR that you want to modify is located.

Partition Name

Select the name of the LPAR that you want to modify. Use the **Partition ID** field to verify that the LPAR that you select is correct. To override the validation that is provided on the parameter,

select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).

Profile Name

Select the LPAR Profile that you want to modify. To override the validation that is provided on the parameter, in the **Validation** column for the parameter and select **OFF**. For more information, see [Turning off validation in a task \(on page 155\)](#).

New Profile Name

Enter a new name for the profile that you selected from the **Profile Name** list. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).

4. From the **Processing Mode** list, select whether you want to add `shared` or `dedicated` processors. If you select `shared`, the managed system assigns partial processor units from the shared processor pool. If you select `dedicated`, the managed system reserves entire physical processors that can be used only by the selected LPAR profile.
5. In the **Processing Settings** section, you can modify the processing settings of the selected LPAR. If you select `shared`, the task displays the following extra parameters: **Minimum Processing Units**, **Desired Processing Units**, and **Maximum Processing Units**. If you select `dedicated`, the task hides these three parameters. Use the **Total Processors available** field to view how many processors are available on the managed system that you selected.

Minimum Processing Units

Enter the minimum number of physical processors that you want to use to create virtual processors. Each processing unit is equivalent to the processing power of one processor. You can enter whole numbers or decimal numbers. For example, 2 or 2.5 processor units can be assigned to the partition.

Desired Processing Units

Enter the number of physical processors that you want to use to create virtual processors. Each processing unit is equivalent to the processing power of one processor. You can enter whole numbers or decimal numbers. For example, 2 or 2.5 processor units can be assigned to the partition.

Maximum Processing Units

Enter the maximum number of physical processors that you want to use to create virtual processors. Each processing unit is equivalent to the processing power of one processor. You can enter whole numbers or decimal numbers. For example, 2 or 2.5 processor units can be assigned to the partition.

Minimum Processing Units required

View the minimum processing units to ensure that you enter valid values in the **Minimum Processors** field.

Minimum Processors

Enter the minimum number of processors that you want to assign to the LPAR profile. Enter a value that is greater than the minimum processing units. If you selected Shared, these processors are virtual. If you selected Dedicated, these processors are physical.

Desired Processors

Enter the number of virtual processors that you want to assign to the LPAR profile. If you selected Shared, these processors are virtual. If you selected Dedicated, these processors are physical.

Maximum Processors

Enter the maximum number of virtual processors that you want to assign to the LPAR profile. If you selected Shared, these processors are virtual. If you selected Dedicated, these processors are physical.

6. In the **Memory Settings** section, enter the changes that you want to make to the memory settings. Use the **Installed Memory** field **Current Memory Available** fields to determine how much memory is available to assign.

Minimum Memory

Select a minimum memory size for the selected LPAR.

Desired Memory

Select a memory size that you want to set for the selected LPAR.

Maximum Memory

Select a maximum memory size for the selected LPAR.

7. Click **Take Action**, and in the **Take Action** dialog box, select the LPAR that you want to modify, and click **OK**.

In the **Action: PowerVM Modify a Logical Partition (LPAR) Profile** window, you can view the progress of the action. When the **Status** changes to **Complete**, the LPAR profile is modified.

Adding a disk to an LPAR

Using the **PowerVM Add disk to a Logical Partition (LPAR)** task, you can add a disk to an existing logical partition (LPAR).

You must activate the following analyses:

- PowerVM® HMC Overview
- PowerVM® LPAR Overview
- PowerVM® Managed System Overview
- PowerVM® VIOS Overview

To activate the analyses, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > PowerVM > Setup and Maintenance** and select **PowerVM HMC Overview**. In the **Analysis: PowerVM HMC Overview** pane, select **Activate**. Repeat this action for the PowerVM® Managed System Overview, PowerVM® LPAR Overview, and PowerVM® VIOS Overview analyses.

For information about how to disable validation on certain parameters in the task, see [Turning off validation in a task \(on page 155\)](#).

1. Open the Server Automation domain.
2. From the Domain Panel, select **Virtualization > PowerVM > LPAR Operations > Configuration Management** and select **PowerVM Add disk to a Logical Partition (LPAR)**.
3. In the **Partitions** section, enter the following parameters to select the LPAR to which you want to add a disk:

HMC

Select the Hardware Management Console on which the LPAR to which you want to add a disk is located.

Managed System

Select the managed system on which the LPAR to which you want to add a disk is located.

Partition Name

Select the name of the LPAR to which you want to add a disk. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).

4. In the **Storage Settings** section, enter the storage values for the new LPAR. From the **Storage Type** list, select whether you want Virtual Small Computer System Interface (vSCSI) or Node Port ID Virtualization (NPIV) storage type for the new LPAR.

- a. If you select vSCSI, enter values for the following parameters.

Storage Settings		
Validation	Parameter name	Parameter value
	*Storage Type:	vSCSI
	*vSCSI Type:	Hard Disk
On <input type="checkbox"/>	*Client Adapter ID:	4
	*VIO Server Partition:	gwccs-01
On <input type="checkbox"/>	*VIO Server Adapter ID:	64
	Configure Redundant IO:	No
	Hard Disk:	hdisk3 (00f759ea4b52f7cf)
	Disk Unique ID:	2811350000393C84BCBCC09MBF2300RC03IBMsas
On <input type="checkbox"/>	Disk Description:	SAS Disk Drive
	*Device Name:	

vSCSI Type

Select whether you want to add a `Hard Disk` or `Logical Volume` storage for the new disk of the LPAR. Depending on your selection, the task displays different parameters. If you select `Hard Disk`, you must enter values for the following parameters: **Configure Redundant IO, Hard Disk**, parameters. If you select `Logical volume`, you must enter the values for the following parameters: **Logical Volume Group, Logical Volume Size (GB)**, and **Logical Volume Name**.

Client Adapter ID

Enter the ID of the LPAR client adapter that you want to use for the new disk. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).

VIO Server Partition

Select the name of the virtual input/output server (VIOS) to which you want to add the adapter ID.

VIO Server Adapter ID

Enter the adapter ID that you want to use on the VIOS for the new disk. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).

Configure Redundant IO

Select whether you want to configure an alternative path for multi-path input/output (MPIO) redundancy. If you select **YES**, you must enter the values for the following parameters: **Redundant Client Adapter ID, Redundant Server Partition**, and **Redundant Server Adapter ID**. The **Hard Disk** list is filtered and displays only hard disks that are configured for MPIO.

Redundant Client Adapter ID

Enter the ID of the redundant LPAR client adapter that you want to use.

Redundant Server Partition

Select the Redundant VIO Server that you want to configure to enable multi-path for the new disk.

Redundant Server Adapter ID

Enter the redundant VIO server adapter ID that you want to use on the redundant VIO server for the new disk.

Hard Disk

Select the physical disk to which you want to attach to the vSCSI adapter. Hard disks that are associated to volume groups or LPARs are not listed. Hard disks without a valid physical volume ID (PVID) are not listed.

Disk Unique ID

View the unique ID of the hard disk that you selected.

Disk Description

View the description of the hard disk. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).

Logical Volume Group

Select the logical volume group from which you want to create storage for the new SCSI disk.

Logical Volume Size (GB)

Enter the size, in gigabytes, that you want to allocate to the new SCSI disk.

Logical Volume Name

Enter a name for the logical volume.

Device Name

Enter a virtual target name that the VIO server associates with the hard disk.

b. If you select **NPIV**, enter the values for following parameters:

▼ Storage Settings		
Validation	Parameter name	Parameter value
	*Storage Type:	NPIV ▼
On <input type="checkbox"/>	*Client Adapter ID:	4
	*VIO Server Partition:	gwccs-01 ▼
On <input type="checkbox"/>	*VIO Server Adapter ID:	64
	Autogenerate WWPNs:	Yes ▼
	WWPN 1:	
	WWPN 2:	
	*Primary FC Port:	fcs0 ▼
	Configure Redundant IO:	No ▼

Client Adapter ID

Enter the ID of the LPAR client adapter that you want to use for the new disk.

VIO Server Partition

Select the name of the VIOS to which you want to add the adapter for the new disk.

VIO Server Adapter ID

Enter the adapter ID that you want to use on the VIOS for the new disk.

Autogenerate WWPNs

Select whether you want to automatically generate worldwide port names (WWPN) for the client adapter. The default setting is **Yes**. If you select **No**, you must enter port name in the **WWPN 1** and **WWPN 2** fields. If you select **No** and are configuring MPIO, you must also enter values for the **Redundant WWPN 1** and **Redundant WWPN 2** parameters.

WWPN 1

Enter the first WWPN for the client adapter.

WWPN 2

Enter the second WWPN for the client adapter.

Primary FC Port

Select the Fibre Channel port that you want to use as the primary port.

Configure Redundant IO

Select whether you want to configure an alternative path for multi-path input/output (MPIO) redundancy. If you select **Yes**, the following parameters become visible:

Redundant Client Adapter ID, Redundant Server Partition, Redundant Server Adapter ID, Redundant WWPN 1, Redundant WWPN 2, and Secondary FC Port.

Redundant Client Adapter ID

Enter the unique ID of the redundant LPAR client adapter that you want to use.

Redundant VIO Server Partition

Select the name of the redundant server to which you want to add the redundant client adapter ID.

Redundant Server Adapter ID

Enter the redundant adapter ID of the Virtual I/O Server that you want to use.

Redundant WWPN 1

Enter the first redundant WWPN for the client adapter.

Redundant WWPN 2

Enter the second redundant WWPN for the client adapter.

Secondary FC Port

Select a secondary Fibre Channel port.

5. Click **Take Action**, and in the **Take Action** dialog box, select the LPAR to which you want to add a disk, and click **OK**.

In the **Action: PowerVM Add disk to a Logical Partition (LPAR)** window, you can view the progress of the task. When the **Status** changes to **Complete**, the disk is added to the LPAR.

You must activate and deactivate the LPAR for the new disk to be discovered by the operating system. You can also run the command `cfgmgr` on the AIX® operating system on the LPAR.

State Management Tasks

Use these tasks to activate and deactivate individual or groups of LPARs. You can also netboot an LPAR.

Activating a logical partition

Using the **PowerVM Activate a Logical Partition** task, you can activate a specific profile instance of a selected LPAR.

You must also activate the following analyses:

- PowerVM® HMC Overview
- PowerVM® Managed System Overview
- PowerVM® LPAR Overview

To activate the analyses, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > PowerVM > Setup and Maintenance** and select **PowerVM HMC Overview**. In the **Analysis: PowerVM HMC Overview** pane, select **Activate**. Repeat this action for the PowerVM® Managed System Overview and PowerVM® LPAR Overview analyses.

For information about how to disable validation on parameters in the task, see [Turning off validation in a task \(on page 155\)](#).

1. Open the Server Automation domain.
2. From the Domain Panel, select **Virtualization > PowerVM > LPAR Operations > State Management** and select **PowerVM Activate a Logical Partition**.
3. From the **HMC** list, select the Hardware Management Console on which the LPAR that you want to activate is located.
4. From the **Managed System** list, select the PowerVM® managed system on which the LPAR that you want to activate is located.
5. From the **LPAR Name** list, select the LPAR that you want to activate. In the **LPAR State** field, you can view the Power® State of the LPAR that you select. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).
6. From the **LPAR Profile** list, select the profile of the LPAR that you want to activate. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).
7. Click **Take Action**. In the **Take Action** dialog box, select the LPAR that you want to activate, and click **OK**.

In the **Action: PowerVM Activate a Logical Partition** window, you can view the progress of the action. When the **Status** changes to **Complete**, the LPAR is activated.

Deactivating a logical partition

Using the **PowerVM Deactivate a Logical Partition** task, you can deactivate a selected LPAR.

You must activate the following analyses:

- PowerVM® HMC Overview
- PowerVM® Managed System Overview
- PowerVM® LPAR Overview

To activate the analyses, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > PowerVM > Setup and Maintenance** and select **PowerVM HMC Overview**. In the **Analysis: PowerVM HMC Overview** pane, select **Activate**. Repeat this action for the PowerVM® Managed System Overview and PowerVM® LPAR Overview analyses.

For information about how to disable validation on certain parameters in the task, see [Turning off validation in a task \(on page 155\)](#).

1. Open the Server Automation domain.
2. From the navigation tree in the Server Automation domain, select **Virtualization > PowerVM > LPAR Operations > State Management** and select **PowerVM Deactivate a Logical Partition (LPAR)**.
3. From the **HMC** list, select the Hardware Management Console on which the LPAR that you want to deactivate is located.
4. From the **Managed System** list, select the PowerVM® managed system on which the LPAR that you want to deactivate is located.
5. From the **LPAR Name** list, select the LPAR that you want to deactivate. In the **LPAR State** field, you can verify whether LPAR that you select is activated or deactivated. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).
6. From the **Shutdown Option** list, select whether you want to perform a hard or soft shutdown of the LPAR.
7. From the **Immediate** list, select whether you want the LPAR to deactivate immediately or with a delay of several minutes. When you complete the form, click **Take Action**.
8. In the **Take Action** dialog box, select the LPAR that you want to deactivate and click **OK**.

In the **PowerVM Deactivate a Logical Partition** window, you can view the progress of the action. When the **Status** changes to **Complete**, the LPAR is deactivated.

Activating multiple LPARs

Using the **PowerVM Activate Multiple Logical Partitions (LPARS)** task, you can power on multiple LPARs at one time from the BigFix console.

1. Open the Server Automation domain.
2. In the Domain Panel, select **Virtualization > PowerVM > LPAR Operations > State Management** and select **PowerVM Activate Multiple Logical Partitions (LPARS)**.
3. From the **LPAR Configuration** list, select **Current Configuration** to activate each LPAR according to its current configuration, or select **Specific Profile** to enter a profile name that you want to activate on each LPAR.
4. In the **Profile Name** field, enter the name of the profile that you want to activate. Profile names are case-sensitive.
5. Click **Take Action**. In the **Take Action** dialog box, select the virtual machines that you want to activate. To select multiple virtual machines, hold the control key while you select more than one virtual machine. Click **OK**.

In the **Action: PowerVM Activate Multiple Logical Partitions (LPARS)** window, you can view the progress of each of the LPARs that you selected to activate.

Deactivating multiple LPARs

Using the **PowerVM Deactivate Multiple Logical Partitions (LPARS)** task, you can deactivate multiple LPARs from within the BigFix console.

1. Open the Server Automation domain.
2. In the Domain Panel, select **Virtualization > PowerVM > LPAR Operations > State Management** and select **PowerVM Deactivate Multiple Logical Partitions (LPARS)**.
3. From the **Shutdown Option** list, select whether you want a hard or soft shutdown of the LPARs.
4. From the **Immediate** list, select whether you want to deactivate the LPAR immediately or later.
5. Click **Take Action**. In the **Take Action** dialog box, select the LPARs that you want to deactivate. To select more than one LPAR, hold the Ctrl key and select multiple LPARs, and click **OK**.

In the **Action: PowerVM Deactivate Multiple Logical Partitions (LPARS)** window, you can view the progress of each of the LPARs that you selected to deactivate.

Netbooting a logical partition

When you create a logical partition (LPAR), you must create a NIM client for the LPAR and then netboot the LPAR.

Using the **PowerVM Netboot a Logical Partition (LPAR)** task, you can netboot an existing LPAR.

If you do not have a NIM client for the LPAR that you want to netboot, create a NIM client with the **AIX NIM Create a Client for a Logical Partition (LPAR) on a NIM Master Server** task. For more information, see [Creating a NIM client for an LPAR on a NIM server \(on page 116\)](#) task.

You must activate the following analyses:

- PowerVM® HMC Overview
- PowerVM® Managed System Overview
- PowerVM® LPAR Overview
- AIX® NIM Overview

To activate the PowerVM® analyses, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > PowerVM > Setup and Maintenance** and select **PowerVM HMC Overview**. In the **Analysis: PowerVM HMC Overview** pane, select **Activate**. Repeat this action for the PowerVM® Managed System Overview and PowerVM® LPAR Overview analyses.

To activate the AIX® NIM analysis, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > AIX NIM > Setup and Maintenance** and select **AIX NIM Overview**. In the **Analysis: AIX NIM Overview** pane, select **Activate**.

For information about how to disable validation on certain parameters in the task, see [Turning off validation in a task \(on page 155\)](#).

1. Open the Server Automation domain.
2. In the Domain Panel, select **Virtualization > PowerVM > LPAR Operations > State Management** and select the **PowerVM Netboot a Logical Partition (LPAR)** task.
3. In the **NIM Details** section, enter values for the following parameters.

NIM Server

Select the NIM server from which you want the LPAR to netboot.

NIM Network

Select a NIM network from which you want the LPAR to netboot. To override the validation that is provided on the parameter, in the **Validation** column for the parameter and select **OFF**. For more information, see [Turning off validation in a task \(on page 155\)](#).

NIM IP

Enter the IP address of the LPAR that you want to netboot.

4. In the **LPAR Details** section, enter values for the following parameters.

HMC

Select the Hardware Management Console on which the LPAR that you want to netboot is located.

Managed System

Select the managed system that hosts the LPAR that you want to netboot.

LPAR Name

Select the LPAR that you want to netboot. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).

LPAR Profile

Select the name of the LPAR profile that you want to netboot. To override the validation that is provided on the parameter, select **OFF** in the **Validation** column for the parameter. For more information, see [Turning off validation in a task \(on page 155\)](#).

LPAR IP

Enter the IP that you want to assign to the selected LPAR.

LPAR Gateway

You can view the gateway IP address of the LPAR that you want to netboot. You can also enter a different NIM IP in this field.

LPAR Subnet

You can view the subnet mask for the LPAR that you want to netboot. You can also enter a different NIM IP in this field.

5. In the **Completion Test Details**, enter values for the following parameters.

Test SSH Connection

Select whether you want to test if SSH is functional when the LPAR netboots. If you select `true`, enter values for the **User Name** and **Password** parameters.

User Name

Enter the user name with which you want to connect with SSH to the LPAR server.

Password

Enter the password that corresponds to the user name with which you want to test the SSH connection to the LPAR server.

6. Click **Take Action**. In the **Take Action** dialog box, select the LPAR that you want to netboot, and click **OK**.

In the **Action: PowerVM Netboot a Logical Partition (LPAR)** window, you can view the progress of the action. When the **Status** changes to **Complete**, the netboot of the LPAR is complete.

Sample Automation Plans

Server Automation provides four sample content Automation Plans for PowerVM®.

Ensure that the Automation Plan Engine is installed. For more information, see Installation roadmap for Server Automation components.

You must deploy and configure a Management Extender for PowerVM® and for AIX® NIM on the BigFix server. For more information, see PowerVM® [Setup and Maintenance \(on page 118\)](#) and AIX® NIM [Setup and Maintenance \(on page 111\)](#).

To deploy the BigFix agent to the new LPAR, you must install the BigFix agent application on the BigFix server. For more information, see the wiki page [BigFix Agent Deployment Wizard \(stand-alone\)](#).

Sample Plan for Creating an LPAR

BigFix Server Automation provides a sample Automation Plan for building a functioning PowerVM® logical partition. Using this Automation Plan, you can provision a logical partition (LPAR) on a PowerVM® Managed System, install an operating system on the LPAR, netboot the LPAR, and deploy a BigFix agent to the LPAR.

1. Open the Server Automation domain.
2. From Domain Panel, select **Automation Plans**.
3. In the **Automation Plans** dashboard, enter `145` in the filter text box and press the Enter key.
4. From the **Automation Plans** list select the **Build AIX LPAR Sample** Automation Plan.
5. Click **Copy** to copy the Automation Plan and then save the copy that you have just created.
6. To run the Automation Plan, click **Take Action**. The following table shows each step of the Plan and provides links to more information about each step.

Table 23. Steps in Sample Plan

Step	Task ID	Name	More Information
1	1018	PowerVM® Create a Logical Partition (LPAR)	Creating a Logical Partition (LPAR) (on page 125)
2	3020	PowerVM® Create a NIM client for a Logical Partition (LPAR) on a NIM Master Server	Creating a NIM client for an LPAR on a NIM server (on page 116)
3	1019	PowerVM® Netboot a Logical Partition (LPAR)	Netbooting a logical partition (on page 148)
4	1581	Deploy BigFix Agent	BigFix Agent Deployment Wizard (stand-alone)

7. Click **OK** to run the Plan.

The Automation Plan runs.

Sample Plan for LPAR with two disks

BigFix for Server Automation provides a sample Automation Plan for building a functioning PowerVM® logical partition (LPAR) and adding hard disks. Using this Automation Plan, you can provision an LPAR on a PowerVM® Managed System, install an operating system image, netboot the LPAR, deploy a BigFix agent, and add a second hard disk to the LPAR.

1. Open the Server Automation domain.
2. From the Domain Panel, select **Automation Plans**.
3. In the **Automation Plans** dashboard, enter `146` in the filter text box and press the Enter key.
4. From the **Automation Plans** list, select the **Build AIX LPAR with 2 disks Sample** Automation Plan.
5. Click **Copy** to copy the Automation Plan and then save the copy that you have just created.

6. To run the Automation Plan, click **Take Action**. The following table shows each step of the Plan and provides links to more information about each step.

Table 24. Steps in Sample Plan

Step	ID	Task Name	More Information
1	1018	PowerVM® Create a Logical Partition (LPAR)	Creating a Logical Partition (LPAR) (on page 125)
2	3020	PowerVM® Create a NIM client for a Logical Partition (LPAR) on a NIM Master Server	Creating a NIM client for an LPAR on a NIM server (on page 116)
3	1019	PowerVM® Netboot a Logical Partition (LPAR)	Netbooting a logical partition (on page 148)
4	1581	Deploy Endpoint Manager Agent	See the BigFix Wiki BigFix Agent Deployment Wizard (stand-alone)
5	1026	PowerVM® Add disk to a Logical Partition (LPAR)	Adding a disk to an LPAR (on page 141)

7. Click **OK** to run the Plan.

The Automation Plan runs.

Sample Plan for building an LPAR with DB2®

BigFix Server Automation provides a sample Automation Plan for building a functioning logical partition (LPAR) and installing DB2®. Using this Automation Plan, you can provision an LPAR on a PowerVM® Managed System, install an operating system image, netboot the LPAR, deploy a BigFix agent, and install DB2® on the LPAR.

1. Open the Server Automation domain.
2. From the Domain Panel, select **Automation Plans**.
3. In the **Automation Plans** dashboard, enter `147` in the filter text box and press the Enter key.
4. From the **Automation Plans** list, select the **Build AIX LPAR DB2 Server Sample** Automation Plan.
5. Click **Copy** to copy the Automation Plan and then save the copy that you created.
6. To run the Automation Plan, click **Take Action**. The following table shows each step of the Plan and provides links to more information about each step.

Table 25. Steps in Sample Plan

Task			
Step	ID	Name	More Information
1	1018	PowerVM® Create a Logical Partition (LPAR)	Creating a Logical Partition (LPAR) (on page 125)
2	3020	PowerVM® Create a NIM client for a Logical Partition (LPAR) on a NIM Master Server	Creating a NIM client for an LPAR on a NIM server (on page 116)
3	1019	PowerVM® Netboot a Logical Partition (LPAR)	Netbooting a logical partition (on page 148)
4	1581	Deploy BigFix Agent	For more information, see the BigFix wiki BigFix Agent Deployment Wizard (stand-alone)
5	23	Install IBM® DB2® UDB Enterprise Server Edition 9.x on RHEL, SLES and IBM® AIX®	For more information, see Server Automation Middleware content .

7. Click **OK** to run the Plan.

The Automation Plan runs.

Sample Plan for AIX® LPAR WebSphere® Server

Server Automation provides a sample Automation Plan for building a functioning logical partition with Websphere Application Server installed. Using this Automation Plan, you can provision a logical partition (LPAR) on a PowerVM® Managed System, install an operating system image, netboot the LPAR, deploy a BigFix agent, and install Websphere Application Server on the LPAR.

1. Open the Server Automation domain.
2. From the Domain Panel, select **Automation Plans**.
3. In the **Automation Plans** dashboard, enter `148` in the filter text box and press the Enter key.
4. From the **Automation Plans** list select the **Build LPAR Websphere Server Sample** Automation Plan.
5. Click **Copy** to copy the Automation Plan and then save the copy that you have just created.
6. To run the Automation Plan, click **Take Action**. The following table shows each step of the Plan and provides links to more information about each step.

Table 26. List of Steps in Sample Plan

Task			
Step	ID	Name	More Information
1	1018	PowerVM® Create a Logical Partition (LPAR)	Creating a Logical Partition (LPAR) (on page 125)

Task			
Step	ID	Name	More Information
2	3020	PowerVM® Create a NIM client for a Logical Partition (LPAR) on a NIM Master Server	Creating a NIM client for an LPAR on a NIM server (on page 116)
3	1019	PowerVM® Netboot a Logical Partition (LPAR)	Netbooting a logical partition (on page 148)
4	1581	Deploy Endpoint Manager Agent	For more information on deploying the BigFix agent, see the BigFix wiki page BigFix Agent Deployment Wizard (stand-alone)
5	43	Install IBM® WebSphere® Application Server (Network Deployment) 7.x on RHEL,SLES and IBM® AIX®.	For more information, see Server Automation Middleware content Server Automation middleware content (on page 217)

7. Click **OK** to run the Plan

The Automation Plan runs.

Management Extender Log Viewer

The **Management Extender Log Viewer** dashboard provides information about each Virtualization task that you run. In the dashboard, you can view a high-level overview of the action logs. Each log entry contains a link to where you can find the original action window. Each entry also contains a link to the log file.

You must activate the following analyses:

- Management Extender Log Files Information
- Management Extender Asynchronous Action Results

To activate the analysis, navigate to the Domain Panel of the Server Automation domain and select **Virtualization > Management Extender Analyses**. In the **Management Extender Analyses** list, select **Management Extender Log Files Information**. In the **Management Extender Log Files Information** panel, click **Activate**. Repeat this action to activate the **Management Extender Asynchronous Action Results** analysis.

. Records are cleared every four days.

To access the **Management Extender Log Viewer**, open the **Server Automation** domain. In the **Domain Panel** of the **Server Automation** domain, select **Virtualization > PowerVM > Management Extender Log Viewer**.

The dashboard provides the following details for each action:

- Action ID: the ID that corresponds with the action in the BigFix console.
- Computer Name: the computer on which the action is targeted. A hyperlink to the Computer in the BigFix console is included.
- Management Extender: the management extender plug-in with which the PowerVM® system is configured.
- Status: Whether the action completed (fixed), is running or failed.
- Description: the task name.
- Action Link: a link to the **Action** window through this link.
- Logs: a link to the log file. The log file is formatted for ease of use. The log file contains a table with two columns. The **Level** column indicates whether the message is an error message or informational message. The **Message** column displays the log message that is found.

Turning off validation in a task

Some of the Virtualization Tasks within the Server Automation domain contain a Validation button which you can use to disable validation and enter your own data for some of the parameters.

The Virtualization Tasks in the Server Automation domain contain forms which are automatically populated with data from external systems which you must complete to take action. However, on occasion, the data can either be out of date, or you might need to work with data that does not currently exist but is scheduled to exist at a specific time in the future. If you must work with data that is not populated within the Task, you can disable validation.

You can check whether you can disable validation in the **Validation** column in the Task. If there is an **ON/OFF** button in the **Validation** column for the parameter that you want to work with, you can select **OFF** to disable validation. For example, if you want to modify a virtual machine that is powered on but is scheduled to be powered off, you can select **OFF** on the button in the **Validation** column for **Power State** and schedule the Task to take action when the virtual machine is powered off.

For some parameters, you can both disable validation and enter your own values. For example, if you want to modify a virtual machine that is not in the **Virtual Machine Name** list because it does not exist, but is scheduled to be created, you can select **OFF** on the button in the **Validation** column and enter the name of the virtual machine that you want to modify.



Important: Disable validation only if you can ensure that your data is correct. When you disable validation on a parameter and take action, the BigFix console does not verify whether the parameter contains valid data. If invalid data is used, the Task fails in VMware.

If you disable validation for a parameter, other parameters which are dependent on that parameter might be affected. For example, in the **VMware Modify Virtual Machine** Task, if you disable the **Virtual Machine Name** parameter, the **Power State** and the **Disk size** parameters are also disabled. The validation on these parameters is disabled because the BigFix console cannot validate the power state or the disk size of a virtual machine that is not listed.

Chapter 4. Configuring your system and best practices

This section describes how the BigFix architecture is relevant for Server Automation. It also describes how Server Automation can affect BigFix performance.

When configured correctly, Server Automation does not adversely affect BigFix performance. However, be aware of the potential impact that Server Automation action sequencing can have on system performance. You also need to know how the BigFix architecture affects Server Automation functionality. For example, because of the refresh interval between Web Reports and the server, there is a delay of 15 seconds between when you create an Automation Plan and when that Automation Plan is available in the Automation Plan Engine.

The configuration information described here assumes that you have existing knowledge of the BigFix platform and performance tuning. If you are not familiar with BigFix performance and tuning, first read the BigFix documentation on performance, deployments, and troubleshooting.

Overview

BigFix Lifecycle Server Automation is built on the BigFix platform. Server Automation uses the key BigFix strengths and advantages. It is also subject to the BigFix architecture capacity considerations and latency. Read the configuration documentation included here to understand how BigFix architecture is relevant to BigFix Lifecycle Server Automation and how you can configure your system for optimum performance. This documentation also describes how Server Automation functionality influences BigFix system performance.

Server Automation provides the capability to sequence Fixlets, Tasks, and Baselines across multiple endpoints. You sequence Fixlets, Tasks, and Baselines across endpoints by creating and running an Automation Plan. Automation Plans are processed by the Automation Plan Engine. When you run an Automation Plan, new actions are created on the BigFix system. An action is created for the Automation Plan and the Automation Plan Engine creates an action for each step in the Automation Plan. When the step has completed the Automation Plan Engine stops the action. In addition, if you schedule an Automation Plan and use the **Prefetch downloads** feature to download content in advance of the Automation Plan execution, an additional action is created for each step in the Automation Plan that contains a prefetch or download statement. You might need to monitor the number of open actions to ensure that system performance is not adversely affected. In a traditional BigFix environment, open actions are created manually by the console operator. Because the Automation Plan Engine automatically creates open actions, you need to be aware of the potential impact on system performance if there are too many open actions on the system. Similarly, depending on the number of Automation Plans that you create, the Automation Plan Engine can potentially leave a large number of stopped and expired actions. Therefore, you might need to monitor the number of open, closed, and expired actions on the system and take action.

There are some latency and refresh considerations that influence Server Automation behaviour and you need to understand these factors to use Server Automation effectively. For example, when you create an Automation Plan, the Automation Plan is not immediately available in the Automation Plan Engine. Normally, there is a 15-second delay because of the refresh interval between Web Reports and the BigFix server.

This documentation assumes that you are familiar with the BigFix platform and architecture and that you are experienced in using BigFix. If you are not familiar with BigFix, read the following BigFix documentation before you read this documentation on Server Automation:

- [BigFix Configuration](#)
- [The Network Traffic Guide](#)
- [Performance Configurations Guide](#)

Server Automation components

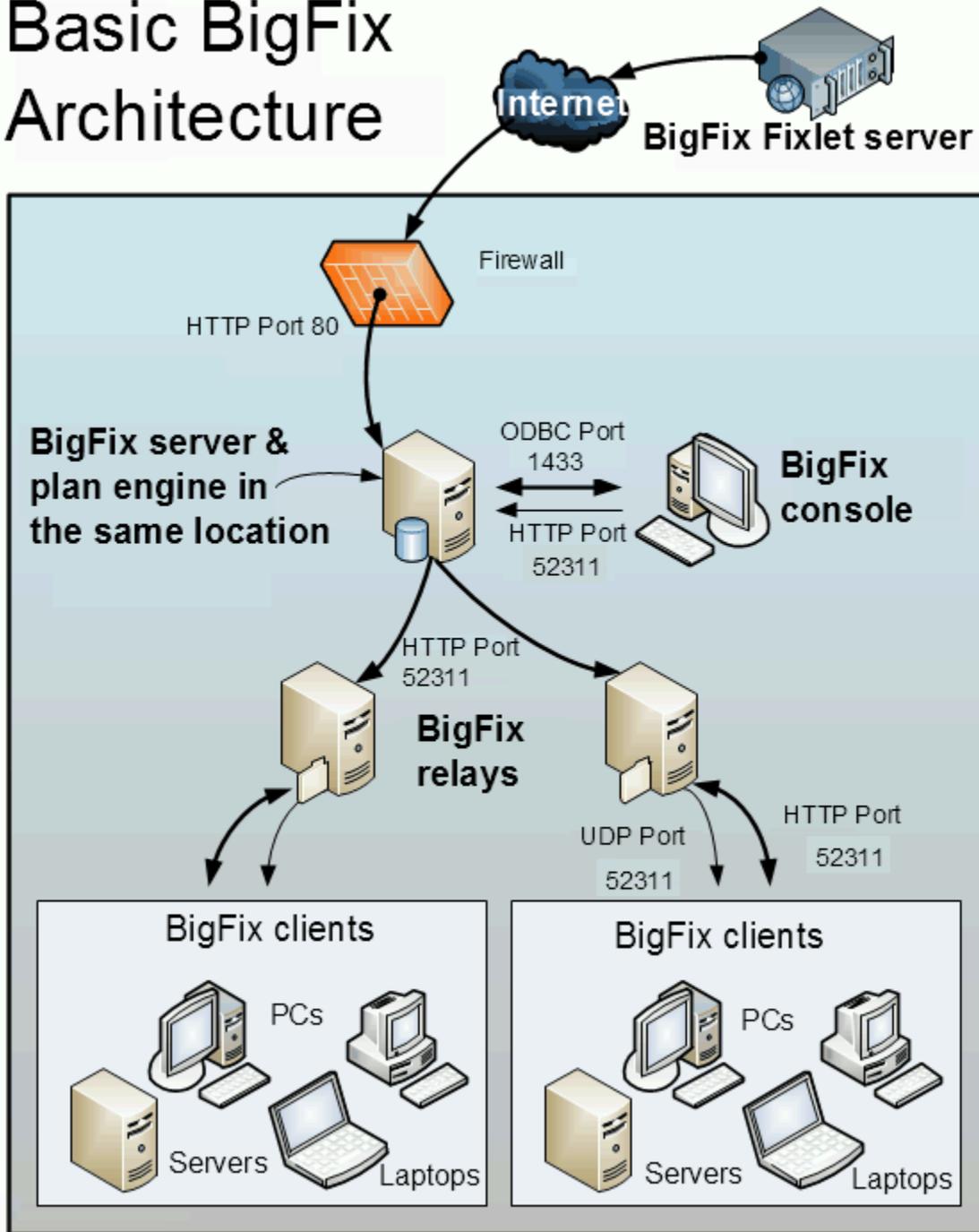
BigFix Lifecycle Server Automation uses BigFix technology and is subject to the same latency considerations as BigFix. Read the information in this section to learn about the inherent latency and how it affects Server Automation.

Review the following information to understand how latency can affect your Server Automation plans:

- When you create a plan, there is approximately 15 seconds delay from the time you create the plan to the time it is available in the Automation Plan Engine. This delay is caused by the refresh interval between Web Reports and the server, the recommended default and the minimum delay is 15 seconds.
- There is a delay between the time a result from an endpoint is stored in the BigFix database to when it is available to the Automation Plan Engine. This can be up to 15 seconds (assuming the Web Reports refresh interval is 15 seconds). A similar delay occurs for results being displayed in the console.
- There is a three-second delay for each relay to communicate with the BigFix server. This value cannot be tuned or improved. Relays transmit their responses every three seconds. The more relays that you have on your system, the longer it takes for results to be returned from the endpoints to the server and the Automation Plan Engine.
- BigFix uses the `https` protocol for communication between the server and the relays.
- BigFix uses the UDP protocol for communication between the relays and BigFix client. Though not a strict requirement, if you do not use the UDP protocol, the alternative is http polling by the agent, which is infrequent.

The following diagram displays the main components in the BigFix architecture. Server Automation uses the same communication protocols and components.

Basic BigFix Architecture



For more information about the Server Automation architecture, see [Server Automation architecture \(on page 23\)](#).

Enhancing the performance of Server Automation

To ensure that you minimize the impact on performance, you need to understand the limits and capacity constraints of the BigFix architecture. This section describes how the BigFix capacity constraints are relevant to BigFix Lifecycle Server Automation. Use the information described here to ensure that your system is tuned for optimum performance.

Actions

To ensure that your system is configured for optimum performance, you need to complete maintenance tasks on existing actions in the system. A large number of actions on the system affects system performance. The number of open actions on the system affects system resources. Closed actions also use system resources, as the system reports on all closed actions.

Try to ensure that the maximum number of open actions on the system does not exceed 2,500. As the number of open actions on the system exceeds 2,500, system performance is adversely affected. It is important to note that the Automation Plan Engine automatically generates actions as it processes the Automation Plans that you create. Therefore, you might need to check the number of open actions on the system more regularly than if you were creating actions manually.



Important: There is a potential performance impact associated with using the **Enable prefetching** option because an additional action is created for each step that requires software downloads. The recommended maximum number of open actions on the system is 2,500. For any given Automation Plan, an action is open for the Automation Plan and also for each individual step in the Automation Plan. If you use the **Enable prefetching** option, additional actions are created and opened for each step that requires software downloads.

To check the number of open actions on the system, complete the following:

1. From the BigFix console, click the **BigFix Management** domain.
2. Click **Deployment Health Checks**.
3. Navigate to the **Deployment Optimization** section.
4. Expand the **Open Actions** node. The system provides information about the number of actions currently open. Review the results and identify if you need to take action.

Try to ensure that the number of closed actions on the system does not exceed 10,000. To check the number of closed actions on the system, complete the following:

1. From the BigFix console, click the **BigFix Management** domain.
2. Click **Deployment Health Checks**.
3. Navigate to the **BES Console Health** section.
4. Expand the **Stopped And Expired Actions** section. Review the results and decide if you need to take action.

To reduce the number of closed actions, you can delete the actions from the server. However, when you delete actions from the server, they remain on the database. To completely remove closed actions, you can purge the actions from the system.

When you are designing your Automation Plan, make sure that you design your action applicability so that you are targeting only relevant endpoints. Ensure that the Site to which you publish your actions is suitable for the endpoints you want to target for Server Automation. For example, many of the endpoints on your network might not be relevant targets for your Automation Plan. Therefore, it is advisable to publish your actions to a more specific group of computers, such as servers.

Each Automation Plan is a Fixlet. To ensure that your Automation Plans are not evaluated by non-relevant endpoints, store your Automation Plans in a site that is not subscribed to by BigFix endpoints.

Troubleshooting

Use the information described here to troubleshoot problems.

Problem 1: When the automation plan engines are installed on one or more DSA servers

When the automation plan engines are installed on one or more DSA servers in your environment, each step of the automation plan execution is created several times instead of once. The number of times each step is created is equal to the number of DSA servers, with the automation plan engine installed, present in your environment.

Cause:

In a DSA environment, you can install the Server Automation components on both the servers (primary and secondary), but you must ensure that only one instance is active at any given time. Otherwise, multiple actions are created for each step in the plan, and both plan engine instances process the same plan.

Solution:

To disable the plan engine on a DSA server, perform these steps:

1. Immediately after installing the plan engine, go to `<BES Root Dir>\Applications\Config` and rename the `PlanEngine.xml` file into `PlanEngine.xml.stop`.
2. To ensure that it is stopped, check the `<BES Root Dir>\Applications\Logs\pe_console.log` file. When stopped, no new message is posted on this log file.



Important: In the event of a primary root server failure:

- On the secondary DSA server, rename the `PlanEngine.xml.stop` file back to `PlanEngine.xml`.
- On the primary server, disable the plan engine instance by adding the `.stop` extension to the `PlanEngine.xml` file).

Problem 2: Delay in starting the scheduled plans

In a DSA environment setup, there can be a delay in starting the scheduled plans.

Cause:

In a DSA environment, the plan engine checks if any plan engine instances exist on the secondary server, regardless of an actual instance running or not. This check is done while the current plan is being processed. This tries to stop the current running instance, which delays the processing of the scheduled plans.

Solution:

Step 1:

Keep only one instance up and running and disable/uninstall the plan engine on the other (secondary) DSA servers. Perform these steps to disable the plan engine:

1. Immediately after installing the plan engine, go to `<BES Root Dir>\Applications\Config` and rename the `PlanEngine.xml` file into `PlanEngine.xml.stop`.
2. To ensure that the plan engine is stopped, check the `<BES Root Dir>\Applications\Logs\pe_console.log` file. When stopped, no new message is posted on this log file.

Step 2:

Perform these steps to use the DSA flag to disable the DSA checks:

1. Go to `<BES Root Dir>\Applications\PlanEngine\bin\planengine.bat`
2. Set `VM_ARGS=%VM_ARGS% -Denable.dsa=0` (by default its set to 0 since 9.5.65)



Important: In the event of a primary root server failure:

- On the secondary DSA server, rename the `PlanEngine.xml.stop` file back to `PlanEngine.xml`.
- On the primary server, disable the plan engine instance by adding the `.stop` extension to the `PlanEngine.xml` file).



Note:



- This solution works only if the plan engine version is 9.5.64 or later.
- If you disable the DSA flag but keep more than one instance of Plan engine up and running, then it results in [Problem 1: When the automation plan engines are installed on one or more DSA servers \(on page 160\)](#).
- If the Plan engine version is in between 9.5.53 and 9.5.63, there is no option to disable the DSA checks. In this case, you need to upgrade to the latest version to use the above solution.

Server Automation REST API

The Server Automation REST API is a node-based application which enables you to execute and monitor Server Automation Plans. Using this REST API, you can perform Server Automation tasks in a standardized and operating system-independent method.



Note: An older version of this application based on IBM WAS Liberty profile is still available; however, new functionalities will be made available only on the Node-based application, and hence, the older version (fixlets 108 and 109 of SA REST API) will be phased out shortly.

The starting/stopping of this service is controlled by means of a Windows service called "`SARESTService`".



Note:

- In fixlet (ID: 157), both http and https ports are configurable. Default http port is 8080 and https port is 8443. User needs to update the default http and https port before installation. If the computer already runs the legacy WAS Liberty based service, the user still can install the fixlet 157 on any available ports.

The application runs only on Windows computers.

How to install/uninstall the node-based Server Automation REST API

The Node-based REST API is installed/uninstalled by means of two tasks that can be found on the "Server Automation" site, namely:

```
(ID: 157) Deploy Server Automation REST API
(ID: 158) Remove Server Automation REST API
```

The server logs can be found at: `<INSTALL_ROOT>\sa_rest_node\Logs`.

For more information, refer to [Server Automation REST API](#)

Chapter 5. Sample Automation Plans

Server Automation is shipped with a number of sample Automation Plans that you can run out of the box. To run these Automation Plans out of the box, ensure that the Fixlets contained in them are available. Typically, you would substitute some of the Fixlets contained in these samples with particular Fixlets that you want to run. Use the information in each of the following sections to find out more about each of the sample plans.

All sample plans are read-only. To use a sample plan, you must copy it, re-name it, and then update the placeholder Fixlets with Fixlets, Tasks, or Baselines as per your requirements.



Note: From 10.0.4 onwards, in the Details tab of a plan, the last modified user of a plan is captured in the `Last Modified By` field. In previous versions, by default, the last modified user was always admin, even if some other operator has modified the plan.

Take Action Edit Copy	
Details Steps Flow Settings	
Name* Sample Plan: Using Notifications within a Plans	
Description This sample plan demonstrates the three different options a user has to receive notification emails: <ol style="list-style-type: none">1. The fixlet at the start of the plan can be used to send a standalone email notification using the details entered by the user at run time.2. The baseline step contains multiple components of Task 2245 (site: BES Support) which has been customised to give a different subject ; values are hard coded into the baseline components, so to use them for your own purposes, the content of the baseline components will more details).	
ID	1341
Domain*	BigFix Management
Site*	Master Action Site
Category	Sample Plan
Source	BigFix
Source Release Date*	7/10/2021
Source Severity	
Creator	Admin
Created	Friday, July 9, 2021 3:31:26 AM
Last Modified By	Admin

Sample plan: Server Patching (Client-Server sample)

BigFix Lifecycle Server Automation provides a sample content Automation Plan. This sample Automation Plan contains Tasks to stop services on client and server endpoints, apply a patch to the server endpoint, and then restart the client and server services. All sample plans are read-only. To use a sample plan, you must copy it, re-name it, and then update the placeholder Fixlets with Fixlets, Tasks, or Baselines as per your requirements.

The patch step in this sample Automation Plan uses a sample placeholder Fixlet for the patching step. Replace this Task with a patching Fixlet, Task or Baseline that you want to apply to your server endpoint. If you want to make a change, you need to make a copy of the Automation Plan.

Complete the following steps to run the sample Automation Plan.

1. Open the **Server Automation** domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the **Automation Plans** dashboard, enter 100 in the filter text box and press Enter. This is the ID of the sample Automation Plan.
4. Select the Automation Plan from the list of Automation Plans.
5. Click **Copy** to copy the Automation Plan, enter a name and then save the copy that you have just created.
6. To run the copied Automation Plan, click **Take Action**. The following table shows the parameters and targets that you need to input for each step in the sample Automation Plan.

Table 27. Parameters and targets

Step	Parameter and targets
Step 1 Stop Service (222)	<ul style="list-style-type: none"> a. Parameter: Client service name b. Targets: Client endpoints
Step 2 Stop Service (222)	<ul style="list-style-type: none"> a. Parameter: Server service name b. Targets: Server endpoint
Step 3 Placeholder for OS or Application Patches - (REPLACE ME)	<ul style="list-style-type: none"> a. No parameters applicable b. Targets: Server endpoint
Step 4 Start Service (221)	<ul style="list-style-type: none"> a. Parameter: Server service name b. Targets: Server endpoint
Step 5 Start Service (221)	<ul style="list-style-type: none"> a. Parameter: Client service name b. Targets: Client endpoints

7. Click **OK** to run the Automation Plan.

The sample Automation Plan runs on the endpoints.

Sample plan: Physical Server Build

This sample Automation Plan completes a simple end-to-end physical server build. You must have BigFix Bare Metal Server set up and integrated with BigFix to run this Automation Plan. The first step in the plan deploys an operating system to one or more computers. The second step creates a baseline patches the operating system on the virtual machine created in the first step. The third step installs Microsoft SQL Server 2008 Enterprise Server Edition on the computer or computers that you created in the first step. The final step patches Microsoft SQL Server 2008 Enterprise

Server Edition that is installed in step 3. All sample plans are read-only. To use a sample plan, you must copy it, rename it, and then update the placeholder Fixlets with Fixlets, Tasks, or Baselines as per your requirements.

This Automation Plan uses some sample Fixlets that will not suit the requirements for your particular server build. Replace these Fixlets with relevant Fixlets that you want to run on your endpoints to complete a physical server build.

Complete the following steps to run the sample Automation Plan.

1. Open the **Server Automation** domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the **Automation Plans** dashboard, enter 102 and press Enter. This is the ID of the sample Automation Plan.
4. Select the Automation Plan from the list of Automation Plans.
5. Click **Copy** to copy the Automation Plan, enter a name and then save the copy that you have just created.
6. To run the copied Automation Plan, click **Take Action**. The following table shows the parameters and targets that you need to input for each step in the sample Automation Plan.

Table 28. Plan steps and parameters and targets

Step	Description	Parameters and targets
Step 1 Deploy an operating system to one or more computers (133)	This step installs an operating system on computers.	<ul style="list-style-type: none"> a. Parameter: For information about the required parameters, see Fixlets for operating system deployment (on page 240). b. Targets: The BigFix Bare Metal Server server.
Step 2 Placeholder for OS or Application Patches - (REPLACE ME)	This Fixlet is a placeholder. Replace this Fixlet with a Fixlet that suits your requirements.	<ul style="list-style-type: none"> a. Parameter: Any parameters required by the Fixlet that you include in step 2. b. Targets: The computer name that you entered for the newly created computer in step 1.
Step 3 Install Microsoft SQL Server 2008 Enterprise Edition on Windows (72)	This step installs Microsoft SQL Server 2008 Enterprise Server Edition on the Windows® virtual machine that you created in step 1.	<ul style="list-style-type: none"> a. Parameter: The parameters are described in the Install Microsoft SQL Server 2008 En-

Step	Description	Parameters and targets
Step 4 Placeholder for OS or Application Patches - (REPLACE ME)	This step patches Microsoft SQL Server 2008 Enterprise Server Edition that you installed in the previous step. The Fixlet contained in the sample plan is a placeholder. Replace this Fixlet with a Fixlet, Task, or Baseline to suit your patching requirements.	<p>terprise Edition on Windows® (72) Fixlet.</p> <p>b. Targets: The computer name that you entered for the newly created computer in step 1.</p> <p>a. Parameter: Any parameters required by the patching Fixlet, Task, or Baseline.</p> <p>b. Targets: The computer name that you entered for the newly created computer in step 1.</p>

7. Click **OK** to run the Automation Plan.

Sample plan: Faster Virtual Server Build (with baseline)

This sample Automation Plan completes a simple end-to-end virtual server build. This sample plan performs exactly the same actions as that of Sample plan: Virtual Server Build. However, in this sample automation plan, a baseline is used as a (regular) step instead of multi-step fixlets. This helps you to execute the plan in a relatively shorter time compared to the plan with multi-step fixlets. Under the take-action and Default dialog box, the baseline step and its component fixlets are represented in parent-child structure to provide parameter support for each component. This feature only works when baseline is added as a regular step and not as a failure-step.

This Automation Plan uses some sample Fixlets that will not suit the requirements for your particular server build. Replace these Fixlets with relevant Fixlets that you want to run on your endpoints to complete a virtual server build. To replace some Fixlets, edit the Automation Plan and remove any Fixlet that does not suit your requirements and replace it with a suitable Fixlet.

Complete the following steps to run the sample Automation Plan.

1. Open the **Server Automation** domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the **Automation Plans** dashboard, enter 107 and press Enter. This is the ID of the sample Automation Plan.
4. Select the Automation Plan from the list of Automation Plans.
5. Click **Copy** to copy the Automation Plan, enter a name and then save the copy that you have just created.
6. To run the copied Automation Plan, click **Take Action**. The following table shows the parameters and targets that you need to input for each step in the sample Automation Plan.

Table 29. Plan steps and parameters and targets

Step	Description	Parameters and targets
Step 1 VMware Create Windows Virtual Machine from Template (84)	This step creates Windows virtual machines from an existing template.	<ul style="list-style-type: none"> a. Parameter: For information about the parameters required for this step, see Table 1 in Creating a Windows virtual machine from a template (on page 94) b. Targets: Enter the names of the new virtual machines to be created.
Step 2 Placeholder for OS or Application Patches - (REPLACE ME)	This Fixlet is a placeholder. Replace this Fixlet with a Fixlet that suits your requirements.	<ul style="list-style-type: none"> a. Parameter: Any parameters required by the Fixlet that you include. b. Targets: The name of the virtual machines that you entered in step 1. You must enter these names manually because the computers do not yet exist.
Step 3 Install Microsoft SQL Server 2008 Enterprise Server Edition on Windows (72)	This step installs Microsoft SQL Server 2008 Enterprise Server Edition on the Windows virtual machine that you created in step 1.	<ul style="list-style-type: none"> a. Parameter: The parameters are described in the Install Microsoft SQL Server 2008 Enterprise Server Edition on Windows (72) Fixlet. b. Targets: The names of the virtual machines that you created in step 1.
Step 4 UPDATE: SQL Server 2008 Service Pack 1 Available (x64) (68103)	This step patches Microsoft SQL Server 2008 Enterprise Server Edition that you installed in the previous step.	<ul style="list-style-type: none"> a. Parameter: Any parameters required by the UPDATE: SQL Server 2008 Service Pack 1 Available (x64) (68103) Fixlet b. Targets: The names of the virtual machines that you created in step 1.

7. Click **OK** to run the Automation Plan.

Sample plan: Server patching

This sample Automation Plan completes a scenario for server patching. All sample plans are read-only. To use a sample plan, you must copy it, re-name it, and then update the placeholder Fixlets with Fixlets, Tasks, or Baselines as per your requirements.

This Automation Plan uses some sample Fixlets that will not suit the requirements for your particular server patching scenario. Replace these Fixlets with relevant Fixlets that you want to run on your endpoints to complete server patching in your environment.

Complete the following steps to run the sample Automation Plan.

1. Open the **Server Automation** domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the **Automation Plans** dashboard, enter 103 and press Enter. This is the ID of the sample Automation Plan.
4. Select the Automation Plan from the list of Automation Plans.
5. Click **Copy** to copy the Automation Plan, enter a name and then save the copy that you have just created.
6. To run the copied Automation Plan, click **Take Action**. The following table shows the parameters and targets that you need to input for each step in the sample Automation Plan.

Table 30. Plan steps and parameters and targets

Step	Description	Parameters and targets
Step 1 Stop Service (222)	This step stops the service. For example, the DB2® client service on the clients.	a. Parameter: Client service name, for example, <code>db2_client</code> . b. Targets: Client endpoints.
Step 2 Stop Service (222)	This step stops the server service. For example, the DB2® server service on the DB2® server.	a. Parameter: Server service name, for example, <code>db2_server</code> . b. Targets: DB2® server.
Step 3 Placeholder for OS or Application Patches (REPLACE ME)	Remove this Fixlet and include an operating system patch that suits your patching requirements. Depending on the Fixlet that you include for this step, you might or might not need to restart the endpoints targeted in this step in step 4.	a. Parameter: Any parameters required by the OS patch Fixlet that you include. b. Targets: DB2® server.

Step	Description	Parameters and targets
Step 4 Restart Endpoint (94)	This step restarts the server endpoint.	<ul style="list-style-type: none"> a. Parameter: No parameter required. b. Targets: DB2® server.
Step 5 Start Service (221)	This step starts the client server, for example, the DB2® client server on the clients.	<ul style="list-style-type: none"> a. Parameter: Client service name, for example, <code>db2_client</code>. b. Targets: Client endpoints.

7. Click **OK** to run the Automation Plan.

Sample plan: Microsoft® Windows® 2008 Release 2 to Microsoft® Windows® 2012 Release 2 Cluster - OS patching (Non-Baseline from Site Sample)

This sample Automation Plan provides you with a template to automate patching of clusters with Microsoft® Windows® Servers 2008 Release 2 and later operating systems. There are two phases in this plan, in the first phase, which runs from steps 1 to 4, you patch the first node or group of nodes in the cluster. For each of the steps in this phase, you target the first node or group of nodes. While these nodes are being patched, the second nodes remain operational. The second phase of the plan is a repeat of the first phase, except that you are targeting the second node or group of nodes in the cluster. The cluster remains operational throughout the patching process. All sample plans are read-only. To use a sample plan, you must copy it, re-name it, and then update the placeholder Fixlets with Fixlets, Tasks, or Baselines as per your requirements.

This sample plan runs advanced Server Automation Tasks. A single Task prepares the environment for patching. The patches are then applied and the targets are restarted in the next two steps. Another Server Automation Task then restores the cluster to its pre-patching state.

For more detailed information about patching Windows clusters, see [Automating patching of operating systems in Microsoft Windows clusters \(on page 202\)](#).

Complete the following steps to run the sample Automation Plan.

1. Open the **Server Automation** domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the **Automation Plans** dashboard, enter 132 for the plan ID and press Enter.
4. Select the sample plan from the list of Automation Plans.

5. Click **Copy** to copy the Automation Plan, enter a name and then save the copy that you have just created.
6. To run the copied Automation Plan, click **Take Action**. The following table shows the parameters and targets that you need to input for each step in the sample Automation Plan.

Table 31. Plan steps and parameters and targets

Step	Description	Parameters and targets
Step 1 Pre Patching Task for Non Hyper-V Clustered Microsoft Servers (Version 2008 R2 onwards)	This Task prepares the targeted nodes for patching. It compiles a list of all groups and virtual machines, pauses the targeted node, and moves any groups from the node.	Target the first node or group of nodes in the cluster. There are no parameters required.
Step 2 Placeholder for OS or Application Patches (REPLACE ME)	This Task is a placeholder for the patching Fixlet or Baseline that you want to use to patch the cluster.	Target the first node or group of nodes in the cluster.
Step 3 Restart Endpoint on Pending Restart and Wait for Restart to Complete	This step restarts the first node or group of nodes in the cluster that you are patching. Only endpoints in a <code>Pending Restart</code> state will be restarted.	Target the first node or group of nodes in the cluster.
Step 4 Post Patching Task for Microsoft Server Clusters (Server 2008 R2 onwards including Hyper-V Clusters)	This step restores the first nodes or group of nodes that you are patching to their original state.	Target the first node or group of nodes in the cluster.
Step 5 Pre Patching Task for Non Hyper-V Clustered Microsoft Servers (Version 2008 R2 onwards)	This Task prepares the targeted nodes for patching. It compiles a list of all groups and virtual machines, pauses the targeted node, and moves any groups from the node.	Target the second node or group of nodes in the cluster.
Step 6 Placeholder for OS or Application Patches (REPLACE ME)	This Task is a placeholder for the patching Fixlet or Baseline that you want to use to patch the cluster.	Target the second node or group of nodes in the cluster.
Step 7 Restart Endpoint on Pending Restart and Wait for Restart to Complete	This step restarts the second node or group of nodes in the cluster that you are patching. Only endpoints in a <code>Pending Restart</code> state will be restarted.	Target the second node or group of nodes in the cluster.
Step 8 Post Patching Task for Microsoft Server Clusters (Server 2008 R2 onwards including Hyper-V Clusters)	This step restores the second nodes or group of nodes that you are patching to their original state.	Target the second node or group of nodes in the cluster.

7. Click **OK** to run the Automation Plan.

Related information

[Automating patching of operating systems in Microsoft Windows clusters \(on page 202\)](#)

Sample plan: Microsoft® Windows® 2008 Release 2 to Microsoft® Windows® 2012 Release 2 Cluster - OS patching

This sample automation plan provides a template for you to automate cluster patching for Microsoft® Windows® 2008-2012 operating systems. You can use this sample plan as a template to patch the nodes in a Microsoft® Windows® cluster. This plan is designed for use where you configure the Pending Restart setting in the Server Automation user interface to automatically restart the endpoints. See the **Settings** tab of the plan in Server Automation and set the Pending Restart option to **Continue to next step**. All sample plans are read-only. To use a sample plan, you must copy it, re-name it, and then update the placeholder Fixlets with Fixlets, Tasks, or Baselines as per your requirements.

There are no parameters required to run this plan.

For more detailed information about patching Microsoft® Windows® clusters, see [Automating patching of operating systems in Microsoft Windows clusters \(on page 202\)](#).

Complete the following steps to run the sample Automation Plan.

1. Open the **Server Automation** domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the **Automation Plans** dashboard, enter 130 (for the plan ID) and press Enter.
4. Select the sample plan from the list of Automation Plans.
5. Click **Copy** to copy the Automation Plan, enter a name and then save the copy that you have just created.
6. To run the copied Automation Plan, click **Take Action**.
7. For steps 1 to 4, target the first node in the cluster.
8. For steps 5 to 8, target the second node in the cluster.
9. Click **OK** to run the Automation Plan.

Related information

[Automating patching of operating systems in Microsoft Windows clusters \(on page 202\)](#)

Sample plan: Microsoft Exchange 2007 Cluster - OS patching

This sample plan shows how you can patch Microsoft Exchange 2007 SP1 on a Microsoft Windows cluster. Use this plan as a template for patching Exchange 2007 SP1 on Windows clusters. This plan patches the operating systems by running Baselines from a site. Before running the plan, add the Baselines that you want to use to patch the operating systems to a custom site. When you are running the plan, you then select that site to patch the Exchange mailbox server. All sample plans are read-only. To use a sample plan, you must copy it, re-name it.

Use the **Pending Restart** settings in the Server Automation application to configure the restart. For this plan, set to **Continue plan**. With this option, the endpoints are automatically restarted by the `Restart Endpoint on Pending Restart` and `Wait for Restart to Complete` Task. To avoid two failovers of the Exchange mailbox server, target the passive node first.

For more detailed information about patching Microsoft Exchange 2007 clusters, see [Patching Microsoft Exchange 2007 on Windows clusters \(on page 209\)](#).

Complete the following steps to run the sample Automation Plan.

1. Open the **Server Automation** domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the **Automation Plans** dashboard, enter 133 (for the plan ID) and press Enter.
4. Select the plan from the list of Automation Plans.
5. Click **Copy** to copy the Automation Plan, enter a name and then save the copy that you have just created.
6. To run the copied Automation Plan, click **Take Action**. The following table shows the parameters and targets that you need to input for each step in the sample Automation Plan.

Table 32. Plan steps and parameters and targets

Step	Description	Parameters and targets
Step 1 Move Exchange 2007 MailboxServer from Node (121)	This step moves the Exchange 2007 mailbox server from the first node that you are patching. Important: It is best practice to patch the passive node first.	Target the system or systems for the first set of nodes that you are patching.
Step 2 Pause Node (Windows 2008-2012) (116)	This step pauses the first node in the cluster that you want to patch.	Target the system or systems for the first set of nodes that you are pausing in step 1. You can select the Use same targets as option to quickly select the same targets you targeted for step 1.
Step 3 Move Groups from Node (Windows 2008-2012) (114)	This step moves groups from the node that you are pausing in step 1.	Target the system or systems for the first set of nodes that you are pausing in step 1. You can select the Use same targets as option to quickly select the same targets you targeted for step 1.
Step 4 Dynamically run Baselines from a Site	This step runs Baselines from a site to patch the operating system.	Target the first node in the cluster. From the Parameters tab, select site that contains the Baselines that you want to run to patch the operating system. For information about how to run Baselines from a site, see . (on page 61) .
Step 5 Restart Endpoint on Pending Restart (113)	This step restarts the computers that you patched in step 3. On-	Target the system or systems for the first set of nodes that you are patching. You can select the

Step	Description	Parameters and targets
ing Restart and Wait for Restart to Complete (126)	ly endpoints in a <code>Pending Restart</code> state are restarted.	Use same targets as option to quickly select the same targets you targeted for step 1.
Step 6 Resume Node (Windows 2008-2012) (115)	This step resumes the first set of computers that you are patching.	Target the system or systems for the first set of nodes that you are patching. You can select the Use same targets as option to quickly select the same targets you targeted for step 1.
Step 7 Move Exchange 2007 MailboxServer from Node (121)	This step moves the Exchange 2007 mail box server from the second set of nodes that you are patching.	Target the system or systems for the second set of nodes that you are patching.
Step 8 Move Groups from Node (Windows 2008-2012) (114)	This step moves groups from the node that you paused in step 6.	Target the system or systems for the second set of nodes that you are patching. You can select the Use same targets as option to quickly select the same targets you targeted for step 6.
Step 9 Dynamically run Baselines from a Site	This step runs Baselines from a site to patch the operating system.	Target the second node in the cluster. From the Parameters tab, site that contains the Baselines that you want to run to patch the operating system. For information about how to run Baselines from a site, see . (on page 61) .
Step 10 Restart Endpoint on Pending Restart and Wait for Restart to Complete (126)	This step restarts the computers patched in step 8. Only endpoints in a <code>Pending Restart</code> state are restarted.	Target the system or systems for the second set of nodes that you are patching. You can select the Use same targets as option to quickly select the same targets you targeted for step 6.
Step 11 Resume Node (Windows 2008-2012) (115)	This step resumes the second set of nodes patched in step 8.	Target the system or systems for the second set of nodes that you are patching. You can select the Use same targets as option to quickly select the same targets you targeted for step 6.

7. Click **OK** to run the Automation Plan.

Sample plan: Install Oracle Database 11g on Linux

This sample automation plan provides a template for you to automate the deployment of Oracle Database 11g Enterprise Edition on Linux. You can use this sample plan as a template by copying it and then making changes to the copy as required. All sample plans are read-only. To use a sample plan, you must copy it, re-name it, and then update the placeholder Fixlets with Fixlets, Tasks, or Baselines as per your requirements.

The plan creates the `oracle` user, then installs Oracle Database 11g Enterprise Edition, then creates the database, then install the Oracle Database 11g client, then configures the client.

To view a demo of this plan running, see this You Tube link [Automate deployment of Oracle Database 11g](#). For more detailed information about deploying middleware, see [Prerequisites \(on page 218\)](#).

To use this sample plan, you must first create a package for the Oracle binaries for the database and the client and upload them to BigFix Software Distribution. This sample plans supports Oracle Database 11g Enterprise Edition on Red Hat Enterprise Linux.

Complete the following steps to run this plan. Before running this plan, you must upload the binaries for Oracle Database 11g and the Oracle client to BigFix Software Distribution.

1. Open the Server Automation domain.
2. From the navigation tree, click **Automation Plans**.
3. In the **Automation Plans** dashboard, enter `314` and press Enter. This is the ID of the sample plan.
4. Select the plan from the list of plans.
5. Copy the plan and then save the copy.
6. To run the copied plan, click **Take Action**. The following table describes the parameters and targets for each step in the plan.

Table 33. Plan steps for deploying Oracle Database 11g

Step	Parameters and targets
Create the oracle user on Linux	Target the computer on which you are deploying Oracle Database 11g and enter a password for the <code>oracle</code> user.
Install Oracle 11g Enterprise Edition on Linux	You can use the same target and the previous step. On the Parameters tab, select the binary for Oracle Database 11g that you uploaded to BigFix Software Distribution.
Create an Oracle 11g Database on Linux	You can use the same target as the previous step. On the Parameters tab, enter the system password.
Install Oracle 11g Client on Linux	Target the computer on which you want to install the Oracle 11g client. On the Parameters tab, select the binary for the Oracle Client 11g.
Configure Oracle Client 11g on Linux	Target the computer on which you are installing the Oracle 11g Client in the previous step. On the Parameters tab, enter the Client Service Name and the host IP address.

7. Click **OK** to run the plan.

Sample plan: Microsoft Hyper-V Servers Cluster - OS patching

This sample automation plan provides a template for you to automate cluster patching of Hyper-V operating systems on Windows 2008-2012 and contains a Fixlet to automatically reboot the targets endpoints. You can use this sample plan as a template if the patch Fixlet that you are including to patch the nodes in the cluster requires the endpoints to be restarted. The sample plan uses the Baselines from a site feature to patch the operating systems. All sample plans are read-only. To use a sample plan, you must copy it, re-name it.

Use this plan with the Pending Restart settings in the Server Automation application. This sample plan uses the Baselines from a site feature to patch the operating systems. For information about the Baselines from a site feature, see [Running baselines from a site \(on page 61\)](#).

For more detailed information about patching Hyper-V clusters, see [Automating patching of operating system servers in a Microsoft Hyper-V cluster \(on page 212\)](#).

Complete the following steps to run the sample Automation Plan.

1. Open the **Server Automation** domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the **Automation Plans** dashboard, enter 141 for the plan ID and press Enter.
4. Select the plan from the list of Automation Plans.
5. Click **Copy** to copy the Automation Plan, enter a name and then save the copy that you have just created.
6. To run the copied Automation Plan, click **Take Action**. The following table shows the parameters and targets that you need to input for each step in the sample Automation Plan.

Table 34. Plan steps and targets

Step	Description	Parameters and targets
Step 1 Prepatching Task for Clustered Microsoft Hyper-V Servers	This step prepares the node for patching.	Target the system or systems for the first set of nodes that you are patching.
Step 2 Dynamically Run Baselines from a Site	This step patches the operating system of the first node in the cluster by running all of the Baselines from a site.	Target the system or systems for the first set of nodes that you are pausing in step 1. You can select the Use same targets as option to quickly select the same targets you targeted for step 1. From the Parameters tab, select the site that contains the Baselines that you want to use to patch the operating system.
Step 3 Restart Endpoint on Pending Restart and Wait for Restart to Complete	This step restarts the computers that you patched in step 3.	Target the system or systems for the first set of nodes that you want to patch. You can select the Use same targets as option to quickly select the same targets you targeted for step 1.

Step	Description	Parameters and targets
Step 4 Post Patching Task for Microsoft Server Clusters (Server 2008 R2 onwards including Hyper-V Clusters)	This step returns the node to its pre-patching state.	Target the system or systems for the first set of nodes that you are patching. You can select the Use same targets as option to quickly select the same targets you targeted for step 1.
Step 5 Prepatching Task for Clustered Microsoft Hyper-V Servers	This step prepares the node for patching.	Target the system or systems for the second set of nodes that you are patching. You can select the Use same targets as option to quickly select the same targets you targeted for step 1.
Step 6 Dynamically Run Baselines from a Site	This step patches the operating system of the first node in the cluster.	Target the system or systems for the second set of nodes that you are patching. From the Parameters tab, select the site that contains the Baselines to patch the operating system.
Step 7 Restart Endpoint on Pending Restart and Wait for Restart to Complete	This step restarts the computers that you patched in step 6.	Target the system or systems for the second set of nodes that you are patching. You can select the Use same targets as option to quickly select the same targets you targeted for step 6.
Step 8 Post Patching Task for Microsoft Server Clusters (Server 2008 R2 onwards including Hyper-V Clusters)	This step returns the node to its pre-patching state.	Target the system or systems for the second set of nodes that you are patching. You can select the Use same targets as option to quickly select the same targets you targeted for step 6.

7. Click **OK** to run the Automation Plan.

Sample plan: Microsoft Exchange 2010/2013 Cluster - OS patching

This sample automation plan provides a template for you to automate patching of operating systems in Microsoft Exchange 2010 and 2013 clusters. This sample plan uses the Baselines from a site feature to patch the operating systems. All sample plans are read-only. To use a sample plan, you must copy it, re-name it, and then update the placeholder Fixlets with Fixlets, Tasks, or Baselines as per your requirements.

This sample plan use the Baselines from a site feature to patch the operating systems. For information about running Baselines from a site, see [Running baselines from a site \(on page 61\)](#).

Complete the following steps to run the sample Automation Plan.

For more detailed information about patching Windows Exchange clusters, see [Patching Servers running Microsoft Exchange 2010 and later Data Availability Groups \(on page 210\)](#).

1. Open the **Server Automation** domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the **Automation Plans** dashboard, enter 136 for the plan ID and press Enter.
4. Select the Automation Plan from the list of Automation Plans.
5. Click **Copy** to copy the Automation Plan, enter a name and then save the copy that you have just created.
6. To run the copied Automation Plan, click **Take Action**. The following table shows the parameters and targets that you need to input for each step in the sample Automation Plan.

Table 35. Plan steps and parameters and targets

Step	Description	Parameters and targets
Step 1 Exchange 2010 and 2013 Start DAG (Database Availability Groups) Maintenance Task	Runs the <code>startDagservermaintainence.ps1</code> powershell script against the target endpoint. Active DAGs on the node are moved off the endpoint. The endpoint is placed on a paused state. If the cluster group is present on the endpoint, it is also moved to another node. The <code>DatabaseCopyAutoActivationPolicy</code> is set to blocked after running this script. The script does not move any non-exchange 2010 groups off the node. When this script is run against an endpoint, the endpoint is in a state where any patch or custom Fixlets can be run.	Target the first node or set of nodes that you are patching.
Step 2 Dynamically Run Baselines from a Site	This step completes the patching by running Baselines from a site.	Target the first node or set of nodes that you are patching. You can select the Use same targets as option to quickly select the same targets you targeted for step 1. From the Parameters tab, select the site that contains the Baselines.
Step 3 Restart Endpoint on Pending Restart and Wait for Restart to Complete	This restarts the targets that were patched in the previous step. Only endpoints that are in a <code>Pending Restart</code> state are restarted.	Target the first node or set of nodes that you are patching. You can select the Use same targets as option to quickly select the same targets you targeted for step 1.
Step 4 Exchange	Runs the <code>stopDagservermaintainence.ps1</code> powershell script against the target endpoint. This script resumes a node and al-	Target the first node or set of nodes that you are patch-

Step	Description	Parameters and targets
2010 and 2013 Stop DAG (Database Availability Groups) Maintenance Task	so sets the <code>DatabaseCopyAutoActivationPolicy</code> to unrestricted for each database on the endpoint. No groups are failed back onto a node after running this script.	ing. You can select the Use same targets as option to quickly select the same targets you targeted for step 1.
Step 5 Exchange 2010 and 2013 Start DAG (Database Availability Groups) Maintenance Task	Runs the <code>startDagservermaintainence.ps1</code> powershell script against the target endpoint. Active DAGs on the node are moved off the endpoint. The endpoint is placed on a paused state. If the cluster group is present on the endpoint, it is also moved to another node. The <code>DatabaseCopyAutoActivationPolicy</code> is set to blocked after running this script. The script does not move any non-exchange 2010 groups off the node. When this script is run against an endpoint, the endpoint is in a state where any patch or custom Fixlets can be run.	Target the second node or set of nodes that you are patching.
Step 6 Dynamically Run Baselines from a Site	This step completes the patching by running Baselines from a site.	Target the second node or set of nodes that you are patching. You can select the Use same targets as option to quickly select the same targets you targeted for step 1. From the Parameters tab, select the site that contains the Baselines.
Step 7 Restart Endpoint on Pending Restart and Wait for Restart to Complete	This restarts the targets that were patched in the previous step. Only endpoints that are in a <code>Pending Restart</code> state are restarted.	Target the second node or set of nodes that you are patching. You can select the Use same targets as option to quickly select the same targets you targeted for step 1.
Step 8 Exchange 2010 and 2013 Stop	Runs the <code>stopDagservermaintainence.ps1</code> powershell script against the target endpoint. This script resumes a node and also sets the <code>DatabaseCopyAutoActivationPolicy</code> to unrestricted for	Target the second node or set of nodes that you are patching. You can select the Use same targets as

Step	Description	Parameters and targets
DAG (Data- base Avail- ability Groups) Mainte- nance Task	each database on the endpoint. No groups are failed back onto a node after running this script.	option to quickly select the same targets you targeted for step 1.
Step 9 Re- balance Ac- tive Data- bases Task Exchange 2010 AND Exchange 2013 DAG (Database availability Groups)	Runs the <code>RedistributeActiveDatabases.ps1</code> powershell script against the target endpoint. This script redistributes the active databases across all nodes available to the DAGs. The script uses the <code>BalanceDbsByActivationPreference</code> switch. You can run this Task at the end of an Automation Plan against all of the endpoints if you want to redistribute the DAGs across the servers after all patching has been completed.	Target all of the nodes in the cluster.

7. Click **OK** to run the Automation Plan.

Sample plan: (Parallel) Microsoft Exchange 2010/2013 and Microsoft Windows 2008 R2 Cluster - OS patching

This sample automation plan provides a template for you to automate patching of the operating systems for a Microsoft Exchange 2010 and 2013 and Windows Server 2008 Release 2 cluster. It is a parallel plan, where the patching of the clustered Exchange 2010 and 2013 servers are patched concurrently with the Windows Server 2008 cluster. This sample plan uses the Baselines from a site feature to complete the patching. All sample plans are read-only. To use a sample plan, you must copy it, re-name it, and then update the placeholder Fixlets with Fixlets, Tasks, or Baselines as per your requirements.

This plan is a parallel plan. To view the processing sequence, seen the **Flow** tab on the plan in the Server Automation user interface. This plan uses the Baselines from a site feature to complete the operating system patching. For information about how to run Baselines from a site, see [Running baselines from a site \(on page 61\)](#).

For detailed information about patching Windows Exchange clusters, see [Patching Servers running Microsoft Exchange 2010 and later Data Availability Groups \(on page 210\)](#).

Complete the following steps to run the sample Automation Plan.

1. Open the **Server Automation** domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the **Automation Plans** dashboard, enter 134 for the plan ID and press Enter.

4. Select the Automation Plan from the list of Automation Plans.
5. Click **Copy** to copy the Automation Plan, enter a name, and then save the copy that you have just created.
6. To run the copied Automation Plan, click **Take Action**. The following table shows the parameters and targets that you need to input for each step in the sample Automation Plan.

Table 36. Plan steps and parameters and targets

Step	Description	Parameters and targets
Step 1 Exchange 2010 and 2013 Start DAG (Data-availability Groups) Maintenance Task	Runs the <code>startDagservermaintainence.ps1</code> powershell script against the target endpoint. Active DAGs on the node are moved off the endpoint. The endpoint is placed on a paused state. If the cluster group is present on the endpoint, it is also moved to another node. The <code>DatabaseCopyAutoActivationPolicy</code> (Data-availability Groups) is set to blocked after running this script. The script does not move any non-exchange 2010 groups off the node. When this script is run against an endpoint, the endpoint is in a state where any patch or custom Fixlets can be run.	Target the first node or set of nodes in the Exchange 2010 or 2013 cluster.
Step 2 Dynamically Run Baselines from a Site	This step patches the OS by running all of the Baselines in a site.	Target the first node or set of nodes in the Exchange 2010 or 2013 cluster. You can select the Use same targets as option to quickly select the same targets you targeted for step 1. From the Parameters tab, select the site that contains the Baselines to patch the operating system.
Step 3 Restart Endpoint on Pending Restart and Wait for Restart to Complete	This restarts the targets that were patched in the previous step. Only endpoints in a <code>Pending Restart</code> state are restarted.	Target the first node or set of nodes in the Exchange 2010 or 2013 cluster. You can select the Use same targets as option to quickly select the same targets you targeted for step 1.

Step	Description	Parameters and targets
Step 4 Exchange 2010 and 2013 Stop DAG (Database Availability Groups) Maintenance Task	Runs the <code>stopDagservermaintainence.ps1</code> powershell script against the target endpoint. This script resumes a node and also sets the <code>DatabaseCopyAutoActivationPolicy</code> to unrestricted for each database on the endpoint. No groups are failed back onto a node after running this script.	Target the first node or set of nodes in the Exchange 2010 or 2013 cluster. You can select the Use same targets as option to quickly select the same targets you targeted for step 1.
Step 5 Exchange 2010 and 2013 Start DAG (Database Availability Groups) Maintenance Task	Runs the <code>startDagservermaintainence.ps1</code> powershell script against the target endpoint. Active DAGs on the node are moved off the endpoint. The endpoint is placed on a paused state. If the cluster group is present on the endpoint, it is also moved to another node. The <code>DatabaseCopyAutoActivationPolicy</code> is set to blocked after running this script. The script does not move any non-exchange 2010 groups off the node. When this script is run against an endpoint, the endpoint is in a state where any patch or custom Fixlets can be run.	Target the second node or set of nodes in the Exchange 2010 or 2013 cluster.
Step 6 Dynamically Run Baselines from a Site	This step patches the OS by running all of the Baselines in a site.	Target the second node or set of nodes in the Exchange 2010 or 2013 cluster. You can select the Use same targets as option to quickly select the same targets. From the Parameters tab, select the site that contains the Baselines to patch the operating system.
Step 7 Restart Endpoint on	This restarts the targets that were patched in the previous step. Only endpoints in a <code>Pending Restart</code> state are restarted.	Target the second node or set of nodes in the Exchange 2010 or 2013 cluster. You can select the Use same targets as option to

Step	Description	Parameters and targets
Pending Restart and Wait for Restart to Complete		quickly select the same targets you targeted for step 1.
Step 8 Exchange 2010 and 2013 Stop DAG (Data-base Avail-ability Groups) Maintenance Task	Runs the <code>stopDagservermaintainence.ps1</code> powershell script against the target endpoint. This script resumes a node and also sets the <code>DatabaseCopyAutoActivationPolicy</code> to unrestricted for each database on the endpoint. No groups are failed back onto a node after running this script.	Target the second node or set of nodes in the Exchange 2010 or 2013 cluster. You can select the Use same targets as option to quickly select the same targets you targeted for step 1.
Step 9 Prepatching Task for Non Hyper-V Clustered Microsoft Server	This step pauses the first node that you want to patch in the Windows 2008 cluster.	Target the first node or set of nodes in the Windows 2008 cluster.
Step 10 Move Groups from Node (Windows 2008-2012)	This step moves groups from the node that you are pausing in the previous step.	Target the first node or set of nodes in the Windows 2008 cluster.
Step 11 Dynamically Run Baselines	This step completes the patching by running the Baselines from a site.	Target the first node or set of nodes in the Windows 2008 cluster. From the Parameters tab, select the site that contains

Step	Description	Parameters and targets
from a Site		the Baselines that you want to use to patch the OS.
Step 12 Restart End- point on Pending Restart and Wait for Restart to Complete	This step restarts the computers that you patched in the previous step. Only endpoints in a <code>Pending Restart</code> state are restarted.	Target the first node or set of nodes in the Windows 2008 cluster.
Step 13 Resume Node (Windows 2008-2012)	This step resumes the first set of Windows Server 2008 nodes that you are patching.	Target the first node or set of nodes in the Windows 2008 cluster.
Step 14 Pause Node (Windows 2008-2012)	This step pauses the second set of Windows Server 2008 nodes that you are patching.	Target the second node or set of nodes in the Windows 2008 cluster.
Step 15 Move Groups from Node (Windows 2008-2012)	This step moves groups from the node or nodes paused in the previous step.	Target the second node or set of nodes in the Windows 2008 cluster.
Step 16 Dynamically Run Baselines from a Site	This step completes the patching by running the Baselines from a site.	Target the second node or set of nodes in the Windows 2008 cluster. From the Parameters tab, select the site that contains the Baselines to patch the OS.
Step 17 Restart End-	This step restarts the computers patched in the previous step. Only endpoints in a <code>Pending Restart</code> state are restarted.	Target the second node or set of nodes in the Windows 2008 cluster.

Step	Description	Parameters and targets
point on Pending Restart and Wait for Restart to Complete		
Step 18 Resume Node (Windows 2008-2012)	This step resumes the second set of Windows 2008 nodes patched in step 16.	Target the second node or set of nodes in the Windows 2008 cluster.

7. Click **OK** to run the Automation Plan.

Related information

[Patching Servers running Microsoft Exchange 2010 and later Data Availability Groups \(on page 210\)](#)

Sample plan: Dynamically Run All Baselines from a Site and Restart the Endpoints

This sample Automation Plan runs all of the Baselines contained in a site against a set of endpoints that you target. After that step has completed, the second step in the automation plan restarts all of the endpoints targeted in the first step. Add the Baselines that you want to execute to a custom site before running this plan. All sample plans are read-only. To use a sample plan, you must copy, re-name, and save it and then use the copy.

Before running this plan, add all of the Baselines that you want to execute to a custom site. Then when you are running the plan, you select the site containing the Baselines. For detailed information about running Baselines from sites, see [Running Baselines from sites. \(on page 61\)](#).

Complete the following steps to run the sample Automation Plan.

1. Open the **Server Automation** domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the **Automation Plans** dashboard, enter 149 and press Enter. This is the ID of the sample Automation Plan.
4. Select the Automation Plan from the list of Automation Plans.
5. Click **Copy** to copy the Automation Plan, enter a name and then save the copy that you have just created.
6. To run the copied Automation Plan, click **Take Action**.
7. For step 1, select the targets against which you want to run the Baselines from a site. From the **Parameters** tab, select the site that contains the Baselines that you want to execute.

8. For step 2, select the same targets as step 1. You can do this quickly by selecting the `Use same targets as` option.
9. Click **OK** to run the Automation Plan.

Sample plan: Microsoft® Windows® 2008 Cluster - OS patching

This sample Automation Plan automates Microsoft® Windows® cluster patching. As well as managing the cluster as it is patched, the automation flow runs all of the Baselines contained in a site against the nodes in the cluster. Add the Baselines to a custom site before running this plan. All sample plans are read-only. To use a sample plan, you must copy it, re-name it, and then update the placeholder Fixlets with Fixlets, Tasks, or Baselines as per your requirements.

Before running this plan, create a custom site and add all of the Baselines that you want to execute to the custom site. Then when you are running the plan, you select the site containing the Baselines to patch the nodes in the cluster. This plan works in two identical phases, steps 1 to 5 patch the first node or set of nodes in the cluster, and steps 6 to 10 patch the second node or set of nodes in the cluster. So for steps 1 to 5, you target the first node or set of nodes, and for steps 6 to 10 you target the second node or set of nodes.

For more information about running Baselines from sites, see [Running baselines from a site \(on page 61\)](#). For important information about automating patching of Microsoft® Windows® clusters, see [Automating patching of operating systems in Microsoft Windows clusters \(on page 202\)](#). The Windows cluster control scripts must be installed on the target nodes in the cluster. You can install these scripts by running the `110 Install Windows Cluster Control Application` Fixlet.

Complete the following steps to run the sample Automation Plan.

1. Open the **Server Automation** domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the **Automation Plans** dashboard, enter 139 and press Enter. This is the ID of the sample Automation Plan.
4. Select the Automation Plan from the list of Automation Plans.
5. Click **Copy** to copy the Automation Plan, enter a name and then save the copy that you have just created.
6. To run the copied Automation Plan, click **Take Action**.
7. The following table lists each of the steps in the plan and describes what you need to do run them successfully.

Table 37. Plan steps, parameters, and targets

Step	Description
Pause Node (Windows 2008-2012)	This step pauses the first node or group of nodes in the cluster in advance of patching. Target the first node or set of nodes in the cluster.
Move Groups from Node (Windows 2008-2012)	This step moves workloads from the first node or group of nodes in the cluster. Target the first node or set of nodes in the cluster.
Dynamically Run Baselines from a Site	This step runs all of the Baselines contained in a site against the first node or group of nodes in a cluster. Target the first node or set of nodes in the cluster.

Step	Description
	From the Parameters tab, select the site that contains the Baselines that you want to run to patch the nodes in the cluster.
Restart Endpoint on Pending Restart and Wait for Restart to Complete	This step restarts the first node or group of nodes in the cluster. Only endpoints in a <code>Pending Restart</code> state are restarted. Target the first node or set of nodes in the cluster.
Resume Node (Windows 2008-2012)	This step resumes the first node or group of nodes in the cluster. Target the first node or set of nodes in the cluster.
Pause Node (Windows 2008-2012)	This step pauses the second node or group of nodes in the cluster in advance of patching. Target the second node or set of nodes in the cluster.
Move Groups from Node (Windows 2008-2012)	This step moves workloads from the second node or group of nodes in the cluster. Target the second node or set of nodes in the cluster.
Dynamically Run Baselines from a Site	This step runs all of the Baselines contained in a site against the second node or group of nodes in a cluster. Target the second node or set of nodes in the cluster. From the Parameters tab, select the site that contains the Baselines that you want to run to patch the nodes in the cluster.
Restart Endpoint on Pending Restart and Wait for Restart to Complete	This step restarts the second node or group of nodes in the cluster. Only endpoints in a <code>Pending Restart</code> state are restarted. Target the second node or set of nodes in the cluster.
Resume Node (Windows 2008-2012)	This step resumes the second node or group of nodes in the cluster. Target the second node or set of nodes in the cluster.

8. Click **OK** to run the Automation Plan.

Sample plan: Microsoft® SQL Server 2008 Release 2 Cluster - Middleware patching

This sample plan automates patching of Microsoft® SQL Server 2008 Release 2 in a cluster. The plan is designed to automate Microsoft® SQL Server 2008 Release 2 patching for a two node cluster. The first step and last step in the plan are common to each of the nodes in the cluster. For these steps, you must target both nodes in the cluster. For steps 2 to 8, target the first node in the cluster, replacing the placeholder patching Fixlet with a Fixlet, Task, or Baseline to patch Microsoft® SQL Server. For steps 9 to 15, target the second node in the cluster, replacing the placeholder Fixlet with a patching Fixlet, Task or Baseline to patch the Microsoft® SQL Server. All sample plans are read-only. To use a sample plan, you must copy it, re-name it, and then update the placeholder Fixlets with Fixlets, Tasks, or Baselines as per your requirements.

This plan automates patching of a two node Microsoft® SQL Server 2008 Release 2 cluster. The first step in the plan adds the nodes in the cluster to the Administrators group. The patching then proceeds for each node in the cluster, one at a time, with 7 steps for each node in the cluster. After you have copied the sample plan, you can modify it for a cluster with a different number of nodes. For example, if you wanted to modify the copied sample plan for a three

node cluster, you would add another 7 steps, replicas of steps 2 to 8, for the third node in the cluster, and targeting the third node in the cluster when you are running the plan.

Each phase in the patching process completes the following actions:

- Prepatch step, moving all groups off the node and pausing the node
- Make the node unavailable as owner for resources in the cluster
- Resume the node
- Patch Fixlets, Tasks, or Baselines - you must replace the placeholder as per your requirements
- Restart the endpoints
- Make node available as owner of resources in the cluster
- Post-patching cleanup step

Complete the following steps to use this sample plan.

1. Open the Server Automation domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the Automation Plans dashboard, enter 350 for the plan ID to search for the sample plan and press Enter.
4. Select the sample plan from the list of Automation Plans. Click **Copy** to copy the Automation Plan, enter a name and then save the copy that you have just created.
5. To run the copied Automation Plan, click **Take Action**.
6. For step 1, target both nodes in the cluster.
7. For steps 2 to 8, target the first node in the cluster. You can use the **Use same target as step** option as necessary. You must replace the placeholder Fixlet with a Fixlet, Task or Baseline that you want to use to patch Microsoft® SQL Server.
8. For steps 9 to 15, target the second node in the cluster. You can use the **Use same target as step** option as necessary. You must also replace the placeholder Fixlet with a Fixlet, Task or Baseline that you want to use to patch Microsoft® SQL Server.
9. For step 16, target both nodes. This step removes the cluster nodes from the Administrators group.
10. Click **OK** to run the plan.

Sample Plan: Microsoft® SQL Server 2012 and later Cluster - Middleware patching

This sample plan automates patching of Microsoft® SQL Server 2012 and Microsoft® SQL Server 2014 clusters. The plan is designed to automate Microsoft® SQL Server 2012 or Microsoft® SQL Server 2014 patching for a two node cluster. The automation is executed in two phases, one for each node in the cluster. For steps 1 to 7, the first node in the cluster is patched. These steps are then replicated in steps 8 to 14 on the second node in the cluster. At all times during the patching process the cluster remains operational and available. For each phase in the automation, replace the placeholder steps, replacing them with a Fixlet, Task or Baseline to patch Microsoft® SQL Server. All sample plans are read-only. To use a sample plan, you must copy it, re-name it, and then update the placeholder Fixlets with Fixlets, Tasks, or Baselines as per your requirements.

This sample demonstrates how you can automate patching of a two node Microsoft® SQL Server 2012 or Microsoft® SQL Server 2014 cluster. The patching process comprises two phases, one for each node. You can modify the copied plan for a cluster with a different number of nodes. For example, if you want the plan to automate patching for a three node cluster, you would add 7 more steps, replicas of steps 1 to 7 for the third node in the cluster.

Each phase in the patching process completes the following actions:

- Prepatch step, moving all groups off the node and pausing the node
- Make the node unavailable as owner for resources in the cluster
- Resume the node
- Patch Fixlets, Tasks, or Baselines - you must replace the placeholder as per your requirements
- Restart the endpoints
- Make node available as owner of resources in the cluster
- Post-patching cleanup step

Complete the following steps to use this sample Automation Plan.

1. Open the Server Automation domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the Automation Plans dashboard, enter 351 for the plan ID to search for the sample plan and press Enter.
4. Select the sample plan from the list of Automation Plans. Click **Copy** to copy the Automation Plan, enter a name and then save the copy that you have just created.
5. To run the copied Automation Plan, click **Take Action**.
6. For steps 1 to 7, target the first node in the cluster. You can use the **Use same target as step** option as necessary. You must replace the placeholder Fixlet with a Fixlet, Task or Baseline that you want to use to patch Microsoft® SQL Server.
7. For steps 8 to 14, target the second node in the cluster. You can use the **Use same target as step** option as necessary. You must also replace the placeholder Fixlet with a Fixlet, Task or Baseline that you want to use to patch Microsoft® SQL Server.

Sample Plan: IBM® WebSphere® Application Server Cluster - OS patching

This sample plan automates operating system patching for WebSphere® Application Server 8.0, 8.5, or 8.5.5 nodes in a Microsoft Windows cluster. The plan is designed to automate operating system patching for three WebSphere® Application Server nodes in a cluster. The automation is executed in three phases, one for each node. The first step sets the parameters for all other steps in the plan. For steps 2 to 5, the first node is patched. These steps are then replicated in steps 6 to 9 on the second node and in steps 10 to 13 for the third node. For each phase in the automation, replace the placeholder steps, replacing them with a Fixlet, Task or Baseline to patch the operating system. All sample plans are read-only. To use a sample plan, you must copy it, re-name it, and then update the placeholder Fixlets with Fixlets, Tasks, or Baselines as per your requirements.

This sample plan demonstrates how you can automate patching of Microsoft® Windows® for a three node WebSphere® Application Server cluster. The patching process comprises three phases, one for each node. You can

modify the copied plan for a different number of nodes. For example, if you want the plan to automate patching of Microsoft® Windows® for two nodes, you can remove the steps for the third node by deleting steps 10 to 13.

Each phase in the patching process completes the following actions:

- Stops WebSphere® Application Server
- Runs patch Fixlets, Tasks, or Baselines to patch the Microsoft® Windows® operating system - you must replace the placeholder as per your requirements
- Restarts the endpoints
- Resumes WebSphere® Application Server

Complete the following steps to use this sample Automation Plan.

1. Open the Server Automation domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the Automation Plans dashboard, enter 559 for the plan ID to search for the sample plan and press Enter.
4. Select the sample plan from the list of Automation Plans. Click **Copy** to copy the Automation Plan, enter a name and then save the copy that you have just created.
5. To run the copied Automation Plan, click **Take Action**.
6. For step 1, target all steps in the plan and enter the following details on the **Parameters** tab:
 - In the **Deployment Manager user name** field, enter the WebSphere® Application Server Deployment Manager user name.
 - In the **Deployment Manager Password** field, enter password for the WebSphere® Application Server Deployment Manager user.
 - In the **Re-enter Deployment Manager Password** field, re-enter WebSphere® Application Server Deployment Manager password.
 - In the **Deployment Manager host name** field, enter the host name for the WebSphere® Application Server Deployment Manager.
 - In the **Deployment Manager profile name** field, enter profile name for the WebSphere® Application Server Deployment Manager
 - In the **WebSphere Target cluster name** field, enter WebSphere® Application Server Target cluster name.
 - From the **Maintain High Availability** menu, select an option depending on whether or not you want another node to be made available before re-booting.

This step provides the parameters that are required for all further steps in the plan so you only need to enter the parameters once.

7. For steps 2 to 5, target the first node in the cluster. You can use the **Use same target as step** option as necessary. For step 3, you must replace the placeholder Fixlet with a Fixlet, Task or Baseline that you want to use to patch WebSphere® Application Server.

8. For steps 6 to 9, target the second node in the cluster. You can use the **Use same target as step** option as necessary. For step 7, you must also replace the placeholder Fixlet with a Fixlet, Task or Baseline that you want to use to patch WebSphere® Application Server.
9. For steps 10 to 13, target the third node in the cluster. You can use the **Use same target as step** option as necessary. For step 11, you must also replace the placeholder Fixlet with a Fixlet, Task or Baseline that you want to use to patch WebSphere® Application Server.

Sample Plan: IBM® WebSphere® Application Server Cluster - Middleware patching

This sample plan automates middleware patching for WebSphere® Application Server 8.0, 8.5, or 8.5.5 nodes in a Microsoft Windows cluster. The plan is designed to automate middleware patching WebSphere® Application Server in a three node cluster. The automation is executed in three phases, one for each node. The first step in the plan sets the parameters for all other steps in the plan. For steps 2 to 5, the first node is patched. These steps are then replicated in steps 6 to 9 on the second node and in steps 10 to 13 for the third node. For each phase in the automation, replace the placeholder steps, replacing them with a Fixlet, Task or Baseline to patch the operating system. All sample plans are read-only. To use a sample plan, you must copy it, re-name it, and then update the placeholder Fixlets with Fixlets, Tasks, or Baselines as per your requirements.

This sample plan demonstrates how you can automate patching of WebSphere® Application Server in three node cluster. The patching process comprises three phases, one for each node. You can modify the copied plan for a cluster with a different number of nodes. For example, if you want the plan to automate patching for a two node cluster, you can remove steps 10 to 13 for the third node in the cluster.

Each phase in the patching process completes the following actions:

- Stops WebSphere® Application Server
- Runs patch Fixlets, Tasks, or Baselines to patch WebSphere® Application Server - you must replace the placeholder as per your requirements
- Restarts the endpoints
- Resumes WebSphere® Application Server

Complete the following steps to use this sample Automation Plan.

1. Open the Server Automation domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the Automation Plans dashboard, enter 560 for the plan ID to search for the sample plan and press Enter.
4. Select the sample plan from the list of Automation Plans. Click **Copy** to copy the Automation Plan, enter a name and then save the copy that you have just created.
5. To run the copied Automation Plan, click **Take Action**.
6. For step 1, target all steps in the plan and enter the following details on the **Parameters** tab:

- In the **Deployment Manager user name** field, enter the WebSphere® Application Server Deployment Manager user name.
- In the **Deployment Manager Password** field, enter password for the WebSphere® Application Server Deployment Manager user.
- In the **Re-enter Deployment Manager Password** field, re-enter WebSphere® Application Server Deployment Manager password.
- In the **Deployment Manager host name** field, enter the host name for the WebSphere® Application Server Deployment Manager.
- In the **Deployment Manager profile name** field, enter profile name for the WebSphere® Application Server Deployment Manager.
- In the **WebSphere Target cluster name** field, enter WebSphere® Application Server Target cluster name.
- From the **Maintain High Availability** menu, select an option depending on whether or not you want another node to be made available before re-booting.

This step provides the parameters that are required for all further steps in the plan so you only need to enter the parameters once.

7. For steps 2 to 5, target the first node in the cluster. You can use the **Use same target as step** option as necessary. For step 3, you must replace the placeholder Fixlet with a Fixlet, Task or Baseline that you want to use to patch WebSphere® Application Server.
8. For steps 6 to 9, target the second node in the cluster. You can use the **Use same target as step** option as necessary. For step 7, you must also replace the placeholder Fixlet with a Fixlet, Task or Baseline that you want to use to patch WebSphere® Application Server.
9. For steps 10 to 13, target the third node in the cluster. You can use the **Use same target as step** option as necessary. For step 11, you must also replace the placeholder Fixlet with a Fixlet, Task or Baseline that you want to use to patch WebSphere® Application Server.

Sample Plan: Microsoft Exchange 2007 Mailbox Cluster - Middleware Patching

This sample plan automates patching of Microsoft Exchange 2007 middleware in a mailbox cluster. The plan is designed to automate Microsoft Exchange 2007 patching in a two node cluster. The automation is executed in two phases, one for each node in the cluster. For steps 1 to 7, the first node in the cluster is patched. These steps are then replicated in steps 8 to 14 on the second node in the cluster. At all times during the patching process the cluster remains operational and available. For each phase in the automation, replace the placeholder steps, replacing them with a Fixlet, Task or Baseline to patch Microsoft Exchange. All sample plans are read-only. To use a sample plan, you must copy it, re-name it, and then update the placeholder Fixlets with Fixlets, Tasks, or Baselines as per your requirements.

Before you can run this sample plan, you must run the following Tasks on all target endpoints.

- 123 Install IBM Exchange Cluster Manager Service
- 110 Install Windows Cluster Control Application

This sample plan demonstrates how you can automate patching of a two node Microsoft Exchange 2007 mailbox cluster. The patching process comprises two phases, one for each node. You can modify the copied plan for a cluster with a different number of nodes. For example, if you want the plan to automate patching for a three node cluster, you would add 7 more steps, replicas of steps 1 to 7, for the third node in the cluster.

Complete the following steps to use this sample Automation Plan.

1. Open the Server Automation domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the Automation Plans dashboard, enter 170 for the plan ID to search for the sample plan and press Enter.
4. Select the sample plan from the list of Automation Plans. Click **Copy** to copy the Automation Plan, enter a name and then save the copy that you have just created.
5. To run the copied plan, click **Take Action**.
6. For steps 1 to 7, target the first node in the cluster. You can use the **Use same target as step** option as necessary. You must replace the placeholder Fixlet with a Fixlet, Task or Baseline that you want to use to patch Microsoft Exchange.
7. For steps 8 to 14, target the second node in the cluster. You can use the **Use same target as step** option as necessary. You must also replace the placeholder Fixlet with a Fixlet, Task or Baseline that you want to use to patch Microsoft Exchange.
8. Click **OK** to run the plan.

Sample Plan: Microsoft Exchange 2010 or 2013 DAG Cluster - Middleware Patching

This sample plan automates patching of Microsoft Exchange 2010 or 2013 middleware in a cluster. The plan is designed to automate Microsoft Exchange patching in a two node cluster. The automation is executed in two phases, one for each node in the cluster. For steps 1 to 5, the first node in the cluster is patched. These steps are then replicated in steps 6 to 10 on the second node. Optionally, if you have a File Share Witness configured, you can add Task 134 `Check File Share Witness status on a Microsoft Windows cluster` to check the status of the File Share Witness. For each phase in the automation, replace the placeholder steps, replacing them with a Fixlet, Task or Baseline to patch Microsoft Exchange. All sample plans are read-only. To use a sample plan, you must copy it, rename it, and then update the placeholder Fixlets with Fixlets, Tasks, or Baselines for your patching requirements.

Before you can run this sample plan, you must run the following Tasks on all target endpoints.

- 123 `Install IBM Exchange Cluster Manager Service`
- 110 `Install Windows Cluster Control Application`
- This Task is supported only on Microsoft Windows 2008 Server Release 2 or newer.
- If you are using Task 134 `Check File Share Witness status on a Microsoft Windows cluster` to check the status of the File Share Witness, the target computers must have the Powershell V2.0 feature installed.
- The targets must have the Windows Failover Cluster Module feature installed and the cluster service must be running.

This sample plan demonstrates how you can automate patching of Microsoft Exchange 2010 or 2013 in a two node cluster. The patching process comprises two phases, one for each node. You can modify the copied plan for a cluster with a different number of nodes. For example, if you want the plan to automate patching for a three node cluster, you would add 5 more steps after step 11, replicas of steps 1 to 5, for the third node in the cluster. The last step in the plan must be Task 128 `Rebalance Active Databases Task Exchange 2010 and Exchange 2013 DAG`.

If you have a file share witness configured on your cluster, you can optionally add Task ID 164 `Check File Share Witness status on a Microsoft Windows cluster` to the plan after the `Restart Endpoint and Wait for Restart to Complete` step. This Task checks the status of the File Share Witness on the targeted host and checks whether the host can access the File Share which has been configured for the File Share Witness in the cluster. If you are using this optional Task 164, review the Task description for information about usage and prerequisites. For more information, see `Check if File Share Witness is accessible`. If you want to add Task 163 `Check Status and Start Services on Microsoft Exchange` and Task 164, add Task 163 `Check Status and Start Services on Microsoft Exchange` after the `Restart Endpoint and Wait for Endpoint to Restart` step and then add Task 164 as the next step.

Complete the following steps to use this sample Automation Plan.

1. Open the Server Automation domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the Automation Plans dashboard, enter 171 for the plan ID to search for the sample plan and press Enter.
4. Select the sample plan from the list of Automation Plans. Click **Copy** to copy the Automation Plan, enter a name and then save the copy that you have just created.
5. To run the copied Automation Plan, click **Take Action**.
6. For steps 1 to 5, target the first node in the cluster. You can use the **Use same target as step** option as necessary. You must replace the placeholder Fixlet with a Fixlet, Task or Baseline that you want to use to patch Microsoft Exchange.
7. For steps 6 to 10, target the second node in the cluster. You can use the **Use same target as step** option as necessary. You must also replace the placeholder Fixlet with a Fixlet, Task or Baseline that you want to use to patch Microsoft Exchange.
8. For step 11, target both nodes in the cluster.
9. Click **OK** to run the plan.

Sample Plan: IBM® WebSphere® Application Server Standalone - OS patching

This sample plan automates operating system patching for stand-alone WebSphere® Application Server 8.0, 8.5, or 8.5.5. nodes. The plan is designed to automate operating system patching for two stand-alone WebSphere® Application Server nodes. The automation is executed in two phases, one for each node. For steps 1 to 4, the first node is patched. These steps are then replicated in steps 5 to 8 on the second node. For each phase in the automation, replace the placeholder steps, replacing them with a Fixlet, Task or Baseline to patch the operating system. All sample plans are read-only. To use a sample plan, you must copy it, re-name it, and then update the placeholder Fixlets with Fixlets, Tasks, or Baselines as per your requirements.

This sample plan demonstrates how you can automate patching of Microsoft® Windows® for two stand-alone WebSphere® Application Server nodes. The patching process comprises two phases, one for each node. You can modify the copied plan for a different number of nodes. For example, if you want the plan to automate patching of Microsoft® Windows® for three nodes, you would add 4 more steps, replicas of steps 1 to 4 for the third stand-alone node.

Each phase in the patching process completes the following actions:

- Saves the server running state for all WebSphere® Application Server profiles and stops WebSphere® Application Server
- Runs patch Fixlets, Tasks, or Baselines to patch the Microsoft® Windows® operating system - you must replace the placeholder as per your requirements
- Restarts the endpoints
- Resumes WebSphere® Application Server based on the saved states from the first step

Complete the following steps to use this sample Automation Plan.

1. Open the Server Automation domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the Automation Plans dashboard, enter 552 for the plan ID to search for the sample plan and press Enter.
4. Select the sample plan from the list of Automation Plans. Click **Copy** to copy the Automation Plan, enter a name and then save the copy that you have just created.
5. To run the copied Automation Plan, click **Take Action**.
6. For steps 1 to 4, target the first node. You can use the **Use same target as step** option as necessary. You must replace the placeholder Fixlet with a Fixlet, Task or Baseline that you want to use to patch the Microsoft® Windows® operating system.
7. For steps 5 to 8, target the second node. You can use the **Use same target as step** option as necessary. You must also replace the placeholder Fixlet with a Fixlet, Task or Baseline that you want to use to patch the Microsoft® Windows® operating system.

Sample Plan: IBM® WebSphere® Application Server standalone - Middleware patching

This sample plan automates patching of WebSphere® Application Server v8.0, 8.5, or 8.5.5 for two stand-alone nodes. The automation is executed in two phases, one for each node. For steps 1 to 4, the first node is patched. These steps are then replicated in steps 5 to 8 on the second node. For each phase in the automation, replace the placeholder steps, replacing them with a Fixlet, Task or Baseline to patch WebSphere® Application Server. All sample plans are read-only. To use a sample plan, you must copy it, re-name it, and then update the placeholder Fixlets with Fixlets, Tasks, or Baselines for your patching requirements.

This sample plan demonstrates how you can automate patching of WebSphere® Application Server in two stand-alone nodes. The patching process comprises two phases, one for each node. You can modify the copied plan for a different number of nodes. For example, if you want the plan to automate patching for three nodes, you would add 4 more steps, replicas of steps 1 to 4 for the third node.

Each phase in the patching process completes the following actions:

- Stops WebSphere® Application Server
- Runs patch Fixlets, Tasks, or Baselines to patch WebSphere® Application Server - you must replace the placeholder as per your requirements
- Restarts the endpoints
- Resumes WebSphere® Application Server

Complete the following steps to use this sample Automation Plan.

1. Open the Server Automation domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the Automation Plans dashboard, enter 553 for the plan ID to search for the sample plan and press Enter.
4. Select the sample plan from the list of Automation Plans. Click **Copy** to copy the Automation Plan, enter a name and then save the copy that you have just created.
5. To run the copied Automation Plan, click **Take Action**.
6. For steps 1 to 4, target the first node. You can use the **Use same target as step** option as necessary. You must replace the placeholder Fixlet with a Fixlet, Task or Baseline that you want to use to patch WebSphere® Application Server.
7. For steps 5 to 8, target the second node. You can use the **Use same target as step** option as necessary. You must also replace the placeholder Fixlet with a Fixlet, Task or Baseline that you want to use to patch WebSphere® Application Server.

Sample Plan: Patching a VMware Windows Template

This sample plan automates patching of VMware templates on Microsoft® Windows® platforms. The automation process works by first creating a virtual machine from the template that you want to patch, then patching the newly created virtual machine, removing the BigFix client identity data, and then converting the virtual machine back to a VMware template. All sample plans are read-only. To use a sample plan, you must copy it, rename it, and then update the placeholder Fixlets with Fixlets, Tasks, or Baselines as per your requirements.

- This patching solution supports only VMware virtual machines and templates.
- The VMware management extender must be installed and must be configured correctly. For information about installing the management extender, see [Installing the management extender \(on page 33\)](#).
- Remote Connector must be installed on the computer that has the VMware management extender installed. Use Server Automation Task 1680 `Install BigFix Remote Connector Tool for SA v9.5` to install Remote Connector.



Note: RXA module is getting deprecated. The Remote Connector module provides the same level of functionality as the existing RXA module. From Server Automation 9.5.61 onwards, BigFix does not support installation or maintenance of RXA module.

- The VMware template that you are patching must have the BigFix client installed and you must provide the host name or IP address, user name and password of the target computer (virtual machine) that is created from the template in step 1 of the plan.
- If necessary, activate both Virtualization analyses `VMware Host Overview` and `SSL Encryption Analysis for Windows Administrator Password`.

Each phase in the patching process completes the following actions:

- Step 1 creates a new virtual machine from the template that you want to patch. Make a note of the name you enter for the new virtual machine and after it is created, note its IP address or host name.
- Step 2 applies the operating system patches to the newly created virtual machine.
- Step 3 removes the BigFix client identity data from the newly created virtual machine using Remote Connector (or RXA). For this step, you must target the computer on which Remote Connector (or RXA) and the management extender are installed from the **Targets** tab and from the **Parameters** tab, you must enter the IP address and host name of the virtual machine created in step 1.
- Step 4 powers off the newly created virtual machine.
- Step 5 converts the newly created and patched virtual machine back to a template with the same name as the newly created virtual machine in step 1.



Important: The targeting for this plan is different to most sample plans. For the third step, on the **Targets** tab, you must target the computer on which Remote Connector (or RXA) is installed and on the **Parameters** tab, you must enter the IP address or host name of the virtual machine that is created in step 1. Read the targeting information carefully before running the plan.

Complete the following steps to use this sample Automation Plan.

1. Open the Server Automation domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the Automation Plans dashboard, enter 161 for the plan ID to search for the sample plan and press Enter.
4. Select the sample plan from the list of Automation Plans. Click **Copy** to copy it, enter a name, and then save the copy that you have just created.
5. To run the copied Automation Plan, click **Take Action**.
6. For steps 1, target the host that contains the template that you are using to create a virtual machine. On the **Parameters** tab, enter the parameters as described in [Creating a Windows virtual machine from a template \(on page 94\)](#).
7. For steps 2, on the **Targets** tab, use **The computers specified in the list of names below option** and enter the name of the virtual machine that you created in step 1. Replace the placeholder Fixlet with a Fixlet, Task, or Baseline to patch the VMware virtual machine.
8. For step 3, on the **Targets** tab, select the **Use applicability** option and target the computer on which Remote Connector (or RXA) and the management extender is installed and on the **Parameters** tab, enter the IP address or host name, user name, and password for the newly created virtual machine.

9. For step 4, on the **Targets** tab, use **The computers specified in the list of names below option** and enter the name of the virtual machine that you created in step 1.
10. For step 5, on the **Targets** tab, use **The computers specified in the list of names below option** and enter the name of the virtual machine that you created in step 1. On the **Parameters** tab, enter the parameters as described in [Converting a virtual machine to a template \(on page 102\)](#).
11. Click **OK** to run the plan.

Sample Plan: Patching a VMware Linux® Template

This sample plan automates patching of a VMware template on Linux® systems. The automation process works by first creating a virtual machine from the template that you want to patch, then patching the newly created virtual machine, removing the BigFix client identity data, and then converting the virtual machine to a VMware template. All sample plans are read-only. To use a sample plan, you must copy it, re-name it, and then update the placeholder Fixlet with Fixlets, Task, or Baselines as per your requirements.

- This patching solution supports only VMware virtual machines and templates.
- The VMware management extender must be installed and must be configured correctly. For information about installing the management extender, see [Installing the management extender \(on page 33\)](#).
- Remote Connector must be installed on the endpoint on which the management extender is installed. Use Server Automation Task 168 `Install BigFix Remote Connector Tool for SA v9.5` to install Remote Connector.



Note: RXA module is getting deprecated. The Remote Connector module provides the same level of functionality as the existing RXA module. From Server Automation 9.5.61 onwards, BigFix does not support installation or maintenance of RXA module.

- The VMware template that you are patching must have the BigFix client installed and you must provide the host name or IP address or host name, user name and password of the target computer.
- If necessary, activate both analyses `VMware Host Overview` and `SSL Encryption Analysis for Windows Administrator Password`.

Each phase in the patching process completes the following actions:

- Step 1 creates a new virtual machine from the template that you want to patch. Make a note of the name you enter for the new virtual machine and after it is created, note its IP address or host name.
- Step 2 applies the operating system patches to the newly created virtual machine.
- Step 3 removes the BigFix client identity data from the newly created virtual machine using [Remote Connector \(on page 243\)](#) (or RXA). For this step, you must target the computer on which Remote Connector (or RXA) and the management extender are installed from the **Targets** tab and from the **Parameters** tab, you must enter the IP address and host name of the virtual machine created in step 1.
- Step 4 powers off the newly created virtual machine.
- Step 5 converts the newly created and patched virtual machine back to a template with the same name as the newly created virtual machine in step 1.



Important: The targeting for this plan is different to most sample plans. For the third step, on the **Targets** tab, you must target the computer on which Remote Connector (or RXA) is installed and on the **Parameters** tab, you must enter the IP address or host name of the virtual machine that is created in step 1. Read the targeting information carefully before running the plan.

Complete the following steps to use this sample Automation Plan.

1. Open the Server Automation domain.
2. From the navigation tree in the Domain Panel, click **Automation Plans**.
3. In the Automation Plans dashboard, enter 165 for the plan ID to search for the sample plan and press Enter.
4. Select the sample plan from the list of Automation Plans. Click **Copy** to copy it, enter a name, and then save the copy that you have just created.
5. To run the copied Automation Plan, click **Take Action**.
6. For steps 1, target the host that contains the template that you are using to create a virtual machine. On the **Parameters** tab, enter the parameters as described in [Creating a Windows virtual machine from a template \(on page 94\)](#).
7. For steps 2, on the **Targets** tab, use **The computers specified in the list of names below option** and enter the name of the virtual machine that you created in step 1. Replace the placeholder Fixlet with a Fixlet, Task, or Baseline to patch the VMware virtual machine.
8. For step 3, from the **Targets** tab, select the **Use applicability** option and target the computer on which you installed [Remote Connector \(on page 243\)](#) (or RXA) - this is the computer on which the management extender is installed. On the **Parameters** tab, enter the IP address or host name, Administrator user name and password of the virtual machine that you created in step 1. The host name is required for Remote Connector (or RXA) to make required changes to the BigFix client.
9. For step 4, on the **Targets** tab use **The computers specified in the list of names below option** and enter the name of the virtual machine that you created in step 1.
10. For step 5, enter the name of the virtual machine that you created in step 1 and on the **Parameters** tab, enter the parameters as described in [Converting a virtual machine to a template \(on page 102\)](#).
11. Click **OK** to run the plan.

Chapter 6. Server Automation content

Server Automation provides content that you can use to automate processes and software deployment.

Advanced patching

You can use Server Automation to complete several advanced patching scenarios, for example to automate patching of virtual machine templates.

Patching IBM® WebSphere® Application Server on Microsoft® Windows® standalone

You can use Server Automation to automate patching of a Windows® cluster that is running stand-alone nodes of WebSphere® Application Server v8.0, v8.5, or v8.5.5.

- Before running any of the patching steps the control scripts must be installed. Use Task `110-Install Windows Cluster Control Application` to install the control scripts.
- This patching solution is supported only on Microsoft Windows 2008 Server Release 2 or newer.

You automate the patching process using an Automation Plan. To automate the patching, you can use Server Automation [sample plan ID 552 \(on page 193\)](#) or [sample plan ID 553 \(on page 194\)](#). Use sample plan ID 552 to automate patching of the operating system for two standalone WebSphere® Application Server nodes, or use sample plan ID 553 to automate the WebSphere® Application Server middleware patching for two standalone nodes.

To automate the patching process, use one of the sample plans listed above, or create an Automation Plan that contains the following content.

1. Use Task `Stop Servers for Stand-alone IBM WebSphere Application Server (8.0, 8.5, or 8.5.5) on Microsoft Windows` to stop the WebSphere® Application Server servers as the first step in the plan. Enter the WAS instance parameter value and enter the WAS credentials user name and password. You can set these values as defaults using the **Default Settings** Server Automation .
2. Include the patch Fixlets to patch WebSphere® Application Server as the second step in the plan.
3. Include one of the following Tasks, depending on whether you are automating patching of the middleware or the operating system:
 - If you are automating patching the WebSphere® Application Server middleware, use Task `160 Restart Endpoint on Pending Restart and Wait for Restart to Complete`.
 - If you are automating patching of the operating system, use Task `126 Restart Endpoint and Wait for Restart to Complete`.
4. Run Task `551 Resume Servers for Stand-alone IBM WebSphere Application Server (8.0 or 8.5) on Microsoft Windows` to resume WebSphere® Application Server.
5. Repeat this process for the second node in the cluster and for any other nodes.

Patching VMware virtual machine templates

To patch a VMware virtual machine template, you run a copy of a Server Automation sample plan. Use sample plan ID 161 to patch a VMware virtual machine template on Microsoft® Windows®, and use sample plan ID 165 to patch on Linux®. The plan automates the process of patching the virtual machine template by creating a new virtual machine from the template that you want to patch, patching that virtual machine, removing BigFix client identity data, and then converting the virtual machine back to a template. The new template is a mirror of the original template except that it has a new name and is updated with your patching content and does not contain the BigFix client identity data and is therefore generic.

Make sure that your system meets the following requirements:

- This patching solution supports only VMware virtual machines and templates.
- The VMware management extender must be installed and must be configured correctly. For information about installing the management extender, see [Installing the management extender \(on page 33\)](#).
- Remote Connector must be installed on the computer that has the VMware management extender installed. Use Server Automation Task 160 `Install BigFix Remote Connector` to install Remote Connector.



Note: RXA module is getting deprecated. The Remote Connector module provides the same level of functionality as the existing RXA module. From Server Automation 9.5.61 onwards, BigFix does not support installation or maintenance of RXA module.

- The VMware template that you are patching must have the BigFix client installed and you must provide the host name or IP address, user name and password of the target computer (virtual machine) that is created from the template in step 1 of the plan.
- If necessary, activate both Virtualization analyses `VMware Host Overview` and `SSL Encryption Analysis for Windows Administrator Password`.

The plan that you run to automate patching of a virtual machine template completes the following tasks:

- Step 1 creates a new virtual machine from the template that you want to patch. Make a note of the name you enter for the new virtual machine and after it is created, note its IP address or host name.
- Step 2 applies the operating system patches to the newly created virtual machine.
- Step 3 removes the BigFix client identity data from the newly created virtual machine using Remote Connector (or RXA). For this step, you must target the computer on which Remote Connector (or RXA) and the management extender are installed from the **Targets** tab and from the **Parameters** tab, you must enter the IP address and host name of the virtual machine created in step 1.
- Step 4 powers off the newly created virtual machine.
- Step 5 converts the newly created and patched virtual machine back to a template with the same name as the newly created virtual machine in step 1.



Important: The targeting for this plan is atypical and different to most sample plans. For the third step, on the **Targets** tab, you must target the computer on which Remote Connector (or RXA) is installed and on the



Parameters tab, you must enter the IP address or host name of the virtual machine that is created in step 1. Read the targeting information carefully before running the plan.

When this automation process has completed, the newly created template is generic and patched and available to use.

Complete the following steps to patch a virtual machine template.

1. From the Server Automation domain, search for and select sample plan ID 161 `Patch VMware Windows Template` for Windows or sample plan ID 165 `Patch VMware Linux Template` for Linux.
2. Create a copy of the sample plan and save the copy.
3. Select the copy of the plan and click **Take Action**.
4. For step 1 `VMware Create Windows Virtual Machine from Template`, from the **Targets** tab, target the host that contains the template that you are using to create a virtual machine and from the **Parameters** tab, enter the parameters as described in [Creating a Windows virtual machine from a template \(on page 94\)](#).
5. For step 2, on the **Targets** tab, on the **Targets** tab, use **The computers specified in the list of names below option** and enter the computer name of the virtual machine that you created in step 1 and replace the placeholder Fixlet with the Fixlet, Task, or Baseline that you want to use to patch the virtual machine template.
6. For step 3, from the **Targets** tab, select the **Use applicability** option and target the computer on which you installed Remote Connector (or RXA) - this is the computer on which the management extender is installed. On the **Parameters** tab, enter the IP address or host name, Administrator user name and password of the virtual machine that you created in step 1. The host name is required for Remote Connector (or RXA) to make required changes to the BigFix client.
7. For step 4, from the **Targets** tab, select the **The computers specified in the list of names below** option and enter the name of the virtual machine that you created in step 1.
8. For step 5, from the **Targets** tab, use **The computers specified in the list of names below** option and enter the name of the virtual machine that you created in step 1. From the **Parameters** tab, enter the parameters as described in [Converting a virtual machine to a template \(on page 102\)](#).

Patching Microsoft Windows® clusters

You can use Server Automation to automate patching of Microsoft Windows® clusters. Server Automation contains preconfigured Fixlets that allow you to patch Microsoft Windows® clusters.

The Server Automation cluster patching Fixlets enable you to patch the operating systems in Microsoft Windows® clusters by managing the cluster as the operating systems are patched. For example, you can use the Server Automation Fixlets for patching scenarios such as Microsoft SQL Server cluster patching.

If you have a File Share Witness configured for a cluster, you can check if the File Share Witness is accessible from the target computers during the patching process. For more information, see [Check if File Share Witness is accessible](#).

Automating patching of operating systems in Microsoft® Windows® clusters

You can patch Windows® clusters using Server Automation Fixlets. To automate the workflow, you combine the Fixlets in an Automation Plan. The Automation Plan that automates the workflow includes a Fixlet to pause the node that you are patching. Another Fixlet moves any groups on the node to another node. The Fixlets to patch the operating system are run next. The last Fixlet in the workflow resumes the node. The Fixlets to pause and resume the nodes are operating system-specific and the supported operating systems are described in the Fixlet descriptions.

The following topics describe patch clusters on various Windows versions:

- [Automating patching of operating systems in Microsoft Windows 2003 and 2008 clusters \(on page 202\)](#)
- [Automating patching of clusters on Windows 2008 Release 2 and later operating systems \(on page 203\)](#)
- [Managing Always On Availability Groups \(on page 204\)](#)

Automating patching of operating systems in Microsoft® Windows® 2003 and 2008 clusters

Read this topic to learn how to patch Windows 2003 and 2008 clusters.

The Windows® cluster control scripts must be installed on the target nodes in the cluster. You can install these scripts by running the `110 Install Windows Cluster Control Application` Fixlet.

The Server Automation cluster patching Fixlets support general Microsoft Windows® clusters, including patching scenarios such as Microsoft SQL Server cluster patching.

The following procedure is designed for use with a cluster set up with a quorum configured for the following systems:

- DiskWitness only (2012 systems)
- NoMajority (Disk Only) (2008 systems)
- Standard Quorum (2003 systems)

With this setup, the cluster remains operational as long as at least one of the nodes in the cluster is still running. If the quorum for the cluster is configured in any other way, ensure that when targeting the nodes in the cluster that half of the total nodes +1 are operational at any time. For example, if there are 20 nodes in the cluster, 11 nodes (10 +1) nodes must be operational at any one time. If there are 16 nodes in the cluster, 9 nodes (8 +1) must be operational at any one time. Otherwise, the cluster stops working. The cluster does not resume functioning correctly until more than half the nodes have resumed the cluster service and the cluster is unavailable until this time.



Note: If your clusters are on Windows® 2008 Release 2 or later operating systems, you can use an alternative procedure to automate the patching workflow. For more information, see [Automating patching of clusters on Windows 2008 Release 2 and later operating systems \(on page 203\)](#).

Complete the following steps to patch a Windows® cluster using the Server Automation Fixlets.

1. Pause the node or nodes in the cluster that you want to patch. Run Fixlet `112 Pause Node in the Cluster (Windows 2003)` to pause the node on Windows® 2003 and Fixlet `116 Pause Node in the Cluster (Windows 2008-2012)` to pause the node on Windows® 2008 and 2012. When running the Fixlet to pause the node, target each node that you want to pause.
2. Move any groups on the node to another node. Use Fixlet `111 Move Groups from Node in the Cluster (Windows 2003)` to move groups on Windows® 2003 and use Fixlet `114 Move Groups from Node in the Cluster (Windows 2008-2012)` to move groups on Windows® 2008 and 2012.
3. Patch or update the node as required. If you use a Baseline to patch the node, check if the Baseline contains an action script that causes the node to report a status of `Pending Restart`, for example, `action requires restart`. If the node returns a `Pending Restart` status, the system determines this as a `wait` state and does not complete the step. To correct this, you must include a restart Fixlet as part of the Baseline.
4. Resume the node. To resume on Windows® 2003, use Fixlets `113 Resume Node in the Cluster (Windows 2003)`. To resume on Windows® 2008 or Windows® 2012, use Fixlets `115 Resume Node in the Cluster (Windows 2008-2012)`.
5. Repeat this process for the remaining nodes in the cluster.

Automating patching of clusters on Windows® 2008 Release 2 and later operating systems

To patch clusters with Windows® 2008 Release 2 and later operating systems, there are two enhanced patching Tasks available. Using these Tasks in an Automation Plan to automate the workflow reduces the number of group moves through the patching cycle, while maintaining the clustered applications availability for the maximum possible time during patching. The cluster groups remain on the nodes they were on before the patching for the maximum possible time and each node is returned to its original state after it is patched, rather than at the end of the entire cluster patching process.

- Before running any of the patching steps, the control scripts must be installed. Use Task `110-Install Windows Cluster Control Application` to install the control scripts on each of the endpoints.
- Powershell must be installed on the node. Powershell is installed by default on all instances of Microsoft Server from 2008 Release 2 onwards, except for core installations. For core installations, use the following links to install Powershell:
 - <http://support.microsoft.com/kb/976736>
 - http://technet.microsoft.com/en-us/library/hh847837.aspx#BKMK_InstallingOnServerCore

You use an automation plan to process the automation flow and patch the nodes in the cluster. You complete the patching in two phases, in the first phase, you patch the first node or group of nodes. You then repeat the process on the second node or group of nodes. The cluster remains operational at all times throughout the patching process.

Complete a procedure similar to the following to automate the patching process.

1. Create a new automation plan or copy a suitable sample automation plan.
2. Add Task `138 Pre Patching Task For Non Hyper-V Clustered Microsoft Servers (Version 2008 R2 onwards)` as the first step in the plan. When you are running the plan, you target the first node or group of nodes.

This Task performs the following functions:

- a. Creates a file that lists all groups and virtual machines in the cluster, including what nodes they are on and the states of each resource in the cluster. If there are empty groups (groups with no resources) in the cluster, a second file is created detailing these groups.
- b. Pauses the node.
- c. Moves any groups on the node that have other available owners. If there are no other potential owners available to take a group, the task will fail. If a group is set up to be online only on the current node, the task takes this group offline (groups with only the target node as the possible owner of the group or at least one of the resources in the group).
- d. Moves groups that have other available owners. If no other owners are available to take groups, the Task fails. Any groups set up to be online only on the current node (only target set as possible owner of the group or at least one resource in the group) are the taken offline.
- e. Takes any empty groups offline.
- f. Checks to ensure the node is paused and has no active groups remaining and is a state suitable for patching the server operating system.



Note: This Task does not move any groups that were offline before the Task was run.

3. Add a second step to the plan, selecting the Fixlet, Task, or Baseline to patch the underlying operating system. When you are running the plan, you target the first node or group of nodes.
4. Add a third step to the plan, selecting Server Automation Task ID 126 `Restart Endpoint and Wait for Endpoint to Restart`. When you are running the plan, you target the first node or group of nodes.
5. Add a fourth step to the plan, selecting Server Automation Task ID 129 `Post Patching task for Microsoft Server Clusters (Server 2008 R2 onwards including Hyper-V Clusters)`. When you are running the plan, you target the first node or group of nodes.

This Task performs the following functions:

- a. Resumes the node.
 - b. If the cluster detail file is found on the targeted endpoints, the Task checks this file and moves any virtual machines and groups back on to the node if they were moved off the node during patching. The Task then brings back online any empty groups or groups which had the target node as the only possible owner of the group before patching.
6. Add four more steps to the plan, to repeat the automation flow completed in steps 2 to 5 for the remaining nodes in the cluster. For each of these steps, you must target the second node or group of nodes in the cluster.

Managing Always On Availability Groups

The content (automation plans, tasks, and scripts) for managing Windows 2008 R2 and later clusters can be used to provide enhanced monitoring and process improvement to manage Windows 2012 and later clusters with Always On Availability Groups (AAGs). To improve the performance by patching the appropriate node, include the monitoring tasks defined in this section in your automation plans.

Monitoring and patching process

Console Operators can plan patching Windows 2012 and later clusters with Always On Availability Groups (AAGs) in two phases. In the first phase, before a given [maintenance window](#), they can monitor the nodes in the environment and manually patch secondary nodes. In the second phase, within the maintenance window, they can target the primary and standalone nodes. This helps to complete patching within the scheduled time limit without spill over, because only the active node is patched during the maintenance window.

Status Collector

Status Collector is a service implemented as a Windows scheduled task that collects important information about the cluster nodes. This task checks the status of the nodes to monitor the health of the failover cluster. This identifies which ones are primary and which ones are secondary nodes.

Prerequisites

Following are the prerequisites to install Status Collector.

- **Operating System:** The cluster nodes must have Windows® 2012 and later and must be configured with AAGs.
- **Database:** The database on the nodes must be MS SQL enterprise edition only.

For detailed prerequisites, restrictions, and recommendations for Always On Availability Groups , see <https://docs.microsoft.com/en-us/sql/database-engine/availability-groups/windows/prereqs-restrictions-recommendations-always-on-availability?view=sql-server-ver16>

Status Collector Tasks

Status Collector runs on the cluster nodes. The scheduled task periodically executes a PowerShell script to query the node and reports the required information through `Analysis 176 - Status of the Always-On failover cluster`.

The following are the Tasks available to install, edit, and uninstall Status Collector.

Task 173 - Deploy Status collector for Windows cluster

Run this Task to install Status Collector. This task checks if the Windows Task Scheduler service is enabled and set to Automatic. If yes, it creates a new task to invoke the provided PowerShell script and the *Trigger* will be a schedule reflecting the frequency chosen by the Console user. The PowerShell script gathers the node status and writes this information together with the execution timestamp, in a file to be saved in a fixed location (**output file location** will be `<BES Client folder>\Applications \StatusCollector folder`).

 **Important:**



- This Task becomes relevant only for the computers that have SQL Server service and Windows Cluster service installed. The applicability of the install Task checks for the Status Collector to be already scheduled in the Windows task Scheduler.
- This is a specific scheduled task to support AAGs. If this task is deployed with another type of Windows cluster other than AAGs, it does not report any information.
- As far as the scheduled task is configured, the user account used to run it is set as **SYSTEM** by default. If you want it to run under a different user account after the installation, ensure the user account has the required privileges to execute the PowerShell script. To configure the user account, open the Windows scheduled task, and under **General**→**Security options**, change it to the required value.

You can configure the following settings while installing Status Collector.

- **Polling time for script execution (in Minutes):** This is the execution frequency of the Status collector task to fetch the status of the node. The default frequency for the script execution is set to 60 minutes.
- **DB Instance name:** It is the name of the SQL Server instance. If kept as `DEFAULT`, the computer name is used as the DB Instance name. If the SQL Server instance name is different from the computer name, you must specify the exact SQL Server instance name of the node here.



Note:

- BigFix Console does not provide the information about the name of the cluster that a particular node belongs to. The Console Operator is expected to find this out.
- **Threshold for Logs folder (in MB):** The maximum disk space that is allowed to store the Status collector log files. Default value is 100 MB. When this threshold is reached, the oldest log files are automatically deleted to accommodate the newest log files within the specified threshold.

Task 174 - Edit Status collector for windows cluster

With this Task, you can modify the settings (Polling time for script execution, DB Instance name, Threshold for Logs folder) configured during the installation of Status Collector through `Task 173 - Deploy status collector`. This Task reconfigures Status Collector on the fly without the need to uninstall or re-deploy it.

Task 175 - Remove Status collector for windows cluster

This Task uninstalls Status Collector that was previously installed. When you uninstall, you cannot monitor through Status Collector anymore.

Analysis to monitor the status

From the BigFix Console, you can monitor the status of the nodes in the cluster with `Analysis 176 - Status of the Always-On failover cluster`. With this analysis, user can monitor and configure the roles of the nodes such as Primary, Secondary, or Standalone node. It reports the timestamp at which the active node last reported. Based on this, the Console Operator can decide which node to be patched within and outside the maintenance window and ensure high availability. This analysis displays the following information.

Computer Name	Role	Preferred Failover	Failover Mode Description	Timestamp	No of Nodes
BL-91	HA_Secondary	<none>	Manual	05/24/2022 09:54:53	2
BL-131	<none>	<none>	NONE	<none>	<none>
BL-81	HA_Primary	<none>	Manual	05/24/2022 09:54:24	2



Important: When the node is not configured with AAG cluster, <None> is displayed in all the fields.

Computer Name

Computer name of the node in a cluster.

Role

Role of the node as configured by the user such as HA_Primary, HA_Secondary, and Standalone.

Failover mode description

- **Manual** – If the HA_Primary node goes down, it does not switch over to secondary node automatically. User must manually select another node as HA_Primary.
- **Automatic** – If the HA_Primary node goes down, it automatically switches over to the secondary node configured under Preferred Failover column.
- **None** – When the node is not configured with AAG cluster, it displays <None>.

Preferred failover

If *Automatic* failover mode is selected, when the HA_Primary node goes down, the server name mentioned under Preferred failover becomes the HA_Primary node.

 **Important:** Ensure the server mentioned under preferred failover is patched outside the maintenance window appropriately to enable it to respond immediately in case of failure of the primary node.

Timestamp

Timestamp shows the date and time at which the data was collected from the nodes to display in the analysis. This indicates when the server responded to the query at the latest. Based on this timestamp, Console Operators can decide if the server status has changed. This can help to decide which server to patch within or outside the maintenance window.

Number of nodes in the cluster

It shows the number of nodes configured in the cluster that a node belongs to.

Task 344 – Make node unavailable as possible owner of resources in cluster with safety check

This Task is an updated version (besides the currently available version) of `fixlet responsible for marking Cluster nodes unavailable`.

This Task is available only for the clusters with 3 or more nodes. It performs an additional safety check before marking any node unavailable for the cluster failover. If the safety check fails, it retries another two times (three attempts in total).

This Task ensures that at any point in time, there are more than half the number of nodes are available to respond to the requests. The actual patching can proceed only if the number of available nodes is greater than half the number of nodes in the cluster, allowing for the failover process, and prevents any data loss. For example, if there are 3 nodes in a cluster, then the maximum number of nodes that can be taken out for patching is 1. The number of nodes that can be available are 2 ($3/2=1.5$). This prevents any data loss.

In a 3-node cluster, standalone is a replica of the active cluster. Primary and standalone are considered to be active and they both are patched inside the maintenance window.

Since the previously mentioned algorithm is not applicable for the 2-node clusters (there can never be more than half the nodes available nodes for failover), `fixlet responsible for marking Cluster nodes unavailable` must be used.

Logs and troubleshooting

- Errors and debugging information about the Status Collector becomes available in the folder *BES CLient/Applications/StatusCollector/Logs*.
- One or more logs files are saved with the name format: *StatusCollector.<date>.log*. Every log file name contains the corresponding date.
- The log files provide all the messages related to the queries to the cluster node.
- Depending on the disk space configured for accumulating the logs through the install or edit tasks, the latest logs are kept and oldest logs are automatically deleted.

- To troubleshoot the Status Collector, the starting point is the timestamp in the analysis which does not refresh after the configured refresh period for a specific node. It could be caused by the Task Scheduler service not running properly (in this case the edit fixlet can be used to reconfigure it to start automatically) or by other reasons. If the edit fixlet does not solve the issue, the Status Collector log file of the node which is not updating needs to be manually checked to troubleshoot the problem.

Patching Microsoft Exchange 2007 on Windows clusters

You can use Server Automation Fixlets to patch a Windows® Cluster that is running Microsoft Exchange 2007 on Windows® Server 2003 or Windows® Server 2008. As per industry standard, patch the passive node first. This avoids moving the Mailbox server twice in a patching scenario. You add the Server Automation Fixlets into a plan to automate the patching process. You can use Fixlet `121 Move Exchange 2007 Mailbox Server from Node` to identify the active node as this Fixlet will only be relevant on the node running the Mailbox server.

- Before running any of the patching steps the control scripts must be installed. Use Task `110-Install Windows Cluster Control Application` to install the control scripts.
- The IBM Exchange Cluster Manager Service must be installed. Use Task `123 Install IBM Exchange Cluster Manager Service` to install the service.
- .Net Framework 4.0 must be installed on each node. Use Fixlet `40301 UPDATE: Microsoft .NET Framework 4.0 Available -Site-Patches for Windows` to install or update the .Net Framework 4.0 on each node.

The IBM cluster patch solution works by using a number of Fixlets and a service to enable patching of an Exchange cluster environment. To move an Exchange Mailbox Server from node to node you must be a domain level user. To achieve this a service is installed on each node which runs with the domain level credentials. Moving the clustered mailbox is governed by a Microsoft Shell Command and might not always successfully move the mailbox.

Start the patching process by patching the passive node. Then repeat the procedure for the active node.

1. Optional: Use Fixlet `121 Move Exchange 2007 MailboxServer from Node` to move the Mailbox Server from the node.
2. Pause the node or nodes in the cluster that you want to patch. Run one of the following Fixlets:
 - a. Fixlet ID 112 Pause Node for Windows® 2003 Servers.
 - b. Fixlet ID 116 Pause Node for Windows® 2008 Servers.
3. Move any groups on the node to another node using one of the following Fixlets:
 - a. Fixlet ID 111 Move Groups for Windows® 2003 Servers.
 - b. Fixlet ID 114 Move Groups for Windows® 2008 Servers.
4. Patch or update the node as required. If you use a Baseline to patch the node, check if the Baseline contains an action script that causes the node to report a status of `Pending Restart`, for example, `action requires restart`. If the node returns a `Pending Restart` status, the system determines this as a `wait` state and does not complete the step. To correct this, you must include a restart Fixlet as part of the Baseline.
5. Resume the node using one of the following Fixlets, depending on your operating system:

- a. Fixlet ID 113 Resume Node for Windows® 2003 Servers
 - b. Fixlet ID 115 Resume Node for Windows® 2008 Servers
6. Repeat this process for the active node in the cluster.

Patching Servers running Microsoft Exchange 2010 and later Data Availability Groups

You can use Server Automation Tasks to patch an operating system running Microsoft Exchange 2010 and Exchange 2013 (Exchange 2013 SP1 and later versions) Data availability groups (DAG), while maintaining the DAG availability. You patch the operating system using a number of Tasks and a service. The Tasks automate the execution of Microsoft Exchange scripts provided with Exchange 2010 and Exchange 2013. You run these Tasks in an Automation Plan and you can combine them with custom Tasks for patching the underlying operating system to fully automate the patching process.

- For Exchange 2013, Exchange 2103 Service Pack 1 and newer versions are supported. All version of Exchange 2010 are supported.
- Before running any of the patching steps, the control scripts must be installed. Use Task `110-Install Windows Cluster Control Application` to install the control scripts.
- The IBM Exchange Cluster Manager Service must be installed. Use Task `123 Install IBM Exchange Cluster Manager Service` to install the service.
- .Net Framework 4.0 must be installed on each node. Use Fixlet `40301 UPDATE: Microsoft .NET Framework 4.0 Available -Site-Patches for Windows` to install or update the .Net Framework 4.0 on each node.

The scripts that are run by your Automation Plan are provided by Microsoft. For more information about these scripts, see the following Microsoft resources:

- [http://technet.microsoft.com/en-us/library/ee861125\(v=exchg.141\).aspx](http://technet.microsoft.com/en-us/library/ee861125(v=exchg.141).aspx)
- [http://technet.microsoft.com/en-us/library/dd298065\(v=exchg.141\).aspx](http://technet.microsoft.com/en-us/library/dd298065(v=exchg.141).aspx)

There are five Server Automation Tasks available for automated patching of Exchange Database Availability Groups:

Table 38. Exchange cluster patching Tasks

Task	Description
Task ID 125 - <code>Exchange 2010 and 2013 Start DAG (Database Availability Groups) Maintenance Task</code>	Runs the <code>startDagservermaintainence.ps1</code> powershell script against the target endpoint. Active DAGs on the node are moved off the endpoint. The endpoint is placed on a <code>paused</code> state. If the cluster group is present on the endpoint, it is also moved to another node. The <code>DatabaseCopyAutoActivationPolicy</code> is set to <code>blocked</code> after running this script. The script does not move any non-exchange 2010 groups off the node. When this script is run against an endpoint, the endpoint is in a state where any patch or custom Fixlets can be run.

Table 38. Exchange cluster patching Tasks**(continued)**

Task	Description
Task ID 127 - Exchange 2010 and 2013 Stop DAG (Database Availability Groups) Maintenance Task	Runs the <code>stopDagservermaintainence.ps1</code> powershell script against the target endpoint. This script resumes a node and also sets the <code>DatabaseCopyAutoActivationPolicy</code> to <code>unrestricted</code> for each database on the endpoint. No groups are failed back onto a node after running this script.
Task ID 128 - Rebalance Active Databases Task Exchange 2010 and 2013 DAG (Database availability Groups) Task	Runs the <code>RedistributeActiveDatabases.ps1</code> powershell script against the target endpoint. This script redistributes the active databases across all nodes available to the DAGs. The script uses the <code>BalanceDbsByActivationPreference</code> switch. You can run this Task at the end of an Automation Plan against one of the endpoints if you want to redistribute the DAGs across the servers after all patching has been completed.
Task ID 163 - Check Status and Start Services on Microsoft Exchange	This Task is optional. This Task runs a script which checks the running status of the Microsoft Exchange services selected by the user on the target endpoint. The script will, by default, try and start any of the selected services which are not in a <code>Running</code> or <code>Pending Restart</code> state on the endpoint. The Task will fail if all selected services have not changed to a <code>Running</code> state within the <code>Services startup timeout</code> period. For information about limitations and about using this Task, see <code>Check if File Share Witness is accessible</code> .
Task ID 164 - Check File Share Witness status on a Microsoft Windows cluster	This Task is optional. This Task runs a script which checks if the targets nodes can communicate with the File Share Witness. It also checks if the file share configured for the File Share Witness is accessible from the target endpoint. For information about limitations and about using this Task, see <code>Check if File Share Witness is accessible</code> .

You can use the Server Automation template sample plans, changing the template to add your patching Fixlets. Server Automation template sample plans for Exchange are Fixlet IDs 133, 134, 136, 170, and 171. The recommended Automation Plan patching process is as follows, where you complete steps 1 to 4 for the first node in the cluster, and then repeat these steps for the other nodes in the cluster:

1. Add Task ID 125 `Exchange 2010 and 2013 Start DAG (Database Availability Groups) Maintenance` to your plan.
2. Add your patching Fixlets to the plan.
3. If a restart is required after the patching Fixlets have completed, add Server Automation Fixlet ID 126 `Restart Endpoint and Wait for Restart to Complete` to the plan.



Note: If you have a File Share Witness configured on your cluster, you can optionally add Task ID 164 `Check File Share Witness status on a Microsoft Windows cluster` to the plan after the `Restart Endpoint and Wait for Restart to Complete` step. If you are using this optional Task, check the Task descriptions for information about usage and prerequisites and see `Check if File Share Witness is accessible`. You can also add another step to the plan to check the status and start services on Microsoft Exchange. If you want to add this step, add Task 163 `Check Status and Start Services on Microsoft Exchange`. If you want to add both of these Tasks, add Task 163 after the `Restart Endpoint and Wait for Restart to Complete` step.

4. Add Task ID 127 `Exchange 2010 and 2013 Stop DAG (Database Availability Groups) Maintenance` to your plan.
5. Add 4 or more steps to the plan (depending on whether you added the optional steps) repeating each of steps 1 to 4 for each additional node in the cluster.
6. Run the plan.

Monitor the execution of the plan from the **Automation Plan Action Status** dashboard. On successful completion of the plan, the Exchange DAGs have been patched with the patching Fixlets you included in the plan.

Automating patching of operating system servers in a Microsoft Hyper-V cluster

You can use Server Automation to automate patching of operating system servers in a Microsoft Hyper-V cluster, without affecting the data availability groups operations. Server Automation enables you to automate the patching process using a number of Tasks which manage the cluster as it is being patched. The Tasks prepare nodes for patching by pausing them and moving all virtual machines, groups, and resources off the nodes. The required patches are then applied to the operating system as part of the automation flow. After the operating system is patched, the automation flow restores the nodes to their original pre-patching state.

- Control scripts must be installed on each of the endpoints that you are patching. Use Server Automation Task 110 `Install Windows Cluster Control Application` to install the control scripts.
- The Powershell feature must be installed on each node that you are patching. By default this is installed on all instances of Microsoft Server from 2008 Release 2 onwards, except for core installations. For core installations, use the following links to install Powershell:
 - <http://support.microsoft.com/kb/976736>
 - http://technet.microsoft.com/en-us/library/hh847837.aspx#BKMK_InstallingOnServerCore

There are two phases in the automated patching flow. In the first phase, one node or group of nodes is patched. In the second phase, the second node of group of nodes is patched. By managing the patching in this way, the cluster remains operational at all times. In phase one, you run a sequence of Tasks to manage the patching of the first node or group of nodes in the cluster. Then you repeat these same steps on the second node or nodes in the cluster. The following operating systems are supported:

- Windows 2012
- Windows 2012 Release 2
- Windows 2008 Release 2 and later

To automate the patching process, you run an automation plan. The automation plan contains a number of steps, each of which represents a stage in patching process. You can create a new automation plan or modify an existing plan, such as an out-of-the-box sample plan by changing some of the steps.

1. Add Task ID 117 `Pre-patching Task for clustered Microsoft HyperVisor Servers` to the plan as step 1 in the plan. When you are running the plan, target the first node or group of nodes in the cluster.

This Task performs the following functions:

- a. Creates a file detailing all groups and virtual machines in the cluster, including what nodes they are on and the states of each resource in the cluster. If there are empty groups (groups with no resources) in the cluster, a second file is created detailing these groups.
- b. Pauses the node.
- c. Checks to see if there are other nodes available to which to move the virtual machines. If other nodes are available, virtual machines are moved using the method you select (either live migrated or quick migrated). If the virtual machines are set up to be online only on the current node (no other possible owners set) the virtual machine is taken offline. If the virtual machine has other possible owners but these owners are not available, the Task fails because it is not possible to move the virtual machine off the node.
- d. Moves groups that have other available owners. If no other owners are available to take groups, the Task fails. Any groups set up to be online only on the current node (only target set as possible owner of the group or at least one resource in the group) are the taken offline.
- e. Takes any empty groups offline.
- f. Checks to ensure the node is paused and has no active groups remaining and is a state suitable for patching the server operating system.



Note: This Task does not move any groups that were offline before the Task was run.

2. Add the required operating system patching Fixlet, Task, or Baseline as the second step in the plan. When you are running the plan, target the first node or group of nodes in the cluster.
3. Add Server Automation Task 126 `Restart Endpoint and Wait for Restart to Complete` to restart the first node or group of nodes in the cluster. When you are running the plan, target the first node or group of nodes in the cluster.
4. Add the post patching Task 129 `Post Patching task for Microsoft Server Clusters (Server 2008 R2 onwards including Hyper-V Clusters)` to restore the node or nodes to their original state. After this Task has run successfully, the first node or nodes in the cluster are patched and back up and running. When you are running the plan, target the first node or group of nodes in the cluster.

This Task performs the following functions:

- a. Resumes the node.
 - b. If the cluster detail file is found on the targeted endpoints, the Task checks this file and moves any virtual machines and groups back on to the node if they were moved off the node during patching. The Task then brings back online any empty groups or groups which had the target node as the only possible owner of the group before patching.
5. Add four more steps to the plan, to repeat steps 1 to 4 for the second node or group of nodes. For each of these steps, you need to target the second node or nodes in the cluster.

Automating middleware patching of Microsoft® SQL Server 2008 Release 2 in Windows clusters

You can use Server Automation Tasks to automate patching of a SQL Server 2008 Release 2 cluster, with minimal impact on the cluster availability. Unlike some of the other Server Automation cluster patching solutions, this solution patches Microsoft® SQL Server and not the underlying Microsoft® Windows® operating system.

- The Windows cluster control scripts must be installed on each node in the cluster. Use Server Automation Task ID 110 to install the scripts to each node in the cluster.
- This cluster patching solution is supported only on Microsoft® Windows® Server 2008 Release 2 or newer.
- This cluster patching solution runs only on Microsoft® Windows® Server clusters that have the Windows Failover Cluster Module feature installed.

You automate the patching process using an Automation Plan. To automate the patching, you can use Server Automation sample plan ID 350, which is designed to automate patching of a three node cluster. You can copy this plan and modify the copy for a cluster with a different number of nodes, if necessary. For information about the sample plan, see [Sample plan: Microsoft SQL Server 2008 Release 2 Cluster - Middleware patching \(on page 186\)](#). To create a new sample plan to automate the patching, complete the following procedure.

1. Create a new Automation Plan and add Task ID 342 `Add cluster nodes to Administrators group` as the first step. When you are taking action, target every node in your cluster.
2. Add a second step to the plan, selecting Server Automation Task 138 `Pre Patching Task for Non Hyper-V Clustered Microsoft Servers (Version 2008 R2 onwards)` for the second step. When you are taking action, target the first node in the cluster.
3. Add a third step to the plan, selecting Server Automation Task ID 340 `Make node unavailable as a possible owner of resources in a cluster` for the third step. When you are taking action, target the first node in the cluster.
4. For the fourth step in the plan, add Server Automation Task ID 115 `Resume Node (Windows 2008-2012)`. When you are taking action, target the first node in the cluster.
5. For the fifth step in the plan, add a Fixlet, Task, or Baseline to patch SQL Server. When you are taking action, target the first node in the cluster.
6. For the sixth step in the plan, add Server Automation Task ID 126 `Restart Endpoint and Wait for Restart to Complete`. When you are taking action, target the first node in the cluster.
7. For the seventh step in the plan, add Server Automation Task ID 341 `Make node available as possible owner of resources in cluster`. When you are taking action, target the first node in the cluster.

8. For the eighth step in the plan, add Server Automation Task ID 129 `Post Patching task for Microsoft Server Clusters (Server 2008 R2 onwards including Hyper-V Clusters)`. When you are taking action, target the first node in the cluster.
9. Add 7 more steps to the plan, identical to steps 2 to 8 for the second node in the cluster. When you are taking action to run the plan, target the second node. If you have more than two nodes in the cluster, add a further 7 steps, mirroring steps 2 to 8.
10. Add a final step to the plan, selecting Server Automation Task ID 343 `Remove cluster nodes from Administrators group` for the final step. When you are taking action, target every node in the cluster.

Automating patching of Microsoft® SQL Server 2012 and later in Windows clusters

You can use Server Automation Tasks in an Automation Plan to automate patching of SQL Server 2012 and later in a Microsoft® Windows® cluster, with minimal impact on cluster availability. The automated patching is done in phases, one phase per node, and at least one node remains operational at all times during the patching. Note that this cluster patching solution patches SQL Server and not the underlying Microsoft® Windows® operating system.

- The Windows cluster scripts must be installed on each node in the cluster. Use Server Automation Task ID 110 to download the scripts to each node in the cluster.
- This cluster patching solution is supported only on Microsoft® Windows® 2008 Server Release 2 or newer.
- This cluster patching solution runs only on Microsoft® Windows® Server clusters that have the Windows Failover Cluster Module feature installed.

You automate the patching process using an Automation Plan. To automate the patching, you can use Server Automation sample plan ID 351, which is designed to automate patching of a three node cluster. You can copy this plan and modify the copy for a cluster with a different number of nodes, if necessary. For information about the sample plan, see [Sample Plan: Microsoft SQL Server 2012 and later Cluster - Middleware patching \(on page 187\)](#). To create a new sample plan to automate the patching, you must add 7 steps to the plan for each separate node in the cluster. These 7 steps comprise a phase in the patching process during which a node is patched.

Complete the following procedure to create a new plan to automate the patching.

1. Create a new Automation Plan, adding Server Automation Task ID 138 `Pre Patching Task For Non Hyper-V Clustered Microsoft Servers (Version 2008 R2 onwards)` as the first step. When you are taking action, target the first node in the cluster.
2. Add Server Automation Task ID 340 `Make node unavailable as possible owner of resources in cluster` as the second step in the plan. When you are taking action, target the first node in the cluster.
3. Add Server Automation Task ID 115 `Resume Node (Windows 2008-2012)` as the third step in the plan. When you are taking action, target the first node in the cluster.
4. Add a Fixlet, Task, or Baseline to patch SQL Server as the fourth step in the plan. When you are taking action, target the first node in the cluster.
5. Add Server Automation Task ID 126 `Restart Endpoint and Wait for Restart to Complete` as the fifth step in the plan. When you are taking action, target the first node in the cluster.

6. Add Server Automation Task ID 341 `Make node available as possible owner of resources in cluster` as the sixth step in the plan. When you are taking action, target the first node in the cluster.
7. Add Server Automation Task ID 129 `Post Patching task for Microsoft Server Clusters(Server 2008 R2 onwards including Hyper-V Clusters)` as the seventh step in the plan. When you are taking action, target the first node in the cluster.
8. For the second node in the cluster, add 7 more steps to the plan, replicating steps 1 to 7. When you are taking action, target the second node in the cluster for each of these steps.
9. If the cluster is a three node cluster, add another 7 replica steps of steps 1 to 7 for the third node in the cluster. When you are taking action, target the third node in the cluster for each of these steps.
10. Click **Take Action** to run the plan.

Cluster patching terms and concepts

The following table describes some key cluster patching terminology and concepts.

Table 39. Cluster patching key terms and concepts

Term	Description
Cluster	One or more servers working together, which appear to the end user as one entity to provide a platform to run applications and services. The system of clustering provides a backup and reserve capability for the applications running on the cluster.
Failover	The process of groups being moved from one node to another node in the event of a failure of the node the resource is currently running on.
Group	A container for resources. Resources that have a link or dependency on each other must be in the same group.
HA	High Availability
Move group	A move group command moves groups from the node the command is run against to another available node in the cluster. Other nodes must be available for this command to work successful.
Node	One server or unit member of a cluster. A cluster is made up of a number of nodes.
Node down	If a node is down it is no longer running the cluster service and is not available for any clustering activity. It is not available to run any applications or services for the cluster. Any groups running on the node before it goes down are failed over onto a different node.
Node up or active	When a node is active, the node can receive and run groups from another node and participate fully in all clustering functions and is available to receive groups in the event of a failure of another node in the cluster.

Table 39. Cluster patching key terms and concepts

(continued)

Term	Description
Pause or paused node	Pause node brings the node into a paused state. While a node is paused the clustering service is still running on the node, however, the node no longer accepts any new groups onto the node and therefore is not available in a failover situation. The node continues to run any groups on the node before it was paused.
Quorum	The quorum is a set of files used by the cluster to maintain the cluster. The quorum is integral to a cluster functioning. The quorum contains the configuration files used by the cluster to ensure the cluster is maintained in an operational state.
Quorum configuration	Describes how the quorum is set up in the cluster. Each cluster has one quorum configuration. For more information, see the following resources: Windows 2003 systems: http://technet.microsoft.com/en-us/library/cc779076(v=ws.10).aspx Windows 2008 systems: http://technet.microsoft.com/en-us/library/cc731739.aspx Windows 2012 systems: http://technet.microsoft.com/en-us/library/jj612870.aspx#BKMK_option_overview
Resource	The lowest entity managed by a cluster. Some resources can have a dependency on others and require other resources to be online before they come online. This is sometimes built in as some resources are integral to a cluster being formed and maintaining functionality. These resources are created and grouped by the Windows®
Resume node	Resuming a node restarts the clustering service on the node and changes the node from a paused or down state to an up state.
HA_Primary or Primary	Active node that handles the business workload and has read/write access to the database. It can be configured to fail-over on a secondary node either manually or automatically.
HA_Secondary or Secondary	Passive node that is synchronized with the Primary, but is not available for queries. In case of a primary fail-over, it can become the Primary node.
Standalone or Backup or Replica	Active node that is synchronized with the Primary and is available for queries. Failover needs to be done manually. In case of a primary failover, the replica will be automatically in sync with the new primary.

Server Automation middleware content

You can use the BigFix Lifecycle Server Automation middleware Tasks to automate the deployment of middleware applications. You can include these Tasks as steps in your Automation Plans.

BigFix V9.5 supports the SHA-256 algorithm. Depending on the configuration you have set for the SHA algorithm in BigFix V9.5, the Server Automation middleware Tasks show different options. If you have enabled SHA-256 in BigFix V9.5, you must use SHA-256 in the Server Automation middleware Tasks. If you have not enabled SHA-256 in BigFix V9.5, you can use SHA-1 in the Server Automation middleware Tasks.

Before you begin using the Tasks, ensure that you read the prerequisite information described here.

Prerequisites

To use the Server Automation middleware Fixlets, you must create packages containing the specific version of the software that you are deploying. You create the packages in the **Manage Software Distribution** dashboard in BigFix. This allows the Fixlets to access the software that you are deploying. You must also configure the BigFix server to allow dynamic downloads. You need access to the **Systems Lifecycle** domain and the Software Distribution site.

For each Fixlet, you must create a corresponding package for the middleware component that you want to deploy and add it to the **Manage Software Distribution** dashboard in BigFix. Then when you are running the Fixlet, you specify the URL for the package that you created. The Fixlet can then download the package and deploy the contents.



Important: When you are creating packages and adding them to the **Manage Software Distribution** dashboard, you need to extract the contents of ZIP files before you upload them to the **Manage Software Distribution** dashboard. If you upload ZIP files without first extracting the contents, the Fixlets are unable to deploy the middleware correctly.



Important: When uploading binary files the **Manage Software Distribution** dashboard, remove any hyphens or special characters from the binary name. Only the following characters work correctly when uploading packages to the **Manage Software Distribution** dashboard:

- Uppercase or lowercase letters from a to z.
- Numerical values from 0 to 9.
- Underscore _
- Period .

If you include hyphens or any other multi-byte characters other than those listed above, the file name of the uploaded package is renamed to its sha 1 value and the download does not work. Only single byte characters work correctly.

For each file to be downloaded in BigFix, there are three required fields.

URL

The URL from which the file can be downloaded. This is generally `http`, `https`, or `ftp`.

SHA-1

The SHA-1 is a generated checksum to ensure that the downloaded file is correct.

**Note:**

BigFix V9.5 supports the SHA-256 algorithm. Depending on the configuration you have set for the SHA algorithm in BigFix V9.5, the Server Automation middleware Tasks show different options. If you have enabled SHA-256 in BigFix V9.5, you must use SHA-256 in the Server Automation middleware Tasks. If you have not enabled SHA-256 in BigFix V9.5, you can use SHA-1 in the Server Automation middleware Tasks.

Size

The size of the file in bytes is used with the SHA-1 to validate the file is correct.

You can use the **Manage Software Distribution** dashboard to download the required files. When the files are downloaded, select the correct binary file from the **Select a binary file** list in the Fixlet description to populate the **URL**, **SHA-1**, and **Size** fields. To use the **Manage Software Distribution** function, you must configure the BigFix server for dynamic downloads.



Note: For binary files larger than 2 GB, you might experience issues. Ensure that these files are successfully archived in the **Manage Software Distribution** dashboard. Large files might display in the Fixlet **Select a binary file** list even if they are not fully uploaded.

Manage Software Distribution dashboard

You can download the required files to the BigFix Server Uploads directory, by clicking **Manage Software Distribution** in the middleware Fixlet **Description** tab. Specific instructions about how to do this are included in the **Description** tab of each Fixlet. The **Manage Software Distribution** dashboard is part of the Systems Lifecycle domain and the Software Distribution site. To use the **Manage Software Distribution** dashboard, you must acquire the Software Distribution site. For information about setting up the Manage Software Distribution dashboard, see [Software Distribution dashboards Setup](#).

To download the required files, you must create a package and add one or more files to the package. For information about creating a Software Distributions package and adding files to packages, see [Managing Packages](#).

Configuring the system for dynamic downloads

The `DownloadWhitelist.txt` file specifies all of the formats that are allowed for dynamically downloaded files. If your system contains an empty or nonexistent whitelist file, all dynamic downloads fail.

The `DownloadWhitelist.txt` file is on the BigFix server in the following directory:

On Windows systems:

```
C:\Program Files (x86)\BigFix Enterprise\BES Server\Mirror Server\Config
```

On Linux systems:

```
/var/opt/BEServer/Mirror Server/config
```

To configure the `DownloadWhitelist.txt` file, complete the following steps:

1. If it does not exist, create the `DownloadWhitelist.txt` file in specified directory on the BigFix server.
2. Specify the formats that you want to enable for dynamic downloading. For example, the following contents in the `DownloadWhitelist.txt` file specify BigFix server locations or external locations:

```
http://127.0.0.1:52311/.*
http://software.bigfix.com/.*
http://127.0.0.1:52311/bfmirror/downloads/ScriptManifest.lst
```

The `.*` entries allow all files to be downloaded. This is a potential security concern and you might choose not to use this option.

3. Save the `DownloadWhitelist.txt` file.



Important: This does not affect static downloading, for example, if you specify a full path name to a file.

For more information about static and dynamic downloading, see the [Actions Guide](#) and search for dynamic downloads.

BigFix Lifecycle Server Automation middleware Tasks

This section lists all of the BigFix Lifecycle Server Automation middleware Tasks and provides a short description of each Task.



Note: For all of the WebSphere® Application Server Tasks, only a single WebSphere® Application Server instance for each server is supported.

Table 40. Product IDs for some middleware applications

The table columns list the products, operating system on which they are supported, and includes the product IDs. Each row lists the individual products.

Product	Operating system (64-bit)	Product ID
DB2® Enterprise Server Edition 9.7	Linux	CZ19NEN
	AIX	CZ19JEN
	Windows	CZ19HML (32-bit only)
DB2® Data Server Client 9.7	Linux	CZ1ATEN
	AIX	CZ1ANEN
	Windows	CZ1AMML
WebSphere® Application Server Base V7.0	Linux	C1FZ9ML

Table 40. Product IDs for some middleware applications

The table columns list the products, operating system on which they are supported, and includes the product IDs. Each row lists the individual products.

(continued)

Product	Operating system (64-bit)	Product ID
	AIX	
	Windows	C1G0TML
WebSphere® Application Server Network Deployment V7.0	Linux	C1G35ML
	AIX	
	Windows	C1G2JML

The following table lists the available DB2® Tasks for Windows®.

Table 41. DB2® Tasks for Windows®

This table lists the DB2® Tasks for Windows. The columns identify the Task IDs, Task names, and descriptions. The table rows list the actual tasks.

ID	Task name	Description
26	Create Instance for IBM DB2® UDB Enterprise Server Edition 9.x on Windows®	This Task creates an instance for IBM UDB DB2® Enterprise Server Edition 9.x on Windows®.
29	Install IBM DB2® UDB Enterprise Server Edition 9.x on Windows®	This Task installs IBM DB2® UDB Enterprise Server Edition 9.x on Windows® operating systems. It also supports installation of Advanced Enterprise Server Edition.
53	Create Instance for IBM DB2® Data Server Client 9.x on Windows®	This Task creates an Instance for IBM DB2® Data Server Client 9.x on Windows®.
25	Create DAS for IBM DB2® UDB Enterprise Server Edition 9.x on Windows®	This Task creates a Database Administration Server (DAS) for IBM DB2® UDB Enterprise Server Edition 9.x on Windows® operating systems.
27	Drop DAS for IBM DB2® UDB Enterprise Server Edition 9.x on Windows®	This Task drops Database Administration Server (DAS) for IBM DB2® UDB Enterprise Server Edition 9.x on Windows® operating systems.
28	Drop Instance for IBM DB2® UDB Enterprise Server Edition 9.x on Windows®	This Task drops an Instance for IBM DB2® 9.x on Windows® operating systems.

Table 41. DB2® Tasks for Windows®

This table lists the DB2® Tasks for Windows. The columns identify the Task IDs, Task names, and descriptions. The table rows list the actual tasks.

(continued)

ID	Task name	Description
30	Start DAS for IBM DB2® UDB Enterprise Server Edition 9.x on Windows®	This task starts Database Administration Server (DAS) for IBM DB2® UDB Enterprise Server Edition 9.x on Windows® operating systems.
31	Start Instance for IBM DB2® UDB Enterprise Server Edition 9.x on Windows®	This Task starts an Instance for IBM DB2® 9.x on Windows® operating systems.
32	Stop DAS for IBM DB2® UDB Enterprise Server Edition 9.x on Windows®	This Task stops Database Administration Server (DAS) for IBM DB2® UDB Enterprise Server Edition 9.x on Windows® operating systems
33	Stop Instance for IBM DB2® UDB Enterprise Server Edition 9.x on Windows®	This Task stops an Instance for IBM DB2® UDB Enterprise Server Edition 9.x on Windows® operating systems.
34	Uninstall IBM DB2® UDB Enterprise Server Edition 9.x on Windows®	This Task uninstalls IBM DB2® UDB Enterprise Server Edition 9.x on Windows® operating systems.
52	Install IBM DB2® Data Server Client 9.x on Windows®	This Task installs IBM DB2® Data Server Client 9.x on Windows® operating systems.
54	Drop Instance for IBM DB2® Data Server Client 9.x on Windows®	This Task drops an Instance for IBM DB2® Data Server Client 9.x on Windows® operating systems.
55	Uninstall IBM DB2® Data Server Client 9.x on Windows®	This Task uninstalls IBM DB2® Data Server Client 9.x on Windows® operating systems.

The following table lists the available DB2® Tasks for Linux®.

Table 42. DB2® Tasks for Linux® platforms

This table lists the DB2® Tasks for Linux. The columns identify the Task IDs, Task names, and descriptions. The table rows list the actual tasks.

ID	Task name	Description
10	Uninstall IBM DB2® Data Server Client 9.x on RHEL, SLES and IBM AIX	This Task removes all installed DB2 database products from the targeted computer. This Task queries your system for existing DB2 installations and automatically retrieves the file path.

Table 42. DB2® Tasks for Linux® platforms

This table lists the DB2® Tasks for Linux. The columns identify the Task IDs, Task names, and descriptions. The table rows list the actual tasks.

(continued)

ID	Task name	Description
11	Create DAS for IBM DB2® UDB Enterprise Server Edition 9.x on RHEL, SLES and IBM AIX	This Task creates a Database Administration Server instance for IBM DB2 UDB Enterprise Server Edition 9.x with a default username as dasusr1 belonging to default group dasadm1. There is only one DAS per computer. One DAS services one or more database instances, including database instances that belong to different installations.
12	Drop DAS for IBM DB2® UDB Enterprise Server Edition 9.x on RHEL, SLES and IBM AIX	This Task drops the Database Administration Server for IBM DB2 UDB Enterprise Server Edition 9.x instance on RHEL,SLES and IBM AIX. You can have only one DAS in a database server.
13	Start DAS for IBM DB2® UDB Enterprise Server Edition 9.x on RHEL, SLES and IBM AIX	This Task starts the Database Administration Server for IBM DB2 UDB ESE 9.x on RHEL,SLES and AIX.
14	Stop DAS for IBM DB2® UDB Enterprise Server Edition 9.x on RHEL, SLES and IBM AIX	This Task stops the Database Administration Server for IBM DB2 UDB Enterprise Server Edition 9.x on RHEL,SLES and IBM AIX.
15	Create Instance for IBM DB2® Data Server Client 9.x on RHEL and SLES	This Task creates an instance for IBM DB2 Data Server Client on RHEL and SLES.
16	Create Instance for IBM DB2® UDB Enterprise Server Edition 9.x on IBM AIX	This Task creates an instance for IBM DB2 UDB Enterprise Server Edition 9.x on IBM AIX. This task creates two operating system users with the instance and fence names specified.
17	Drop Instance for IBM DB2® Data Server Client 9.x on RHEL, SLES and IBM AIX	This Task drops an instance for IBM DB2 Data Server Client 9.x on RHEL,SLES and IBM AIX.
18	Drop Instance for IBM DB2® UDB Enterprise Server Edition 9.x on RHEL,SLES and IBM AIX	This Task removes an instance for IBM DB2 UDB ESE 9.x on RHEL,SLES and IBM AIX.
20	Start Instance for IBM DB2® UDB Enterprise Server Edition 9.x on RHEL, SLES and IBM AIX	This Task starts an instance for IBM DB2 UDB Enterprise Server Edition 9.x on RHEL,SLES and IBM AIX.
21	Install IBM DB2 Data Server Client 9.x on RHEL, SLES and IBM AIX	This Task installs DB2® on RHEL, SLES and IBM AIX.

Table 42. DB2® Tasks for Linux® platforms

This table lists the DB2® Tasks for Linux. The columns identify the Task IDs, Task names, and descriptions. The table rows list the actual tasks.

(continued)

ID	Task name	Description
22	Stop Instance for IBM DB2® UDB Enterprise Server Edition 9.x on RHEL,SLES and IBM AIX	This Task stops an instance for IBM DB2 Enterprise Server Edition 9.x on RHEL,SLES and IBM AIX.
23	Install IBM DB2 UDB Enterprise Server Edition 9.x on RHEL, SLES and IBM AIX	This task installs DB2 UDB Enterprise Server Edition 9.x on RHEL, SLES and IBM AIX systems.
24	Uninstall IBM DB2® UDB Enterprise Server Edition 9.x on RHEL, SLES and IBM AIX	This Task removes the DB2 product that is installed on a computer. This Task queries your system for existing DB2 installations and retrieves the path.
50	Create Instance for IBM DB2® Data Server Client 9.x on IBM AIX	This Task creates an instance for IBM DB2 Data Server Client 9.x on IBM AIX. This Task creates an operating system users with the same name as the instance name specified. It also creates a default group with the name "db2iadm1" provided it does not exist.
51	Create Instance for IBM DB2® UDB Enterprise Server Edition 9.x on REEL and SLES	This Task creates an instance for IBM DB2® UDB Enterprise Server Edition 9.x on RHEL and SLES. This Task creates two operating system users with the same name as the instance name specified.

The following table lists the available DB2® Tasks for multiple operating systems.

Table 43. Multi-operating system DB2® Tasks

This table lists the multi operating system DB2 Tasks. The table columns list the Task IDs, the Task names, and the descriptions. Each individual row lists the actual Tasks.

ID	Task name	Description
82	Create Database for IBM DB2 UDB Enterprise Server Edition 9.x on Windows, RHEL, SLES and IBM AIX	This Task creates a database for IBM DB2 UDB Enterprise Server Edition 9.x on Windows, RHEL, SLES and IBM AIX.
83	Drop Database for IBM DB2 UDB Enterprise Server Edition 9.x on Windows, RHEL,SLES and IBM AIX	This Task drops a database for IBM DB2 UDB Enterprise Server Edition 9.x on Windows, RHEL, SLES and IBM AIX.

Table 43. Multi-operating system DB2® Tasks

This table lists the multi operating system DB2 Tasks. The table columns list the Task IDs, the Task names, and the descriptions. Each individual row lists the actual Tasks.

(continued)

ID	Task name	Description
89	Backup a database for IBM UDB Enterprise Server Edition 9.x on Windows, Linux and AIX	This Task creates a database backup for IBM UDB Enterprise Server Edition 9.x on Windows, Linux and AIX operating systems
90	Restore a database for IBM UDB Enterprise Server Edition 9.x on Windows, Linux and AIX	This Task restores a database for IBM UDB Enterprise Server Edition 9.x on Windows, Linux and AIX operating systems.
96	Execute SQL and DDL scripts on IBM DB2® UDB Enterprise Server Edition 9.x on Windows, RHEL, SLES and IBM AIX	This Task executes a SQL and DDL scripts on IBM DB2 UDB Enterprise Server Edition 9.x on Windows, RHEL, SLES and IBM AIX.

The following table lists the available WebSphere® Application Server middleware Tasks on Linux. Only a single WebSphere® Application Server instance for each server is supported for all of these Tasks.

Table 44. WebSphere Application Server v8.x Tasks on Linux

This table lists the WebSphere® Application Server v8.x Tasks on Linux. The table columns list the Task IDs, the Task names, and the descriptions. Each individual row lists the actual Tasks.

ID	Task name	Description
500	Install IBM Installation Manager on Red Hat Enterprise Linux®	This Task installs IBM Installation Manager on Red Hat Enterprise Linux® V6.0 or newer. IBM Installation Manager is required to install WebSphere® Application Server version 8.0 and newer.
501	Uninstall IBM Installation Manager on Red Hat Enterprise Linux®	This Task uninstalls IBM Installation Manager on Red Hat Enterprise Linux® V6.0 or newer.
520	Install IBM WebSphere® Application Server Base 8.0 on Red Hat Enterprise Linux®	This Task installs IBM WebSphere® Application Server Base version 8.0 on Red Hat Enterprise Linux® V6.0 or newer.
521	Install IBM WebSphere® Application Server Network Deployment 8.0 on Red Hat Enterprise Linux®	This Task installs IBM WebSphere® Application Server Network Deployment version 8.0 on Red Hat Enterprise Linux® V6.0 or newer.

Table 44. WebSphere Application Server v8.x Tasks on Linux

This table lists the WebSphere® Application Server v8.x Tasks on Linux. The table columns list the Task IDs, the Task names, and the descriptions. Each individual row lists the actual Tasks.

(continued)

ID	Task name	Description
522	Install IBM WebSphere® Application Server Supplements (Base or Network Deployment) 8.0 on Red Hat Enterprise Linux®	This Task installs IBM WebSphere® Application Server Supplements (Base or Network Deployment) version 8.0 on Red Hat Enterprise Linux® V6.0 or newer.
523	Install fixpack for IBM WebSphere® Application Server (Base or Network Deployment) 8.0 on Red Hat Enterprise Linux®	This Task installs IBM WebSphere® Application Server Supplements (Base or Network Deployment) version 8.0 on Red Hat Enterprise Linux® V6.0 or newer.
524	Install IFIX for IBM WebSphere® Application Server (Base or Network Deployment) 8.0 on Red Hat Enterprise Linux®	This Task installs IFIX for IBM WebSphere® Application Server (Base or Network Deployment) version 8.0 on Red Hat Enterprise Linux® V6.0 or newer.
525	Uninstall IBM WebSphere® Application Server (Base or Network Deployment) 8.0 on Red Hat Enterprise Linux®	This Task uninstalls IBM WebSphere® Application Server (Base or Network Deployment) version 8.0 on Red Hat Enterprise Linux® V6.0 or newer.
526	Uninstall IBM WebSphere® Application Server Supplements (Base or Network Deployment) 8.0 on Red Hat Enterprise Linux®	This Task uninstalls IBM WebSphere® Application Server Supplements (Base or Network Deployment) version 8.0 on Red Hat Enterprise Linux® V6.0 or newer.
527	Create a profile for IBM WebSphere® Application Server Base 8.0 on Red Hat Enterprise Linux®	This Task creates a profile for IBM WebSphere® Application Server Base version 8.0 on Red Hat Enterprise Linux® V6.0 or newer.
528	Start a profile for IBM WebSphere® Application Server Base 8.0 on Red Hat Enterprise Linux®	This Task starts a profile for IBM WebSphere® Application Server Base version 8.0 on Red Hat Enterprise Linux® V6.0 or newer.
529	Stop a profile for IBM WebSphere® Application Server Base 8.0 on Red Hat Enterprise Linux®	This Task stops a profile for IBM WebSphere® Application Server Base version 8.0 on Red Hat Enterprise Linux® V6.0 or newer.
530	Delete a profile for IBM WebSphere® Application Server Base 8.0 on Red Hat Enterprise Linux®	This Task deletes a profile for IBM WebSphere® Application Server Base version 8.0 on Red Hat Enterprise Linux® V6.0 or newer.

Table 44. WebSphere Application Server v8.x Tasks on Linux

This table lists the WebSphere® Application Server v8.x Tasks on Linux. The table columns list the Task IDs, the Task names, and the descriptions. Each individual row lists the actual Tasks.

(continued)

ID	Task name	Description
531	Execute a script against IBM WebSphere® Application Server (Base or Network Deployment) 8.0 on Red Hat Enterprise Linux®	This Task executes a script against IBM WebSphere® Application Server (Base or Network Deployment) version 8.0 on Red Hat Enterprise Linux® V6.0 or newer.
532	Create Profile for IBM WebSphere® Application Server Network Deployment 8.0 on Red Hat Enterprise Linux®	This Task creates a profile for IBM WebSphere® Application Server Network Deployment version 8.0 on Red Hat Enterprise Linux® V6.0 or newer.
533	Start Profile for IBM WebSphere® Application Server Network Deployment 8.0 on Red Hat Enterprise Linux®	This Task starts a profile for IBM WebSphere® Application Server Network Deployment version 8.0 on Red Hat Enterprise Linux® V6.0 or newer.
534	Stop Profile for IBM WebSphere® Application Server Network Deployment 8.0 on Red Hat Enterprise Linux®	This Task stops a profile for IBM WebSphere® Application Server Network Deployment version 8.0 on Red Hat Enterprise Linux® V6.0 or newer.
535	Delete Profile for IBM® WebSphere® Application Server Network Deployment 8.0 on Red Hat Enterprise Linux®	This Task deletes a profile for IBM WebSphere® Application Server Network Deployment version 8.0 on Red Hat Enterprise Linux® V6.0 or newer.
536	Install an application on IBM® WebSphere® Application Server (Base or Network Deployment) 8.0 on Red Hat Enterprise Linux®	This Task installs an application for IBM WebSphere® Application Server (Base or Network Deployment) version 8.0 on Red Hat Enterprise Linux® V6.0 or newer.
IBM® WebSphere® Application Server versions 8.5 and 8.5.5		
502	Install IBM WebSphere Application Server Base 8.5 on Red Hat Enterprise Linux®	This Task installs IBM WebSphere® Application Server Base version 8.5 on Red Hat Enterprise Linux® V6.0 or newer.
503	Uninstall IBM® WebSphere® Application Server Base 8.5 on Red Hat Enterprise Linux®	This Task uninstalls IBM WebSphere® Application Server Base version 8.5 on Red Hat Enterprise Linux® V6.0 or newer.

Table 44. WebSphere Application Server v8.x Tasks on Linux

This table lists the WebSphere® Application Server v8.x Tasks on Linux. The table columns list the Task IDs, the Task names, and the descriptions. Each individual row lists the actual Tasks.

(continued)

ID	Task name	Description
504	Create a profile for IBM® WebSphere® Application Server Base 8.5 on Red Hat Enterprise Linux®	This Task creates a profile for IBM WebSphere® Application Server Base version 8.5 on Red Hat Enterprise Linux® V6.0 or newer.
505	Delete a profile for IBM® WebSphere® Application Server Base 8.5 on Red Hat Enterprise Linux®	This Task deletes a profile for IBM WebSphere® Application Server Base version 8.5 on Red Hat Enterprise Linux® V6.0 or newer.
506	Start a profile for IBM® WebSphere® Application Server Base 8.5 on Red Hat Enterprise Linux®	This Task starts a profile for IBM WebSphere® Application Server Base version 8.5 on Red Hat Enterprise Linux® V6.0 or newer.
507	Stop a profile for IBM® WebSphere® Application Server Base 8.5 on Red Hat Enterprise Linux®	This Task stops a profile for IBM WebSphere® Application Server Base version 8.5 on Red Hat Enterprise Linux® V6.0 or newer.
509	Install fixpack for IBM® WebSphere® Application Server (Base or Network Deployment) 8.5 on Red Hat Enterprise Linux®	This Task installs a fixpack for IBM WebSphere® Application Server (Base or Network Deployment) version 8.5 on Red Hat Enterprise Linux® V6.0 or newer.
510	Execute a script on IBM® WebSphere® Application Server 8.5 (Base or Network Deployment) on Red Hat Enterprise Linux®	This Task executes a script on IBM WebSphere® Application Server (Base or Network Deployment) version 8.5 on Red Hat Enterprise Linux® V6.0 or newer.
511	Install IBM® WebSphere® Application Server Network Deployment 8.5 on Red Hat Enterprise Linux®	This Task installs IBM WebSphere® Application Server Network Deployment version 8.5 on Red Hat Enterprise Linux® V6.0 or newer.
512	Uninstall IBM® WebSphere® Application Server Network Deployment 8.5 on Red Hat Enterprise Linux®	This Task uninstalls IBM WebSphere® Application Server Network Deployment version 8.5 on Red Hat Enterprise Linux® V6.0 or newer.
513	Create Profile for IBM® WebSphere® Application Server Network Deployment 8.5 on Red Hat Enterprise Linux®	This Task creates a profile for IBM WebSphere® Application Server Network Deployment version 8.5 on Red Hat Enterprise Linux® V6.0 or newer.

Table 44. WebSphere Application Server v8.x Tasks on Linux

This table lists the WebSphere® Application Server v8.x Tasks on Linux. The table columns list the Task IDs, the Task names, and the descriptions. Each individual row lists the actual Tasks.

(continued)

ID	Task name	Description
514	Delete Profile for IBM® WebSphere® Application Server Network Deployment 8.5 on Red Hat Enterprise Linux®	This Task deletes a profile for IBM WebSphere® Application Server Network Deployment version 8.5 on Red Hat Enterprise Linux® V6.0 or newer.
515	Start Profile for IBM® WebSphere® Application Server Network Deployment 8.5 on Red Hat Enterprise Linux®	This Task starts a profile for IBM WebSphere® Application Server Network Deployment version 8.5 on Red Hat Enterprise Linux® V6.0 or newer.
516	Stop Profile for IBM® WebSphere® Application Server Network Deployment 8.5 on Red Hat Enterprise Linux®	This Task stops a profile for IBM WebSphere® Application Server Network Deployment version 8.5 on Red Hat Enterprise Linux® V6.0 or newer.
517	Install IBM® WebSphere® Application Server 8.5 Supplements on Red Hat Enterprise Linux®	This Task installs IBM WebSphere® Application Server version 8.5 Supplements on Red Hat Enterprise Linux® V6.0 or newer.
518	Uninstall IBM® WebSphere® Application Server 8.5 Supplements on Red Hat Enterprise Linux®	This Task uninstalls IBM WebSphere® Application Server version 8.5 Supplements on Red Hat Enterprise Linux® V6.0 or newer.
519	Install IFIX for IBM® WebSphere® Application Server (Base or Network Deployment) 8.5 on Red Hat Enterprise Linux®	This Task installs IFIX for IBM WebSphere® Application Server (Base or Network Deployment) version 8.5 on Red Hat Enterprise Linux® V6.0 or newer.
540	Install an application on IBM® WebSphere® Application Server (Base or Network Deployment) 8.5 on Red Hat Enterprise Linux®	This Task installs an application on IBM WebSphere® Application Server (Base or Network Deployment) version 8.5 on Red Hat Enterprise Linux® V6.0 or newer.

The following table lists the available WebSphere® Application Server middleware Tasks on Windows®. Only a single WebSphere® Application Server instance for each server is supported for all of these Tasks.

Table 45. WebSphere® Application Server v7.x base Tasks for Windows®

This table lists the WebSphere® Application Server v7.x base tasks for Windows®

ID	Task name	Description
36	Install IBM WebSphere® Application Server Base (Distributed operating systems) 7.x on Windows®	This Task installs IBM WebSphere® Application Server (Base) 7.x on Windows® operating systems.  Note: Do not use the Disable OS prerequisite check on this Task or the Task does not run successfully.
37	Create profile for IBM WebSphere® Application Server Base (Distributed Operating Systems) 7.x on Windows®	This Task creates a profile using the manageprofiles command for IBM WebSphere® Application Server Base 7.x on Windows® operating systems.
38	Start a profile for IBM WebSphere® Application Server Base (Distributed operating systems) 7.x on Windows®	This Task starts a profile for IBM WebSphere® Application Server Base 7.x on Windows® operating systems.
39	Stop a profile for IBM WebSphere® Application Server Base (Distributed operating systems) 7.x on Windows®	This Task stops a profile for IBM WebSphere® Application Server Base 7.x on Windows® operating systems.
40	Uninstall IBM WebSphere® Application Server Base (Distributed operating systems) 7.x on Windows®	This Task uninstalls 32-bit and 64-bit IBM WebSphere® Application Server Base 7.x on Windows® operating systems.  Note: Because of compatibility issues with WebSphere® Application Server, this Task does not work on Windows® 2012 and Windows® 2012 R2.
56	Delete profile for IBM WebSphere® Application Server Base (Distributed Operating Systems) 7.x on Windows®	This Task deletes a profile using the manageprofiles command for IBM WebSphere® Application Server Base 7.x on Windows® operating systems.  Note: Because of compatibility issues with WebSphere® Application Server, this Task does not work on Windows® 2012 and Windows® 2012 R2.

The following table lists the available WebSphere® Application Server Network Deployment Tasks on Windows®. Only a single WebSphere® Application Server instance for each server is supported for all of these Tasks.

Table 46. WebSphere® Application Server v7.x network deployment tasks for Windows®

This table lists the WebSphere® Application Server v7.x Network Deployment tasks for Windows platforms

ID	Task name	Description
41	Install IBM WebSphere Application Server Base (Distributed Operating Systems) 7.x on RHEL,SLES and IBM AIX	This Task installs IBM WebSphere Application Server Base (Distributed Operating Systems) 7.x on RHEL,SLES and IBM AIX systems.
43	Install IBM WebSphere Application Server (Network Deployment) 7.x on RHEL,SLES and IBM AIX	This Task installs IBM WebSphere Application Server (Network Deployment) 7.x on RHEL,SLES and IBM AIX systems.
57	Install IBM WebSphere® Application Server Network Deployment (Distributed operating systems) 7.x on Windows®	This Task installs IBM WebSphere® Application Server (Network Deployment) 7.x on Windows® operating systems.
60	Create Profile for IBM WebSphere® Application Server (Network Deployment) 7.x on RHEL, SLES and IBM AIX	This Task creates a profile for IBM WebSphere Application Server (Network Deployment) 7.x on RHEL, SLES and IBM AIX systems.
61	Stop a profile for IBM WebSphere® Application Server (Distributed Operating Systems) 7.x on RHEL,SLES and IBM AIX	This Task stops a profile for IBM WebSphere Application Server (Distributed Operating Systems) 7.x on RHEL, SLES and IBM AIX systems.
62	Stop a profile for IBM WebSphere® Application Server (Network Deployment) 7.x on RHEL,SLES and IBM AIX	This Task stop a profile for IBM WebSphere Application Server (Network Deployment) 7.x on RHEL,SLES and IBM AIX systems.
63	Start a profile for IBM WebSphere® Application Server Network Deployment (Distributed operating systems) 7.x on Windows®	This Task starts a profile for IBM WebSphere® Application Server Network Deployment (Distributed Operating Systems) 7.x on Windows®.
64	Stop a profile for IBM WebSphere® Application Server Network Deployment (Distributed operating systems) 7.x on Windows®	This Task stops a profile for IBM WebSphere® Application Server (Network Deployment) 7.x on Windows® operating systems.
65	Create profile for IBM WebSphere® Application Server Network Deployment (Distributed Operating Systems) 7.x on Windows®	This Task creates a profile using the manageprofiles command for IBM WebSphere® Application Server Network Deployment 7.x on Windows® operating systems.

Table 46. WebSphere® Application Server v7.x network deployment tasks for Windows®

This table lists the WebSphere® Application Server v7.x Network Deployment tasks for Windows platforms

(continued)

ID	Task name	Description
67	Create a cell profile for IBM WebSphere® Application Server Network Deployment (Distributed Operating Systems) 7.x on Windows®	This Task creates a cell profile using the <code>manageprofiles</code> command for IBM WebSphere® Application Server Network Deployment 7.x on Windows® operating systems.
48	Uninstall IBM WebSphere® Application Server Network Deployment (Distributed operating systems) 7.x on Windows®	This Task uninstalls IBM WebSphere® Application Server (Network Deployment) 7.x on Windows® operating systems.
 Note: Because of compatibility issues with WebSphere® Application Server, this Task does not work on Windows® 2012 and Windows® 2012 R2.		
64	Stop a profile for IBM WebSphere® Application Server Network Deployment (Distributed operating systems) 7.x on Windows®	This Task stops a profile for IBM WebSphere® Application Server (Network Deployment) 7.x on Windows® operating systems.
66	Delete profile for IBM WebSphere® Application Server Network Deployment (Distributed Operating Systems) 7.x on Windows®	This Task deletes a profile using the <code>manageprofiles</code> command for IBM WebSphere® Application Server Network Deployment 7.x on Windows® operating systems.
 Note: Because of compatibility issues with WebSphere® Application Server, this Task does not work on Windows® 2012 and Windows® 2012 R2.		
69	Install IBM Update Installer 7.x for IBM Websphere Software on Windows®	This Task installs IBM Update Installer 7.x for IBM Websphere Software on Windows® operating systems.
70	Install fixpack for IBM WebSphere® Application Server (Base or Network Deployment) 7.x on Windows	This Task installs IBM WebSphere® Application Server fixpack 7.x for base and network deployments on Windows® operating systems.

The following table lists the available WebSphere® Application Server middleware Tasks on Linux®. Only a single WebSphere® Application Server instance for each server is supported for all of these Tasks.

Table 47. WebSphere® Application Server v7.x Tasks for Linux® platforms

This table lists the WebSphere® Application Server v7.x tasks for Linux®

ID	Task name	Description
42	Uninstall IBM WebSphere® Application Server Base (Distributed Operating Systems) 7.x from RHEL,SLES and IBM AIX	This Task uninstalls IBM WebSphere® Application Server (Distributed Operating Systems) 7.x from RHEL,SLES and IBM AIX. It retrieves the install location using the WAS registry file.
44	Create Profile for IBM WebSphere® Application Server Base (Distributed Operating Systems) 7.x on RHEL,SLES and IBM AIX	This Task creates a profile for IBM WebSphere® Application Server Base (Distributed Operating Systems) 7.x on RHEL,SLES and IBM AIX
45	Start a profile for IBM WebSphere® Application Server Base (Distributed Operating Systems) 7.x on RHEL,SLES and IBM AIX	This Task starts a profile for WebSphere® Application Server 7.x on RHEL,SLES and IBM AIX.
46	Start a profile for IBM WebSphere® Application Server (Network Deployment) 7.x on RHEL,SLES and IBM AIX	This Task starts a profile for WebSphere® Application Server 7.x on RHEL,SLES and IBM AIX.
47	Uninstall IBM WebSphere® Application Server (Network Deployment) 7.x from RHEL,SLES and IBM AIX	This Task uninstalls IBM WebSphere® Application Server (Network Deployment) 7.x from RHEL,SLES and IBM AIX. It retrieves the install location using the WAS registry file.
59	Delete Profile for IBM WebSphere® Application Server Base (Distributed Operating Systems) 7.x on RHEL,SLES and IBM AIX	This Task deletes a profile for IBM WebSphere® Application Server (Distributed Operating Systems) 7.0 on RHEL,SLES and IBM AIX. The profile directory is deleted when you delete the profile so that you can recreate the profile without having to manually delete the directory.
68	Delete Profile for IBM WebSphere® Application Server (Network Deployment) 7.x on RHEL,SLES and IBM AIX	This Task deletes a profile for IBM WebSphere® Application Server (Network Deployment) 7.0 on RHEL,SLES and IBM AIX. The profile directory is deleted when you delete the profile so that you can recreate the profile without having to manually delete the directory.
80	Install IBM Update Installer 7.x for IBM Websphere Software on RHEL,SLES and IBM AIX	This Task installs IBM Update Installer 7.x for IBM Websphere Software on RHEL,SLES and IBM AIX.

Table 47. WebSphere® Application Server v7.x Tasks for Linux® platforms

This table lists the WebSphere® Application Server v7.x tasks for Linux®

(continued)

ID	Task name	Description
81	Install fixpack for IBM WebSphere® Application Server (Base and Network Deployment) 7.x on Linux and IBM AIX	This Task installs a fixpack for IBM WebSphere® Application Server Base and Network Deployment 7.x on Linux and IBM AIX.
98	Create a cell profile for IBM WebSphere® Application Server Network Deployment (Distributed Operating Systems) 7.x on RHEL,SLES and IBM AIX	This Task creates a cell profile using the manage-profiles command for IBM WebSphere® Application Server Network Deployment 7.x on RHEL,SLES and IBM AIX operating systems.

The following table lists the available WebSphere® Application Server middleware Tasks on multiple operating systems. Only a single WebSphere® Application Server instance for each server is supported for all of these Tasks.

Table 48. Multi-operating system WebSphere® Application Server v7.x Tasks

This table lists the multi operating system WebSphere® Application Server v7.x tasks

ID	Task name	Description
91	Execute a script against IBM WebSphere Application Server (Base or Network Deployment) on Windows, Linux and IBM AIX	This Task executes a script against IBM WebSphere Application Server (Base or Network Deployment) on Windows, Linux and IBM AIX systems.
99	Install an application on IBM WebSphere Application Server (Base or Network Deployment) on Windows, Linux and IBM AIX	This Task installs an application on IBM WebSphere Application Server (Base or Network Deployment) on Windows, Linux and IBM AIX systems.

The following table lists the available Microsoft SQL Server Tasks for Windows®.

Table 49. Microsoft SQL Server Tasks for Windows®

This table lists the Microsoft SQL Server Tasks for Windows®

ID	Task name	Description
35	Create Database for Microsoft SQL Server 2008 or 2008 R2 Enterprise Server Edition on Windows®	This Task creates a database for Microsoft SQL Server 2008 or Microsoft SQL Server 2008 Release 2 Enterprise Server Edition on Windows® Server 2003 to Windows Server 2012 operating systems.
71	Drop Database for Microsoft SQL Server 2008 or 2008 R2 Enterprise Server Edition on Windows®	This Task drops a database for Microsoft SQL Server 2008 or Microsoft SQL Server 2008 Release 2 En-

Table 49. Microsoft SQL Server Tasks for Windows®

This table lists the Microsoft SQL Server Tasks for Windows®

(continued)

ID	Task name	Description
		terprise Server Edition on Windows® Server 2003 to Windows Server 2012 operating systems.
72	Install Microsoft SQL Server 2008 or 2008 R2 Enterprise Server Edition on Windows®	This Task installs Microsoft SQL Server 2008 or Microsoft SQL Server 2008 Release 2 Enterprise Server Edition on Windows® Server 2003 to Windows Server 2012 operating systems.
73	Uninstall Microsoft SQL Server 2008 or 2008 R2 Enterprise Server Edition on Windows®	This Task uninstalls Microsoft SQL Server 2008 or Microsoft SQL Server 2008 Release 2 Enterprise Server Edition on Windows® Server 2003 to Windows Server 2012 operating systems.
74	Pause an Instance of Microsoft SQL Server 2008 or 2008 R2 on Windows®	This Task pauses an instance of Microsoft SQL Server 2008 or Microsoft SQL Server 2008 Release 2 Enterprise Server Edition on Windows® Server 2003 to Windows Server 2012 operating systems.
75	Resume an Instance of Microsoft SQL Server 2008 or 2008 R2 Enterprise Edition on Windows®	This Task resumes an instance of Microsoft SQL Server 2008 or Microsoft SQL Server 2008 Release 2 Enterprise Server Edition on Windows® Server 2003 to Windows Server 2012 operating systems.
76	Start an Instance of Microsoft SQL Server 2008 or 2008 R2 Enterprise Edition on Windows®	This Task starts an instance of Microsoft SQL Server 2008 or Microsoft SQL Server 2008 Release 2 Enterprise Server Edition on Windows® Server 2003 to Windows Server 2012 operating systems.
77	Start Server Agent Instance of Microsoft SQL Server 2008 or 2008 R2 Enterprise Edition on Windows®	This Task starts a server agent instance of Microsoft SQL Server 2008 or Microsoft SQL Server 2008 Release 2 Enterprise Server Edition on Windows® Server 2003 to Windows Server 2012 operating systems.
78	Stop an Instance of Microsoft SQL Server 2008 or 2008 R2 Enterprise Edition on Windows®	This Task stops an instance of Microsoft SQL Server 2008 or Microsoft SQL Server 2008 Release 2 Enterprise Server Edition on Windows® Server 2003 to Windows Server 2012 operating systems.
79	Stop Server Agent Instance of Microsoft SQL Server 2008 or 2008 R2 Enterprise Edition on Windows®	This Task stops a server agent instance of Microsoft SQL Server 2008 or Microsoft SQL Server 2008 Re-

Table 49. Microsoft SQL Server Tasks for Windows®

This table lists the Microsoft SQL Server Tasks for Windows®

(continued)

ID	Task name	Description
		lease 2 Enterprise Server Edition on Windows® Server 2003 to Windows Server 2012 operating systems.
320	Install Microsoft SQL Server 2012 Enterprise Edition on Windows	This Task installs Microsoft SQL Server 2012 Enterprise Edition on Windows® Server 2003 to Windows Server 2012 operating systems.
321	Uninstall Microsoft SQL Server 2012 Enterprise Edition on Windows	This Task uninstalls Microsoft SQL Server 2012 Enterprise Edition on Windows® Server 2003 to Windows Server 2012 operating systems.
322	Create Database for Microsoft SQL Server 2012 Enterprise Edition on Windows	This Task creates the database for Microsoft SQL Server 2012 Enterprise Edition on Windows® Server 2003 to Windows Server 2012 operating systems.
323	Drop Database for Microsoft SQL Server 2012 Enterprise Edition on Windows	This Task drops the database for Microsoft SQL Server 2012 Enterprise Edition on Windows® Server 2003 to Windows Server 2012 operating systems.
324	Start an Instance of Microsoft SQL Server 2012 Enterprise Edition on Windows	This Task starts an instance of Microsoft SQL Server 2012 Enterprise Edition on Windows® Server 2003 to Windows Server 2012 operating systems.
325	Stop an Instance of Microsoft SQL Server 2012 Enterprise Edition on Windows	This Task stops an instance of Microsoft SQL Server 2012 Enterprise Edition on Windows® Server 2003 to Windows Server 2012 operating systems.
326	Pause an Instance of Microsoft SQL Server 2012 Enterprise Edition on Windows	This Task pauses an instance of Microsoft SQL Server 2012 Enterprise Edition on Windows® Server 2003 to Windows Server 2012 operating systems.
327	Resume an Instance of Microsoft SQL Server 2012 Enterprise Edition on Windows	This Task resumes an instance of Microsoft SQL Server 2012 Enterprise Edition on Windows® Server 2003 to Windows Server 2012 operating systems.
328	Start Server Agent of Microsoft SQL Server 2012 Enterprise Edition on Windows	This Task starts the server agent for Microsoft SQL Server 2012 Enterprise Edition on Windows® Server 2003 to Windows Server 2012 operating systems.
329	Stop Server Agent of Microsoft SQL Server 2012 Enterprise Edition on Windows®	This Task stops the server agent for Microsoft SQL Server 2012 Enterprise Edition on Windows® Server 2003 to Windows Server 2012 operating systems.

Table 49. Microsoft SQL Server Tasks for Windows®

This table lists the Microsoft SQL Server Tasks for Windows®

(continued)

ID	Task name	Description
330	Install Microsoft SQL Server 2014 Enterprise Edition on Windows®	This Task installs Microsoft SQL Server 2014 Enterprise Edition on Windows® Server 2008 to Windows® Server 2012 operating systems.
331	Uninstall Microsoft SQL Server 2014 Enterprise Edition on Windows®	This Task uninstalls Microsoft SQL Server 2014 Enterprise Edition on Windows® Server 2008 to Windows® Server 2012 operating systems.
332	Create Database for Microsoft SQL Server 2014 Enterprise Edition on Windows®	This Task creates the database for Microsoft SQL Server 2014 Enterprise Edition on Windows® Server 2008 to Windows® Server 2012 operating systems.
333	Drop Database for Microsoft SQL Server 2014 Enterprise Edition on Windows®	This Task drops the database for Microsoft SQL Server 2014 Enterprise Edition on Windows® Server 2008 to Windows® Server 2012 operating systems.
334	Start an Instance of Microsoft SQL Server 2014 Enterprise Edition on Windows®	This Task starts an instance of Microsoft SQL Server 2014 Enterprise Edition on Windows® Server 2008 to Windows® Server 2012 operating systems.
335	Stop an Instance of Microsoft SQL Server 2014 Enterprise Edition on Windows®	This Task stops and instance of Microsoft SQL Server 2014 Enterprise Edition on Windows® Server 2008 to Windows® Server 2012 operating systems.
336	Pause an Instance of Microsoft SQL Server 2014 Enterprise Edition on Windows®	This Task pauses an instance of Microsoft SQL Server 2014 Enterprise Edition on Windows® Server 2008 to Windows® Server 2012 operating systems.
337	Resume an Instance of Microsoft SQL Server 2014 Enterprise Edition on Windows®	This Task resumes an instance of Microsoft SQL Server 2014 Enterprise Edition on Windows® Server 2008 to Windows® Server 2012 operating systems.
338	Start Server Agent of Microsoft SQL Server 2014 Enterprise Edition on Windows®	This Task starts the server agent for Microsoft SQL Server 2014 Enterprise Edition on Windows® Server 2008 to Windows® Server 2012 operating systems.
339	Stop Server Agent of Microsoft SQL Server 2014 Enterprise Edition on Windows®	This Task stops the server agent for Microsoft SQL Server 2014 Enterprise Edition on Windows® Server 2008 to Windows® Server 2012 operating systems.

The following table lists the available Oracle Database Tasks for Linux.

Table 50. Oracle Database 11g Tasks on Linux

This table lists the Oracle Database 11g Tasks for Linux

ID	Task name	Description
306	Create the oracle user on Linux	This Task create the oracle user on Red Hat Enterprise Linux.
309	Install Oracle 11g Enterprise Edition on Linux	This Task installs Oracle 11g Enterprise Edition on Red Hat Enterprise Linux.
311	Create an Oracle 11g Database on Linux	This Task creates a database for Oracle 11g Enterprise Edition on Red Hat Enterprise Linux.
300	Startup an Oracle 11g database on Linux	This Task starts up an Oracle 11g database on Red Hat Enterprise Linux.
304	Install Oracle Client 11g on Linux	This Task installs Oracle Client 11g on Red Hat Enterprise Linux.
308	Configure Oracle 11g Client on Linux	This Task configures Oracle 11g Client on Red Hat Enterprise Linux.
313	Uninstall Oracle 11g Client on Linux	This Task uninstalls Oracle 11g Client on Red Hat Enterprise Linux.
302	Delete oracle user on Linux	This Task delete the oracle user for Oracle 11g Enterprise Edition on Red Hat Enterprise Linux.
301	Shutdown an Oracle 11g database on Linux	This Task shuts down Oracle 11g Enterprise Edition on Red Hat Enterprise Linux.
310	Uninstall Oracle Enterprise Edition 11g on Linux	This Task uninstalls Oracle 11g Enterprise Edition on Red Hat Enterprise Linux.
303	Drop an Oracle 11g Database on Linux	This Task drops an Oracle 11g Enterprise Edition Database on Red Hat Enterprise Linux.

Log file locations

After you run any of the middleware Tasks, you can access log files for the tasks to help troubleshoot any issues.

You can access the log files for Tasks from the `<your_site>/mw-logs/` directory. For example,

- On Linux® platforms, the `/var/opt/BESClient/___BESData/<site_name>/mw-logs` directory.
- On Windows® platforms, `C:\Program Files (x86)\BigFix Enterprise\BES Client___BESData\<site_name>\IEMFSA Main\mw-logs` directory.

Server Automation operating system deployment content

BigFix Lifecycle Server Automation provides a number of Fixlets that allow you to deploy operating systems from within BigFix. These Fixlets connect to the BigFix Bare Metal Server server, which carries out the actual provisioning. You can include these Fixlets in your Automation Plans.

Before you begin using the Fixlets, review the example and other documentation included here.

This version of Server Automation supports operating system deployment for Windows® server operating systems and Linux® operating systems.

Example: end-to-end provisioning

In this example we are going to look at how you can use the BigFix Operating System deployment and Server Automation applications to complete an end-to-end server deployment. This example shows a process starting with the deployment of an operating system profile on a newly created computer through to the point where the newly created computer is up and running as a web server. The entire process is fully automated end-to-end using an Automation Plan.

To begin the process, we first create a simple two step Automation Plan, as follows:

- For step 1, we want to provision a new computer with an operating system and a software image. We can do this by adding the `Deploy operating system to one or more registered computers` Fixlet as the first step in our Automation Plan. The operating system profile contains a version of the Red Hat Enterprise Linux® operating system. This version of Red Hat Enterprise Linux® contains an Apache HTTP system.
- Then we add a second step to our Automation Plan. This step is a baseline with six components that we have created for this purpose. Step 2 will apply a patch to the Apache HTTP system and then start the Apache web server so that when the Automation Plan has completed, we have provisioned a new computer and it will be up and running as a web server. The baseline contains components for the following:
 - Change the CPU usage
 - Stop the Apache server
 - Apply a patch
 - Restart the computer
 - Start Apache
 - Set the CPU usage back to normal level

To run the Automation Plan we click **Take Action**:

1. For step 1, we need to target the Bare Metal Server that contains the operating system profile that we want to deploy for the new computer. We also need to specify the required parameters for step 1 in our Automation Plan. These required parameters are:
 - MAC address of the new computer.
 - The new computer's computer name. We need to note this as we need to provide it when specifying the target for step 2.
 - We select the Bare Metal Profile that we want to deploy on the new computer. This is the operating system profile that we want to deploy on the new computer.

This completes the first step in the Automation Plan, and by the time this step has completed, the new computer will be provisioned with an operating system and an Apache web server.

2. For step 2 in the Automation Plan, which is to apply a baseline to this new computer created in step 1, we must specify the target computer. Because the target computer does not yet exist and we cannot select it in the system, we need to target it by its computer name that we entered in step 1. We enter the computer name that we specified for the new computer in step 1 of the Automation Plan.
3. The Automation Plan is now ready to go so we click **OK**. The Automation Plan is then executed and we can track its progress.

After the Automation Plan has completed, a new computer has been created and is up and running as a web server.

How it works

You must have BigFix Bare Metal Server set up and you need to complete some configuration to connect BigFix Bare Metal Server to your BigFix system.

Requirements

You need to configure your BigFix system to work with the BigFix Bare Metal Server application. For information about how to configure this, see [OS Deployment User's Guide Setup](#).

How it works

This version of Server Automation supports operating system deployment for Windows® server operating systems and Linux® operating systems.

You create and manage your .RAD bare metal profiles, also known as operating system profiles, in BigFix Bare Metal Server. Note that only .RAD format profiles are supported. You can then use the **OS Deployment and Bare Metal Imaging** application in the **Systems Lifecycle** domain in BigFix to import those profiles into your BigFix system. After you have imported these bare metal profiles into the BigFix system, the profiles become available for selection in the Server Automation Fixlets. For more information about how to use the **OS Deployment and Bare Metal Imaging** application, see [OS Deployment User's Guide](#).

Fixlets for operating system deployment

Server Automation provides a number of Fixlets that you can use for operating system deployment provisioning. You can include these in your Automation Plans. Including these Fixlets in your Automation Plans allows you to complete

end-to-end provisioning, where you can add a step to your Automation Plan to perform the bare metal provisioning, and then other steps to deploy software and patch the computers.

Server Automation includes the Fixlets described in the following table.

Table 51. Server Automation operating system deployment Fixlets

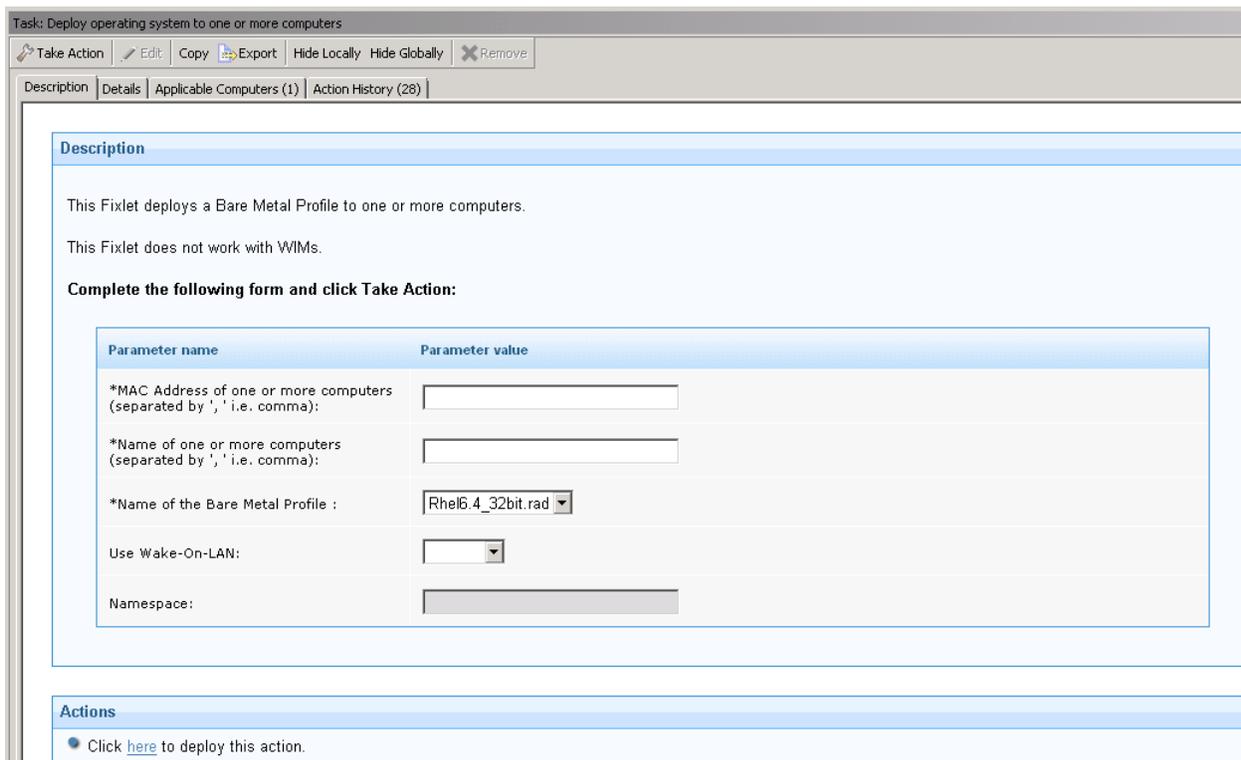
Fixlet	Description
Deploy operating system to one or more registered computers	<p>This Fixlet deploys an operating system profile to one or many computers that are registered in a bare metal server.</p> <ul style="list-style-type: none"> • Specify the MAC addresses of the computer or computers that you are creating, entering them as a comma separated list. • Specify the operating system profile, known as the bare metal profile, that you want to deploy. • Optional: You can select the Wake on LAN option if you want to power on the computers.
Deploy operating system to one or more computers	<p>This Fixlet deploys an operating system profile to one or many computers that are already registered in a bare metal server.</p> <ul style="list-style-type: none"> • Specify the MAC addresses of the computer or computers that you are creating, entering them as a comma separated list. • Enter the name or names for the computers that you are creating. Use commas to separate entries. Do not include spaces. • Specify the operating system profile, known as the bare metal profile, that you want to deploy. • Optional: You can select the Wake on LAN option if you want to power on the computers.
Register computer in a bare metal server	<p>This Fixlet registers new computers in the bare metal server. To register the computers in a bare metal server, you enter one or more MAC addresses and associated computer names. For each entry, a corresponding entry is created in a bare metal server, recording the MAC address and computer name for each. Enter the MAC address and computer names as a comma separated list.</p> <ul style="list-style-type: none"> • Specify the MAC addresses of the computer or computers that you are creating, entering them as a comma separated list. • Enter the name or names for the computers that you are creating. Use commas to separate entries. Do not include spaces.

Table 51. Server Automation operating system deployment Fixlets

(continued)

Fixlet	Description
Change boot order to allow re-imaging	This Fixlet changes the boot order of a computer so that it can be re-imaged. This Fixlet changes the boot order for a computer, forcing it to boot on the network instead of from the operating system. It allows the computer to skip booting from the operating system just once. It finishes by initiating a reboot of the computer. This allows Big-Fix Bare Metal Server to capture the computer and re-image a new operating system on the computer as part of an Automation Plan. There are no parameters required to run this Fixlet. To run it you target the computer for which you want to change the boot order.

The following graphic shows the Deploy operating system to one or more computers Fixlet.



Server Automation Chef-Solo content

You can use BigFix Lifecycle Server Automation Chef-Solo Tasks to automate the installation of Chef-Solo and download and run Chef-Solo cookbooks and recipes. The Chef-Solo installation and Chef-Solo cookbooks are downloaded from the Opscode Community web site.

BigFix Lifecycle Server Automation Chef-Solo Tasks

This section lists all of the BigFix Lifecycle Server Automation Chef-Solo Tasks and provides a description of each Task.

The following platforms are supported:

- Windows Server 2003 R2
- Windows Server 2008
- Windows Server 2008 R2
- Windows Server 2012
- Windows 7

The following table lists the Chef-Solo Tasks. For more detailed information about each Task, see the descriptions in the Tasks.

Table 52. Server Automation Chef-Solo Tasks

ID	Task	Description
200	Set Up Chef-Solo Development Environment for Windows	This Task configures the development environment for Chef-Solo on a Microsoft Windows target computer.
201	Install Chef-Solo for Windows	This Task installs Chef-Solo on a Microsoft Windows target computer and creates the Chef-Solo repository in a location that you specify.
202	Download Chef-Solo Cookbook from Opscode	This Task downloads a Cookbook from the Opscode Community site and adds it to the Chef-Solo repository on the target computer.
203	Download Chef-Solo Cookbook from url	This Task downloads a Cookbook from a URL and adds it to the Chef-Solo repository on the target computer.
204	Run a downloaded Chef-Solo Cookbook	This Task runs a Chef-Solo Cookbook that has previously been downloaded to a Microsoft Windows target computer.
205	Run a downloaded Chef-Solo Recipe	This Task runs a Chef-Solo Recipe that has previously been downloaded to a Microsoft Windows target computer.

Server Automation Remote Connector

BigFix Remote Connector module replaces the existing RXA module. When the Remote Connector is installed on a machine, the machine can act as an intermediary to execute BigFix functionality such as executing commands on or transferring files to a remote target machine, even if BigFix agent is not installed in that target machine. For example, Linux embedded targets. You can use Server Automation content to install Remote Connector on a system on which the BigFix agent is installed.



Note: RXA module is getting deprecated. The Remote Connector module provides the same level of functionality as the existing RXA module. From Server Automation 9.5.61 onwards, BigFix does not support installation or maintenance of RXA module.

Installing Remote Connector

BigFix Remote Connector module replaces the existing RXA module. You can install Remote Connector on BigFix version 9.5 onwards.

- Ensure **BigFix** client is installed in the Windows machine in which you want to install Remote Connector.
- Ensure SSH is installed and running in both client and remote target machines to install Remote Connector.
- Do not modify the default SSH port.
- Ensure that the remote targets that you are planning to run Remote Connector actions are capable of receiving Remote Connector commands.
- Ensure that these remote targets are not secured so that no communication can be established. For example, the `sshd` daemon in the case of a Unix systems must be running and accessible.
- For the current release, you must install Remote Connector on a Windows system.

Complete the following steps to install Remote Connector on a Microsoft® Windows® system:

1. Open the BigFix console.
2. Search for Fixlet 168 `Install BigFix Remote Connector Tool for SA v9.5`.
3. Target the Microsoft® Windows® system on which you want to install Remote Connector.
4. Click **OK** to run the installation.

Remote Connector is installed. After the installation is completed, the RC application folder is created, and you can review the contents of the installation in the `BES Client\Applications\RC` folder.

Refer to Fixlet 167 `Remote Connector Example` for further information on how to use the Remote Connector APIs to establish connection with the remote target machine and execute commands.

Uninstalling Remote Connector

To uninstall Remote Connector, run the Fixlet 169 `Uninstall Remote Connector Tool for SA v9.5`.

Notices

This information was developed for products and services offered in the US.

HCL may not offer the products, services, or features discussed in this document in other countries. Consult your local HCL representative for information on the products and services currently available in your area. Any reference to an HCL product, program, or service is not intended to state or imply that only that HCL product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any HCL intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-HCL product, program, or service.

HCL may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:

HCL
330 Potrero Ave.
Sunnyvale, CA 94085
USA
Attention: Office of the General Counsel

For license inquiries regarding double-byte character set (DBCS) information, contact the HCL Intellectual Property Department in your country or send inquiries, in writing, to:

HCL
330 Potrero Ave.
Sunnyvale, CA 94085
USA
Attention: Office of the General Counsel

HCL TECHNOLOGIES LTD. PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. HCL may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-HCL websites are provided for convenience only and do not in any manner serve as an endorsement of those websites. The materials at those websites are not part of the materials for this HCL product and use of those websites is at your own risk.

HCL may use or distribute any of the information you provide in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

HCL
330 Potrero Ave.
Sunnyvale, CA 94085
USA
Attention: Office of the General Counsel

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by HCL under terms of the HCL Customer Agreement, HCL International Program License Agreement or any equivalent agreement between us.

The performance data discussed herein is presented as derived under specific operating conditions. Actual results may vary.

Information concerning non-HCL products was obtained from the suppliers of those products, their published announcements or other publicly available sources. HCL has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-HCL products. Questions on the capabilities of non-HCL products should be addressed to the suppliers of those products.

Statements regarding HCL's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to actual people or business enterprises is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to HCL, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. HCL, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs. The sample programs are provided "AS IS," without warranty of any kind. HCL shall not be liable for any damages arising out of your use of the sample programs.

Each copy or any portion of these sample programs or any derivative work must include a copyright notice as follows:

© (your company name) (year).

Portions of this code are derived from HCL Ltd. Sample Programs.

Trademarks

HCL Technologies Ltd. and HCL Technologies Ltd. logo, and hcl.com are trademarks or registered trademarks of HCL Technologies Ltd., registered in many jurisdictions worldwide.

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

Java and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Other product and service names might be trademarks of HCL or other companies.

Terms and conditions for product documentation

Permissions for the use of these publications are granted subject to the following terms and conditions.

Applicability

These terms and conditions are in addition to any terms of use for the HCL website.

Personal use

You may reproduce these publications for your personal, noncommercial use provided that all proprietary notices are preserved. You may not distribute, display or make derivative work of these publications, or any portion thereof, without the express consent of HCL.

Commercial use

You may reproduce, distribute and display these publications solely within your enterprise provided that all proprietary notices are preserved. You may not make derivative works of these publications, or reproduce, distribute or display these publications or any portion thereof outside your enterprise, without the express consent of HCL.

Rights

Except as expressly granted in this permission, no other permissions, licenses or rights are granted, either express or implied, to the publications or any information, data, software or other intellectual property contained therein.

HCL reserves the right to withdraw the permissions granted herein whenever, in its discretion, the use of the publications is detrimental to its interest or, as determined by HCL, the above instructions are not being properly followed.

You may not download, export or re-export this information except in full compliance with all applicable laws and regulations, including all United States export laws and regulations.

HCL MAKES NO GUARANTEE ABOUT THE CONTENT OF THESE PUBLICATIONS. THE PUBLICATIONS ARE PROVIDED "AS-IS" AND WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE.