

HP Database and Middleware Automation Solution Packs

For Linux, Solaris, AIX, HP-UX, and Windows®

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WebSphere 7 Provisioning User Guide

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Contents

Contents	5
Audience	7
Document Map	8
Important Terms	9
The WebSphere 7 Provisioning Solution	10
What this Solution Includes	11
Supported Products and Platforms	12
Prerequisites	13
WebSphere 7 Provisioning Quick Start	14
Import the Solution Pack	15
Create a Deployable Workflow	18
Create a Deployment	19
Run Your Workflow	20
View the Results	21
Workflow Details	22
Provision IBM HTTP Server and WebSphere 7 Two Node Cell	24
Prerequisites for this Workflow	27
How this Workflow Works	29
How to Run this Workflow	34
Sample Scenario	37
Parameters for Provision IBM HTTP Server and WebSphere 7 Two Node Cell	38
Add WebSphere 7 Node to Existing Cell	51
Prerequisites for this Workflow	53
How this Workflow Works	55
How to Run this Workflow	59
Sample Scenario	61
Parameters for Add WebSphere 7 Node to Existing Cell	62

Provision IBM HTTP Server and WebSphere 7 StandAlone Profile	75
Prerequisites for this Workflow	77
How this Workflow Works	79
How to Run this Workflow	81
Sample Scenario	84
Parameters for Provision HTTP Server and WebSphere 7 StandAlone Profile	85
Reference Information	92
WebSphere 7 Product Documentation	92
HP DMA Documentation	93
Tips and Best Practices	94
How this Solution is Organized	95
How to Expose Additional Workflow Parameters	99
How to Use a Policy to Specify Parameter Values	100
Create a Policy	100
Extract a Policy	101
Reference the Policy in the Deployment	101
How to Import a File into the Software Repository	103
Troubleshooting	104
Target Type	104
User Permissions and Related Requirements	104
Discovery in HP DMA	105
Glossary	106

Audience

This solution is designed for:

- IT architects and engineers who are responsible for planning, implementing, and maintaining application-serving environments using IBM WebSphere Application Server version 7 (WebSphere 7).
- Engineers who are implementing—or planning to implement—HP Database and Middleware Automation (HP DMA)

To use this solution, you should be familiar with WebSphere 7 and its requirements (see links to the [WebSphere 7 Product Documentation](#) on page 92).

Document Map

The following table shows you how to navigate this guide:

Topic	Description
The WebSphere 7 Provisioning Solution	General information about this solution, including what it contains and what it does.
WebSphere 7 Provisioning Quick Start	A step-by-step tutorial that shows you how to run the workflows to provision WebSphere 7—using the Provision IBM HTTP Server and WebSphere 7 Two Node Cell workflow as an example.
Workflow Details	Information about the WebSphere 7 workflows included in this solution, including: prerequisites, how it works, how to run it, sample scenarios, and a list of input parameters.
Reference Information	Links to current WebSphere 7 product documentation and additional HP DMA documentation.
Tips and Best Practices	Simple procedures that you can use to accomplish a variety of common HP DMA tasks.
Troubleshooting	Tips for solving common problems.

Important Terms

Here are a few basic HP DMA terms that you will need to know:

- In HP DMA, a **workflow** executes a process —such as installing a software product or checking a database instance for compliance with a specific security benchmark.
- A workflow consist of a sequence of **steps**. Each step performs a very specific task. Steps can be shared among workflows.
- Steps can have input and output **parameters**, whose values will be unique to your environment.

If you provide correct values for the input parameters that each scenario requires, the workflow will be able to accomplish its objective. Output parameters from one step often serve as input parameters to another step.

- A **solution pack** contains a collection of related workflows and the steps, functions, and policies that implement each workflow.

More precisely, solution packs contain **workflow templates**. These are read-only versions of the workflows that cannot be deployed. To run a workflow included in a solution pack, you must first create a deployable copy of the workflow template and then customize that copy for your environment.

- The umbrella term **automation items** is used to refer to those items to which role-based permissions can be assigned. Automation items include workflows, deployments, steps, and policies.

Organizations also have role-based permissions. Servers, instances, and databases inherit their role-based permissions from the organization in which the server resides.

- The **software repository** contains any files that a workflow might need to carry out its purpose (for example, software binaries or patch archives). If the files that a workflow requires are not in the software repository, they must be stored locally on each target server.

When you are using HP DMA with HP Server Automation (HP SA), the software repository is the HP SA Software Library.

- An **organization** is a logical grouping of servers. You can use organizations to separate development, staging, and production resources—or to separate logical business units. Because user security for running workflows is defined at the organization level, organizations should be composed with user security in mind.

Additional terms are defined in the [Glossary](#) on page 106.

Chapter 1

The WebSphere 7 Provisioning Solution

The WebSphere 7 provisioning solution provides tools that you can use to provision many features of a WebSphere 7 environment. These tools enable you to:

- Provision an IBM HTTP Server 7
- Create a WebSphere 7 Network Deployment cell
- Add additional WebSphere 7 nodes to an existing Network Deployment cell
- Create a WebSphere 7 stand-alone profile
- Create and federate a WebSphere 7 custom node profile
- Create a WebSphere 7 Deployment Manager
- Create a WebSphere 7 plug-in

The WebSphere 7 provisioning composite workflows—described in this guide—enable you to:

- Create a web server tier
- Create an application tier
- Create an application cluster that is both vertically and horizontally clustered
- Create a replication cluster that is horizontally clustered
- Create unmanaged nodes and web server objects
- Create remote management of IBM HTTP Server 7 web servers

By consistently using the tools provided in this solution, you can quickly, efficiently, and accurately set up your WebSphere 7 environment. You maintain immense flexibility over the architecture by configuring environment-specific information through the input parameters.

What this Solution Includes

The Application Server Provisioning solution pack contains the following WebSphere 7 provisioning composite workflows:

Workflow Name	Purpose
Provision IBM HTTP Server and WebSphere 7 Two Node Cell	Use this workflow to provision a web server tier with two web servers and an application tier with a two node Network Deployment cell on a Red Hat Enterprise Linux platform. Each node is an IBM WebSphere Application Server version 7 server. The Network Deployment cell contains an application cluster and a replication cluster.
Add WebSphere 7 Node to Existing Cell	Use this workflow in conjunction with the Provision IBM HTTP Server and WebSphere 7 Two Node Cell workflow to expand the Network Deployment cell by one node (up to a maximum of 10 nodes in the cell).
Provision IBM HTTP Server and WebSphere 7 StandAlone Profile	Use this workflow to provision IBM HTTP Server version 7 on a single target machine, provision IBM WebSphere Application Server version 7 on the same machine, and create a stand-alone profile. This workflow is intended for small non-production environments used for development and integration testing.

Supported Products and Platforms

Most WebSphere 7 provisioning workflows are supported on Red Hat Enterprise Linux, Solaris, AIX, HP-UX, and Windows platforms.

Operating Systems

For specific target operating system versions supported by each workflow, see the *HP Database and Middleware Automation Support Matrix* available on the HP Software Product Manuals web site:

<http://h20230.www2.hp.com/selfsolve/manuals>

Hardware Requirements

For HP DMA server hardware requirements, see the *HP DMA Installation Guide* and the *HP DMA Release Notes* (version 10.00 or later).

HP Software Requirements

This solution requires HP DMA version 10.00 (or later).

Prerequisites

The following prerequisites must be satisfied before you can run the WebSphere 7 provisioning workflows in this solution pack:

Per the WebSphere 7 documentation, the following system libraries are required before provisioning IBM WebSphere Application Server version 7 on 64-bit Red Hat Linux:

Platform	Required Library
64-bit Red Hat Enterprise Linux version 5	compat-libstdc++-33-3.2.3-61 compat-db-4.2.52-5.1 libXp-1.0.0-8 compat-libstdc++-296-2.96-138 rpm-build-4.4.2-37.el5

Make sure that these libraries exist on each target server before running this workflow. If newer versions of these libraries are available, you can install the newer versions.

Chapter 2

WebSphere 7 Provisioning Quick Start

This tutorial shows you how to provision WebSphere 7 using HP Database and Middleware Automation.

The tutorial will guide you through the following basic steps to import the Application Server Provisioning Solution Pack and to run the Provision IBM HTTP Server and WebSphere 7 Two Node Cell workflow:

1. [Import the Solution Pack](#) on next page
2. [Create a Deployable Workflow](#) on page 18
3. [Create a Deployment](#) on page 19
4. [Run Your Workflow](#) on page 20
5. [View the Results](#) on page 21

You can follow the same steps to run the other WebSphere 7 provisioning workflows.

In this tutorial, default values will be used for most input parameters. Before executing these steps, make sure that these default values are suitable for your environment.

See [Parameters for Provision IBM HTTP Server and WebSphere 7 Two Node Cell](#) on page 38 for descriptions of available input parameters, including default values.

The information presented in this tutorial assumes the following:

- HP DMA is installed and operational.
- At least one valid target is available.

Note: This tutorial uses a very simple scenario to help you get started quickly. For detailed information about how the provisioning workflows work and how you can customize them for your environment, see the [Workflow Details](#) on page 22.

Import the Solution Pack

The following instructions assume that you have purchased a license for the HP DMA solution pack that you want to import.

The HP DMA 10.00 solution packs are included on the HP DMA 10.00 installation media. They are located in the following folders:

- The `DMA_10.0_Server_and_Client` folder contains the Discovery solution pack.
- The `DMA_10.0_Database_Solution_Packs` folder contains all of the database solution packs (provisioning, advanced provisioning, patching, advanced patching, compliance, refresh, and release management).
- The `DMA_10.0_Middleware_Solution_Packs` folder contains all of the application server solution packs (provisioning, patching, and release management).

Note: The Discovery solution pack is not automatically installed in HP HP DMA version 10.00 (and later). You must import it if you want to use the discovery workflows.

Always check to see if there are more recent versions of the HP DMA solution packs available online. Due to frequent releases, it is likely that the solution packs provided on the installation media have since been updated.

To get the most recent version of a solution pack:

1. Go to the following web site: [HP Software Support Online](#)
2. Go to the Self-Solve tab, and sign in using your HP Passport credentials (see [Support](#) on page 4 for more information).
3. On the Advanced Search page, specify the following search criteria:

Product:	Database and Middleware Automation Solution Packs
Version:	All Versions
Operating System:	All Operating Systems
Document Type:	Patches

4. Click **Search**.
5. If there is a more recent version of the Application Server Provisioning solution pack, do the following:
 - a. Click the link for the solution pack that you want to import (for example: AS Prov 10.0x).
 - b. Click the **DOWNLOAD PATCH** link, and download the ZIP file that contains the patch.
 - c. From the patch ZIP file, extract the ZIP file that contains the solution pack.

Note: This ZIP file may be included in a larger ZIP file that contains multiple solution packs.

To import the solution pack:

1. On the system where you downloaded the solution pack, open a web browser, and go to the following address:
`https://<HP_DMAserver>:8443/dma/login`
2. Log in to the HP DMA server using an account with Administrator capability.
3. On the Solutions > Installed tab, click the **Browse** button in the lower right corner. The Choose File dialog opens.

Note: This button and the dialog that subsequently opens may have different names depending on the browser that you are using.

4. Locate and select the solution pack ZIP file that you extracted earlier, and click **Open**.
5. Click **Import solution pack**.

To view basic information about the solution pack, hover your mouse over its name in the left pane:

The screenshot shows the HP Database & Middleware Automation web interface. The top navigation bar includes links for Home, Automation, Reports, Environment, Solutions, and Setup. Below this, the 'Installed' tab is selected, showing a list of installed solution packs. A green banner at the top of the main content area states: 'Successfully imported HP_DMA Application Server Provisioning Solution Pack'.

The 'Installed Solutions' section is divided into two panes. The left pane, titled 'SOLUTION PACKS', lists several solution packs, with 'HP DMA Application Server Provisioning Solution Pack' (Version 10.0) highlighted in blue. The right pane, titled 'DETAILS', provides information for the selected solution pack:

DETAILS	
Name:	HP DMA Application Server Provisioning Solution Pack
Version:	10.0
Targets:	23
Installed:	26 Nov, 2012
Description:	Provisioning workflows for WebSphere, WebLogic, and JBoss Build 31995

At the bottom right of the interface, there are two buttons: 'Browse...' and 'Import solution pack'.

To view detailed information about the solution pack, click its name in the left pane. To view a list of the workflows that the solution pack contains, go to the Workflows tab.

The screenshot displays the HP Database & Middleware Automation console. The top navigation bar includes links for Home, Automation, Reports, Environment, Solutions, and Setup. Below this, a sub-navigation bar shows Installed and History. The main content area is titled "HP DMA Application Server Provisioning Solution Pack" with a version of 10.0. It features several tabs: General, Policies, Workflows, Steps, and Reports. The Workflows tab is active, showing a list of workflows on the left and a detailed view of the selected workflow on the right. The workflow list on the left includes tasks such as "Increase WebLogic Domain Span", "Provision HTTP Server and WebSphere 7 StandAlone Profile", "Provision IBM HTTP Server 7 and Plug-in", "Provision IBM HTTP Server and WebSphere 7 Two Node Cell" (which is selected), "Provision Open Source JBoss 7 StandAlone Mode", "Provision Red Hat JBoss StandAlone", "Provision Weblogic Cluster", "Provision Weblogic Domain and Admin Server", and "Provision Weblogic Managed Servers". The detailed view on the right shows a sequence of 12 steps for the selected workflow, starting with "Configure Target Options" and ending with "Run Provision WebSphere 7 and Deployment Manager". A "DELETE" button is visible at the bottom of the console.

Workflow	Step
Configure Target Options	1
Gather IBM HTTP Server 1 Data	2
Failure	3
Gather IBM HTTP Server 2 Data	4
Gather WebSphere Deployment Manager System Data	5
Gather Parameters for IHS and WebSphere Cell	6
Gather Advanced Parameters for IHS and WebSphere Cell	7
Run Provision IBM HTTP Server 7 and Plug-in	8
Validate IBM IHS install	9
Run Provision IBM HTTP Server 7 and Plug-in	10
Validate IBM IHS install	11
Run Provision WebSphere 7 and Deployment Manager	12

Create a Deployable Workflow

The workflow templates provided by HP in your solution pack are read-only and cannot be deployed. When you are viewing a read-only item in the HP DMA web UI, you will see the lock icon in the lower right corner:

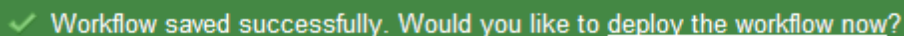


Read-only workflows are not deployable. You can create a deployable workflow by making a copy of a workflow template.¹

To create a deployable copy of the workflow template:

1. In the HP DMA web interface, go to Automation > Workflows.
2. From the list of workflows, select the workflow template that you want to use (for example, Provision IBM HTTP Server and WebSphere 7 Two Node Cell).
3. Click the **Copy** button in the lower left corner.
4. On the Documentation tab, specify the following:
 - Name – Name that will appear in the list of available workflows
 - Tags – Keywords that you can use later to search for this workflow (optional)
 - Type – Either OS or the specific type of database (the correct type will be selected as a result of the copy)
 - Target level – Server, Instance, or Database (the correct target level will be selected as a result of the copy)
5. On the Roles tab, grant Read access to at least one user or group and Write access to at least one user or group.
6. Click **Save**.

Your new workflow now appears in the list of available workflows, and the following message is displayed:



Workflow saved successfully. Would you like to [deploy the workflow now?](#)

7. Click the **deploy the workflow now** link in the green message bar.

¹For more information about creating and working with workflows, see “Workflows” in the *HP DMA User Guide*. This document is available on the HP Software Product Manuals web site: <http://h20230.www2.hp.com/selfsolve/manuals>

Create a Deployment

Before you can run your new workflow, you must create a deployment. A deployment associates a workflow with one or more specific targets (servers, instances, or databases).

To create a deployment:

1. If you do not see the green message bar—for example, if you navigated to another page after you created your copy of the workflow template—follow these steps:
 - a. Go to the Automation > Deployments page.
 - b. In the lower right corner, click **New deployment**.
2. Specify the following:
 - Name – Name that will appear in the list of available deployments.
 - Workflow – From the drop-down list, select the deployable workflow that you just created.
 - Schedule – Frequency or date when the workflow will run. If you select None, the workflow will run only once when you explicitly tell it to run.
3. From the list of AVAILABLE servers on the left side of the Targets area, click the **ADD** link for the target (or targets) where the workflow will run.

Note: If you are running a bridged execution workflow, the targets that you select on the Deployment page will be included in the lists of available targets that you can choose from on the Run page.

For more information about bridged execution workflows, see the *User Guide: Database and Middleware Automation*. This document is available on the HP Software Product Manuals web site: <http://h20230.www2.hp.com/selfsolve/manuals>

4. On the Parameters tab, specify values for the input parameters listed there.

These are a subset of the required parameters for this workflow. Parameters that are not visible in the deployment will have default values.

Note: See the [Reference Information](#) included in this guide for descriptions of all available input parameters for your workflow, including default values.

5. If you do not want to explicitly enter the values here, you can create a policy that stores the values and then reference that policy in your deployment (see [How to Use a Policy to Specify Parameter Values](#) on page 100).
6. Click **Save**.

Your new deployment now appears in the list of available workflows, and the following message is displayed:

✓ Deployment saved successfully. Would you like to [run the workflow now?](#)

7. Click the **run the workflow now** link in the green message bar.

Run Your Workflow

Now you are ready to run your workflow against the server that you selected.

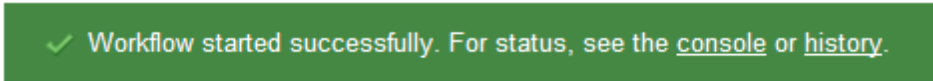
To run the workflow:

1. If you do not see the green message bar—for example, if you navigated to another page after you created your deployment—follow these steps:
 - a. Go to the Automation > Run page.
 - b. In the list of WORKFLOWS on the left side, select the workflow that you created.
 - c. In the list of DEPLOYMENTS on the right side, select the deployment that you just created.

2. If you are running a single-target workflow, select the check box for each target where you want to run the workflow.

If you are running a bridged execution workflow, click the **SELECT** link to specify each target. The targets that are available to choose from here are the targets that you selected on the Deployment page.

3. Click the **Run workflow** button.
4. The following message is displayed:



✓ Workflow started successfully. For status, see the [console](#) or [history](#).

5. To view the progress of your deployment, click the **console** link in the green message bar.

View the Results

While your workflow is running, you can watch its progress on the Automation > Console page.

- To view the progress of the workflow as the deployment proceeds, click the workflow name in the upper box on the Console page.
- To view the outcome of a specific step, select that step in the left box in the Output area. Informational messages are displayed in the right box, and the values of any output parameters are listed.

While the workflow is running, its status indicator on the Console says **RUNNING**. After the workflow finishes, its status indicator changes to **SUCCESS**, **FAILURE**, or **FINISHED**.

After the workflow has finished running, you can view a summary of your deployment on the History page. This page lists all the workflows that have run on this HP DMA server during the time period specified in the Filter box.

To view step-by-step results, select the row in the table that corresponds to your deployment. The tabs below the table show you information about each step in the workflow. This includes the start and end time for each step, the exit code, and the following information:

- Output tab – any informational messages that were produced
- Errors tab – any errors that were reported
- Header tab – values assigned to any output parameters

Chapter 3

Workflow Details

The Application Server Provisioning solution pack contains the following WebSphere 7 provisioning composite workflows. You can run these workflows ad-hoc for custom WebSphere 7 installations or create reusable deployments to standardize WebSphere 7 installations in your environment.

Workflow Name	Purpose
Provision IBM HTTP Server and WebSphere 7 Two Node Cell	Use this workflow to provision a web server tier with two web servers and an application tier with a two node Network Deployment cell on a Red Hat Enterprise Linux platform. Each node is an IBM WebSphere Application Server version 7 server. The Network Deployment cell contains an application cluster and a replication cluster.
Add WebSphere 7 Node to Existing Cell	Use this workflow in conjunction with the Provision IBM HTTP Server and WebSphere 7 Two Node Cell workflow to expand the Network Deployment cell by one node (up to a maximum of 10 nodes in the cell).
Provision IBM HTTP Server and WebSphere 7 StandAlone Profile	Use this workflow to provision IBM HTTP Server version 7 on a single target machine, provision IBM WebSphere Application Server version 7 on the same machine, and create a stand-alone profile. This workflow is intended for small non-production environments used for development and integration testing.

Each workflow included in this solution pack has a set of input parameters whose values will be unique to your environment. If you provide correct values for the parameters that each scenario requires, the workflow will be able to accomplish its objective.

There are two steps required to customize this solution:

1. Ensure that all required parameters are visible. You do this by using the workflow editor.

For simple provisioning scenarios, you can use the default values for most parameters. To use this solution's more advanced features, you will need to expose additional parameters.

2. Specify the values for those parameters. You do this when you create a deployment.

Tip: Detailed instructions are provided in the "How to Use this Workflow" topic associated with each workflow.

The information presented here assumes the following:

- HP DMA is installed and operational.

- At least one suitable target server is available (see [Supported Products and Platforms](#) on page 12).
- You are logged in to the HP DMA web interface.
- You have permission to create, edit, and deploy copies of the workflows included in this solution pack.

Tip: All parameters used by the workflows in this solution are described in the "Parameters" topic associated with each workflow.

Provision IBM HTTP Server and WebSphere 7 Two Node Cell

Use this workflow to provision a web server tier with two web servers and an application tier with a two node Network Deployment cell on a Red Hat Enterprise Linux platform. Each node is an IBM WebSphere Application Server version 7 server. The Network Deployment cell contains an application cluster and a replication cluster.

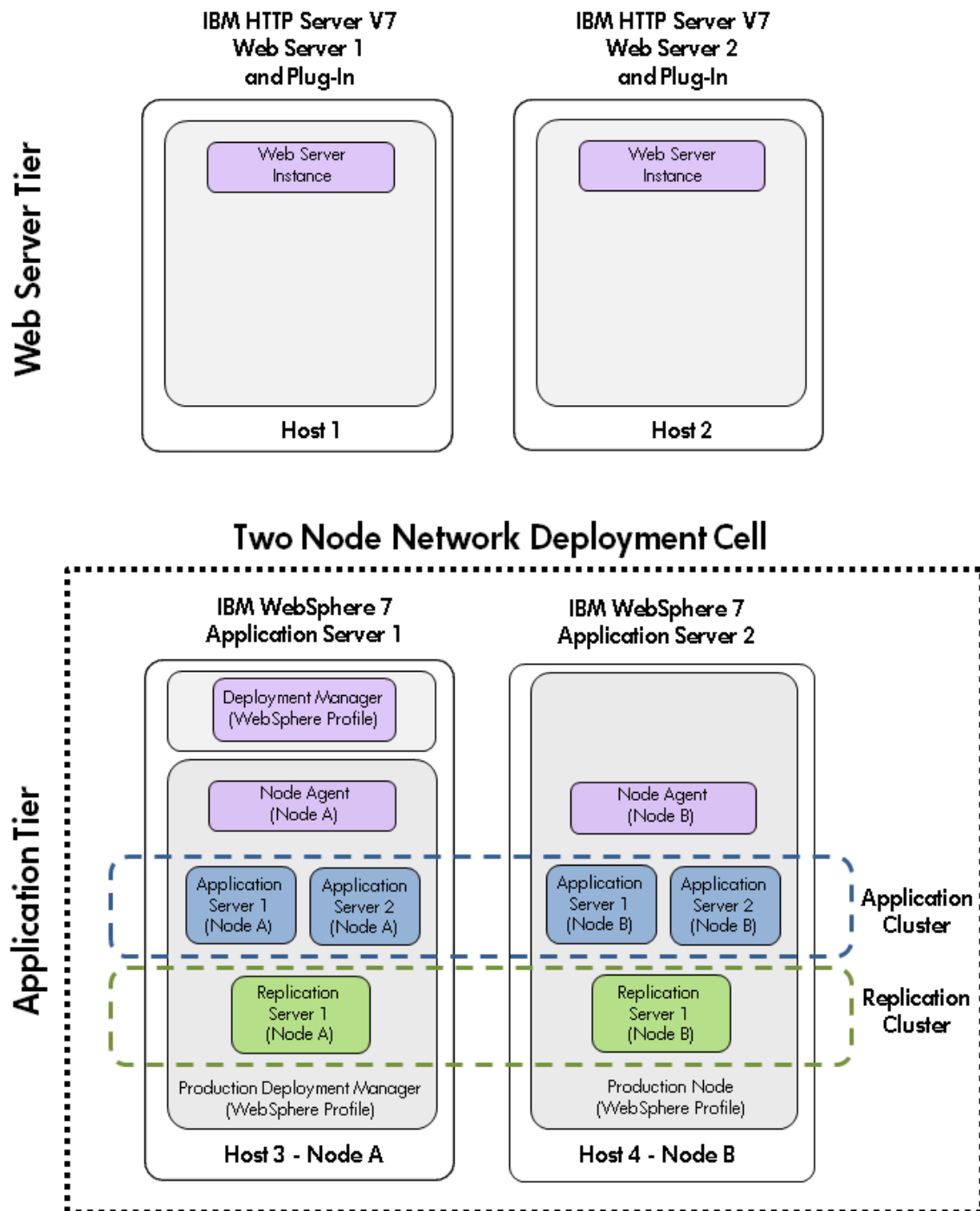
The workflow does the following:

- Provisions IBM HTTP Server version 7 on two target machines
- Provisions IBM WebSphere Application Server version 7 on two other target machines
- Creates a two node Network Deployment cell with a Deployment Manager profile and two custom node profiles
- Creates an application cluster that is both vertically and horizontally clustered to deploy applications
- Creates a replication cluster that is horizontally clustered to replicate HTTP sessions from one application server to the other, providing session persistence
- Creates unmanaged nodes and web server objects for mapping applications at deployment time
- Creates remote management of the two IBM HTTP Server version 7 web servers

All the cluster members are configured to take part in a replication domain. The application cluster members are the clients, and the replication cluster members are the servers.

This workflow takes advantage of composite workflows, component workflows, and bridged execution functionality within HP DMA so that some workflows become steps in a larger workflow. This gives the ability to execute complex workflows across multiple target machines using very few parameters.

Architecture Diagram



To use this workflow in your environment, see the following information:

Topic	Information Included
Prerequisites for this Workflow	List of prerequisites that must be satisfied before you can run this workflow
How this Workflow Works	Information about what the workflow does, including validation checks performed, steps executed, and a high-level process flow
How to Run this Workflow	Instructions for running this workflow in your environment
Sample Scenario	Examples of typical parameter values for this workflow
Parameters	List of input parameters for this workflow

Prerequisites for this Workflow

Be sure that the following prerequisites are satisfied before you run the Provision IBM HTTP Server and WebSphere 7 Two Node Cell workflow:

Hardware and Software Requirements

Type	Requirement
Number and Operating System of Servers	4 machines running Red Hat Enterprise Linux 5.x
Number and Processor Architecture of CPUs	2 cores/server and x86 architecture for Web Server Tier 4 cores/server and x86 architecture for Application Tier
Memory per CPU/Server	4GB per IBM HTTP Server 16GB per IBM WebSphere Application Server
Virtual Memory Settings	None
Server Configuration	None
Storage	Local disk size should be 100GB/server with most of the space allocated to the /opt file system
Product Software	IBM WebSphere Application Server Network Deployment Manager 7 64-bit binaries IBM HTTP Server version 7 binaries

Dependencies

1. This workflow requires unchallenged `sudo` access to a user (typically root) who can access all required files and directories.
2. Per the WebSphere 7 documentation, the following system libraries are required before provisioning IBM WebSphere Application Server version 7 on 64-bit Red Hat Linux:

Platform	Required Library
64-bit Red Hat Enterprise Linux version 5	compat-libstdc++-33-3.2.3-61 compat-db-4.2.52-5.1 libXp-1.0.0-8 compat-libstdc++-296-2.96-138 rpm-build-4.4.2-37.el5

Make sure that these libraries exist on each target server before running this workflow. If newer versions of these libraries are available, you can install the newer versions.

3. This workflow will install WebSphere Application Server as root because of the following IBM documented limitations:
 - Creation of a Linux service for WebSphere Application Server
 - Native registration with the operating system

- Port conflicts that may occur with other installations of WebSphere Application Server that are not registered with the operating system

If there is a need to run as a non-root user after installation, you can run a recursive `chown` under the installation root and set owner permissions accordingly.

For more information about prerequisites for WebSphere 7, refer to the [WebSphere 7 Product Documentation](#) on page 92.

How this Workflow Works

The following information describes how the Provision IBM HTTP Server and WebSphere 7 Two Node Cell workflow works:

Overview

This workflow does the following things in the order shown:

- Provisions IBM HTTP Server version 7 on two target machines
- Provisions IBM WebSphere Application Server version 7 on two other target machines
- Creates a two node Network Deployment cell with a Deployment Manager profile and two custom node profiles
- Creates an application cluster that is both vertically and horizontally clustered to deploy applications
- Creates a replication cluster that is horizontally clustered to replicate HTTP sessions from one application server to the other, providing session persistence
- Creates unmanaged nodes and web server objects for mapping applications at deployment time
- Creates remote management of the two IBM HTTP Server version 7 web servers

Validation Checks Performed

This workflow automatically runs validation steps after each component workflow step to make sure that the component workflow successfully provisioned and configured the servers, plug-ins, Deployment Manager, and nodes. The workflow only proceeds to the next step if the validation was successful.

Most of the validation centers on special characters and spaces in the parameters. There are also validation checks that happen at the operating system level, including file system space checks and RPM checks for Red Hat Linux.

The workflow first performs the following parameter checks:

1. None of the following characters are used in the Admin User, Cell Name, Node Name, or Profile Name parameters: / \ * , ; : = + ? | < > & % ' " [] > # \$ ^ { }
2. If Enable Security is true, Admin Password and Admin User are specified.
3. Admin Password (if specified) does not begin with a dash or contain a space.
4. Admin User (if specified) does not begin with a dash, a period, or a space.
5. Profile Name does not begin with a period.
6. Personal CertDN and Signing CertDN do not contain spaces.
7. If Ports File is specified, Validate Ports is true.
8. All specified file names are legal file names.

The workflow then performs the following operating system checks on the target machine:

1. All required libraries are present (see [Prerequisites for this Workflow](#) on page 27).
2. Sufficient disk space is available to install .
3. Sufficient disk space is available to extract the binary files from the compressed archive.

Process Flow

The Provision IBM HTTP Server and WebSphere 7 Two Node Cell workflow provisions a web server tier and an application tier. For the web server tier, the workflow provisions two IBM HTTP Server 7 servers with plug-ins. For the application tier, the workflow provisions two WebSphere 7 servers, creates a Deployment Manager for one, and creates custom nodes (node agents) for both.

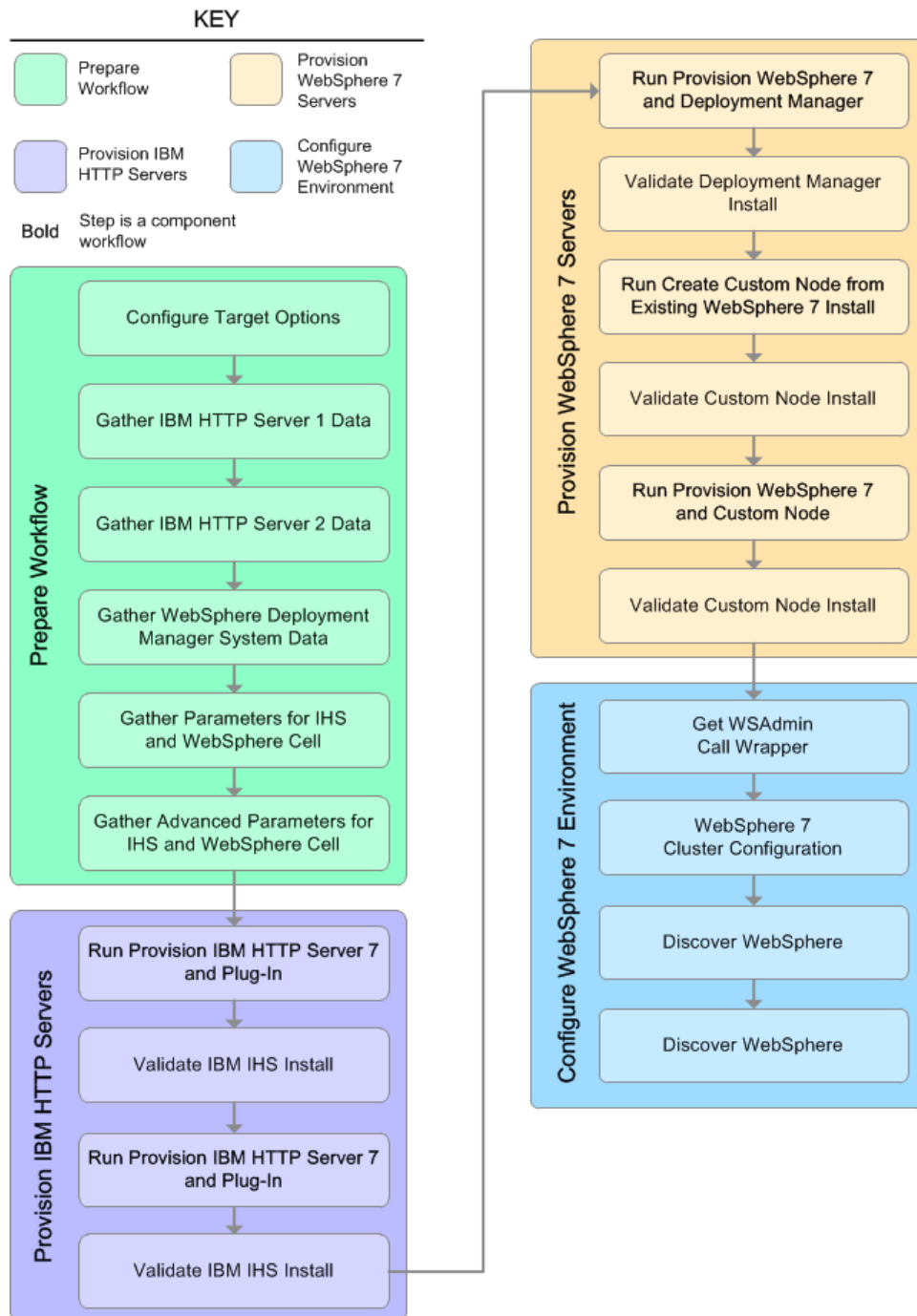
The workflow creates two clusters across the WebSphere 7 servers. The first cluster, which is vertically and horizontally clustered, is set up so that applications can be deployed to it. The second cluster, which is horizontally clustered, is meant for memory-to-memory replication of HTTP sessions.

All cluster members are configured to take part in a replication domain. The application cluster members are configured as the clients, and the replication cluster members are configured as the servers. The workflow creates unmanaged nodes and web server objects for mapping applications at deployment time. The workflow creates remote management of the two IBM HTTP Server version 7 servers.

The workflow sets minimum and maximum java heap sizes to 4GB and sets the garbage collection policy to generational concurrent (gencon).

Steps Executed

The Provision IBM HTTP Server and WebSphere 7 Two Node Cell workflow includes the following steps. Each step must complete successfully before the next step can start. If a step fails, the workflow reports a failure and all subsequent steps are skipped.



Steps Used in the Provision IBM HTTP Server and WebSphere 7 Two Node Cell Workflow

Workflow Step	Description
Configure Target Options	Prepares the target machine parameters needed to provision both IBM HTTP Server and WebSphere Application Server version 7.
Gather IBM HTTP Server 1 Data	Retrieves the host name of the specified IBM HTTP Server 1 target machine in the HP DMA environment.
Gather IBM HTTP Server 2 Data	Retrieves the host name of the specified IBM HTTP Server 2 target machine in the HP DMA environment.
Gather WebSphere Deployment Manager System Data	Retrieves the host name of the specified IBM HTTP Deployment Manager target machine in the HP DMA environment.
Gather Parameters for IHS and WebSphere Cell	Prepares the parameters needed to provision IBM HTTP Server and WebSphere Application Server version 7.
Gather Advanced Parameters for IHS and WebSphere Cell	Prepares the advanced parameters needed to provision and configure IBM HTTP Server and WebSphere Application Server version 7.
Run Provision IBM HTTP Server 7 and Plug-in	Calls the Provision IBM HTTP Server 7 and Plug-in workflow via the HP DMA API to provision IBM HTTP Server 1.
Validate IBM IHS install	Validates that the provisioning of IBM HTTP Server and plug-in were successful for IBM HTTP Server 1.
Run Provision IBM HTTP Server 7 and Plug-in	Calls the Provision IBM HTTP Server 7 and Plug-in workflow via the HP DMA API to provision IBM HTTP Server 2.
Validate IBM IHS install	Validates that the provisioning of IBM HTTP Server and plug-in were successful for IBM HTTP Server 2.
Run Provision WebSphere 7 and Deployment Manager	Calls the Provision WebSphere 7 and Deployment Manager workflow via the HP DMA API to provision IBM WebSphere 7 Application Server 1 with Deployment Manager.
Validate Deployment Manager Install	Validates that the provisioning of IBM WebSphere Deployment Manager was successful for IBM WebSphere 7 Application Server 1.
Run Create Custom Node from Existing WebSphere 7 Install	Calls the Create Custom Node From Existing WebSphere 7 workflow via the HP DMA API to provision IBM WebSphere 7 Application Server 1.

Steps Used in the Provision IBM HTTP Server and WebSphere 7 Two Node Cell Workflow (continued)

Workflow Step	Description
Validate Custom Node Install	Validates that the creation and federation of the custom node were successful for IBM WebSphere 7 Application Server 1.
Run Provision WebSphere 7 and Custom Node	Calls the Provision WebSphere 7 and Custom Node workflow via the HP DMA API to provision IBM WebSphere 7 Application Server 2.
Validate Custom Node Install	Validates that the creation and federation of the custom node were successful for IBM WebSphere 7 Application Server 2.
Get WSAdmin Call Wrapper	Creates the necessary call wrapper to call wsadmin to execute certain operations within the specified WebSphere environment.
WebSphere 7 Cluster Configuration	Creates the cluster and cluster members for the specified WebSphere environment as well as replication domains, heap sizes, garbage collection policy, unmanaged nodes and web server instances.
Discover WebSphere	Audits the Node A server's physical environment looking for WebSphere cells, clusters, and managed servers
Discover WebSphere	Audits the Node B server's physical environment looking for WebSphere cells, clusters, and managed servers

For parameter descriptions and defaults, see [Parameters for Provision IBM HTTP Server and WebSphere 7 Two Node Cell](#) on page 38.

How to Run this Workflow

The following instructions show you how to customize and run the Provision IBM HTTP Server and WebSphere 7 Two Node Cell workflow in your environment.

The workflow provides default values for some parameters. These default values are usually sufficient for a "typical" installation. You can override the defaults by specifying parameter values in the deployment. You can also expose additional parameters in the workflow, if necessary, to accomplish more advanced scenarios. Any parameters not explicitly specified in the deployment will have the default values listed in [Parameters for Provision IBM HTTP Server and WebSphere 7 Two Node Cell](#) on page 38

Note: Before following this procedure, review the [Prerequisites for this Workflow](#), and ensure that all requirements are satisfied.

To use the Provision IBM HTTP Server and WebSphere 7 Two Node Cell workflow:

1. Create a deployable copy of the Provision IBM HTTP Server and WebSphere 7 Two Node Cell workflow (see [Create a Deployable Workflow](#) on page 18).
2. Determine the values that you will specify for the following parameters:

Input Parameters for Gather Parameters for IHS and WebSphere Cell

Parameter Name	Default Value	Required	Description
All - DMA Password	no default	required	Password for the HP DMA web services API.
All - DMA Username	no default	required	User who is capable of modifying the managed environment through the HP DMA Discovery web services API.
Application Name	no default	required	Name of the application that will be used through to create the application servers and clusters that will be created under the profile.
WebSphere Deployment Manager - Cell Name	no default	required	Unique cell name that does not contain any of the following special characters / \ * , : ; = + ? < > & % ' " [] > # \$ ^ { }. If you plan to federate into an existing cell later, make sure that this name is not the same as the existing cell name.

Tip: To avoid having to re-enter passwords whenever they change, you can create a policy to provide them to the workflow (see [How to Use a Policy to Specify Parameter Values](#) on page 100).

Note: This is the minimum set of parameters required to run this workflow. You may need to expose additional parameters depending on your provisioning objectives.

See [Parameters for Provision IBM HTTP Server and WebSphere 7 Two Node Cell](#) on page 38 for detailed descriptions of all input parameters for this workflow, including default values.

3. In the workflow editor, expose any additional parameters that you need (see [How to Expose Additional Workflow Parameters](#) on page 99). You will specify values for those parameters when you create the deployment.
4. Save the changes to the workflow (click **Save** in the lower right corner).
5. Create a new deployment (see [Create a Deployment](#) on page 19 for instructions).
6. On the Parameters tab, specify values for the required parameters listed in step 2 and any additional parameters that you have exposed. You do not need to specify values for those parameters whose default values are appropriate for your environment.
7. On the Targets tab, specify one or more targets for this deployment.
8. Save the deployment (click **Save** in the lower right corner).
9. Run the workflow using this deployment (see [Run Your Workflow](#) on page 20 for instructions). Select the following targets:

Input Parameters for Configure Target Options

Parameter Name	Default Value	Required	Description
Primary Target	no default	required	Any target machine (although this target is not currently used, it is included for backward compatibility with older workflows).
IBM HTTP Server System 1	no default	required	First target machine that will be (or was) provisioned with the IBM HTTP Server software.
IBM HTTP Server System 2	no default	required	Second target machine that will be (or was) provisioned with the IBM HTTP Server software.
Provision WebSphere 7 and Custom Node System	no default	required	Target machine that will be provisioned with IBM WebSphere software and a custom node profile.
WebSphere Deployment Manager System	no default	required	Target machine that will be provisioned with IBM WebSphere software, Deployment Manager, and a custom node profile.

To verify the results:

The workflow will complete and report SUCCESS on the Console if it has run successfully. If an error occurs during workflow execution, the error is logged, and the workflow terminates in the FAILURE state.

This workflow automatically runs validation steps after each component workflow step to make sure that the component workflow successfully provisioned and configured the servers, plug-ins, Deployment Manager, and nodes. The workflow only proceeds to the next step if the validation was successful.

Optional: if you want to further verify the results, perform the following steps:

1. After the workflow has completed, run the following command to check the version of WebSphere Application Server that was installed:

```
WAS_ROOT/bin/versionInfo.sh
```

Here, *WAS_ROOT* is the directory where WebSphere 7 is installed. This is the path that you specified in the WebSphere Install Location parameter.

2. Validate that the profile has been created and is running by doing the following:

- a. View the *WAS_ROOT/profiles/PROFILE_NAME/logs/AboutThisProfile.txt* file. This file is created after the creation of the profile and contains specific information about the profile.

Here, *PROFILE_NAME* is the name of the profile that you just created. This is the name that you specified in the Profile Name parameter.

- b. Change to the *WAS_ROOT/profiles/PROFILE_NAME/logs/CELL_NAME* directory, and tail the *SystemOut.log* file. Look for the following line:

```
Server CELL_NAME open for e-business
```

Here, *CELL_NAME* is the name of the WebSphere 7 cell to which this profile pertains. This is the name that you specified in the Cell Name parameter.

Sample Scenario

The Provision IBM HTTP Server and WebSphere 7 Two Node Cell workflow is very straightforward. The purpose is to provision two IBM HTTP Server 7 servers and two WebSphere 7 servers and to create a two node cell.

This topic shows you typical parameter values used for the Provision IBM HTTP Server and WebSphere 7 Two Node Cell workflow.

Input Parameters for Gather Parameters for IHS and WebSphere Cell

Parameter Name	Example Value	Description
All - DMA Password	password	Password for the HP DMA web services API.
All - DMA Username	admin	User who is capable of modifying the managed environment through the HP DMA Discovery web services API.
Application Name	ProdApp	Name of the application that will be used through to create the application servers and clusters that will be created under the profile.
WebSphere Deployment Manager - Cell Name	ProdDmgr	Unique cell name that does not contain any of the following special characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }. If you plan to federate into an existing cell later, make sure that this name is not the same as the existing cell name.

Tip: To avoid having to re-enter passwords whenever they change, you can create a policy to provide them to the workflow (see [How to Use a Policy to Specify Parameter Values](#) on page 100).

Parameters for Provision IBM HTTP Server and WebSphere 7 Two Node Cell

The following tables describe the required and optional input parameters for this workflow. Some of these parameters may not be initially visible in a deployment (see [How to Expose Additional Workflow Parameters](#) on page 99). For most parameters, if you do not specify a value for a parameter, a default value is assigned.

Note: Only those parameters that are configurable in a standard deployment are listed here. Input parameters that must be mapped to output parameters of previous steps are not listed.

Input Parameters Defined in this Step: Configure Target Options

Parameter Name	Default Value	Required	Description
IBM HTTP Server System 1	no default	required	First target machine that will be (or was) provisioned with the IBM HTTP Server software.
IBM HTTP Server System 2	no default	required	Second target machine that will be (or was) provisioned with the IBM HTTP Server software.
Provision WebSphere 7 and Custom Node System	no default	required	Target machine that will be provisioned with IBM WebSphere software and a custom node profile.
WebSphere Deployment Manager System	no default	required	Target machine that will be provisioned with IBM WebSphere software, Deployment Manager, and a custom node profile.

Input Parameters Defined in this Step: Gather Parameters for IHS and WebSphere Cell

Parameter Name	Default Value	Required	Description
All - DMA Password	no default	required	Password for the HP DMA web services API.
All - DMA Username	no default	required	User who is capable of modifying the managed environment through the HP DMA Discovery web services API.
Application Name	no default	required	Name of the application that will be used through to create the application servers and clusters that will be created under the profile.
WebSphere Deployment Manager - Cell Name	no default	required	Unique cell name that does not contain any of the following special characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }. If you plan to federate into an existing cell later, make sure that this name is not the same as the existing cell name.

Input Parameters Defined in this Step: Gather Advanced Parameters for IHS and WebSphere Cell

Parameter Name	Default Value	Required	Description
Application Name	no default	required	Name of the application that will be used through to create the application servers and clusters that will be created under the profile.
Custom Node Parameters-Cell Name 1	ProdNode01	required	Unique cell name that does not contain any of the following special characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }. If you plan to federate into an existing cell later, make sure that this name is not the same as the existing cell name.
Custom Node Parameters-Cell Name 2	ProdNode02	required	Unique cell name that does not contain any of the following special characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }. If you plan to federate into an existing cell later, make sure that this name is not the same as the existing cell name.
HTTP Access Log	see description	required	Used to configure web server instances inside of WebSphere for management operational purposes. The default is: <code>/opt/IBM/HTTPServer/ logs/access_log</code>
HTTP Error Log	see description	required	Used to configure web server instances inside of WebSphere for management operational purposes. The default is: <code>/opt/IBM/HTTPServer/ logs/error_log</code>
Install IHS for WebSphere 7-Password	password	required for Windows targets	This is the Windows Administrator user's password.
Install IHS for WebSphere 7-Username	wasadmin	required for Windows targets	This is the Windows Administrator user who will install WebSphere 7.
Install WebSphere 7 Create Profile-Password	password	required for Windows targets	This is the WebSphere 7 Administrator user's password.

Input Parameters Defined in this Step: Gather Advanced Parameters for IHS and WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Install WebSphere 7 Create Profile-Username	wasadmin	required for Windows targets	This is the WebSphere 7 Administrator user.
Instance	no default	optional	Used internally by the workflow. Caution: This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.
Node Name	no default	required	Used to configure an unmanaged node inside of WebSphere for management operational purposes.
Node OS	linux	required	Used to configure an unmanaged node inside of WebSphere for management operational purposes.
Plugin Root	see description	required	Used to configure web server instances inside of WebSphere for management operational purposes. The default is: <code>/opt/IBM/HTTPServer/Plugins</code>
Validate Existing Install Custom Node Parameters-Cell Name	ProdNode01	required	Unique cell name that does not contain any of the following special characters <code>/ \ * , ; = + ? < > & % ' " [] > # \$ ^ { }</code> . If you plan to federate into an existing cell later, make sure that this name is not the same as the existing cell name.
Validate Existing Install Custom Node Parameters-Dmgr Admin Password	password	optional	Administrative user password for the Deployment Manager. When Enable Security is set to true, this parameter must contain a string that does not begin with a dash(-) or contain a space().

Input Parameters Defined in this Step: Gather Advanced Parameters for IHS and WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Validate Existing Install Custom Node Parameters-Dmgr Admin User	wasadmin	required	Deployment Manager administrative user. When Enable Security is set to true, this parameter must contain a string that does not begin with a dash(-), a period(.), or a space(). It cannot contain any of the following characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }.
Validate Existing Install Custom Node Parameters-Dmgr HostName	no default	required	Host name or IP address of the machine where the Deployment Manager is running. Specify this parameter and the Dmgr Port parameter to federate the new custom node as it is created.
Validate Existing Install Custom Node Parameters-Dmgr Port	8879	required	The SOAP port on which the Deployment Manager is listening. Specify this parameter and the Dmgr Host Name parameter to federate the new custom node as it is created.
Validate Existing Install Custom Node Parameters-Enable Security	true	required	Enables administrative security on the Deployment Manager. Must be set to either true or false. If Enable Security is true, the Dmgr Admin User and Dmgr Admin Password parameters must have values.
Validate Existing Install Custom Node Parameters-Install Location	see description	required	Fully qualified path where WebSphere Application Server will be installed. The default is: /opt/IBM/WebSphere/AppServer

Input Parameters Defined in this Step: Gather Advanced Parameters for IHS and WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Validate Existing Install Custom Node Parameters-Node Name	ProdNode01	required	Unique node name that cannot contain any of the following special characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }. If you plan to federate into an existing cell later, make sure that the name is unique within that cell.
Validate Existing Install Custom Node Parameters-Profile Name	ProdNode01	required	A unique profile name. It cannot begin with a period (.) and cannot contain any of the following special characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }.
Validate Existing Install Custom Node Parameters-Profile Path	see description	required	Fully qualified path to the profile. The default is: <code>/opt/IBM/WebSphere/AppServer/profiles/ProdNode01</code>
Validate Existing Install Custom Node Parameters-Response File	see description	required	Fully qualified path where the response file that this workflow creates will be located. This file will then be used to drive the profile creation. The default is: <code>/tmp/custom_node_resp.txt</code>
Validate IHS 7 Parameters-Admin Auth Password	password	optional	The password used to authenticate to the IBM HTTP administration server using the WebSphere Application Server administrative console. When Create Admin Auth is set to true, this parameter must have a value. It cannot begin with a dash(-) or contain a space().
Validate IHS 7 Parameters-Admin Auth Password Confirm	password	optional	Confirms the Admin Auth Password.

Input Parameters Defined in this Step: Gather Advanced Parameters for IHS and WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Validate IHS 7 Parameters-Admin Auth User	wasadmin	optional	The user ID used to authenticate to the IBM HTTP administration server using the WebSphere Application Server administrative console. When Create Admin Auth is set to true, this parameter must have a value. It cannot begin with a dash(-), a period(.), or a space() and cannot contain any of the following characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }.
Validate IHS 7 Parameters-Admin Port	8008	required	The port on which the HTTP administration web server will run. This is usually 8008.
Validate IHS 7 Parameters-Binary Archive	see description	required	Fully qualified path to the compressed software package on the target machine. The default is: /opt/install/C1G36ML.tar.gz
Validate IHS 7 Parameters-Create Admin Auth	true	required	Set this to true to create a user ID and password to authenticate to the IBM HTTP administration server using the WebSphere Application Server administrative console. If this parameter is set to true, the following parameters must have values: Admin Auth Password, Admin Auth Password Confirm, and Admin Auth User.
Validate IHS 7 Parameters-Create Admin User Group	true	required	Set to true to create a user ID and group used to set up the IBM HTTP Administration Server on Linux and UNIX operating systems.
Validate IHS 7 Parameters-Extract Dir	/tmp/	required	Fully qualified path where the compressed software will be extracted on the target machine.
Validate IHS 7 Parameters-Http Port	80	required	The port on which the web server will listen. Usually, this is set to 80.

Input Parameters Defined in this Step: Gather Advanced Parameters for IHS and WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Validate IHS 7 Parameters-Install Location	see description	required	Fully qualified path where IBM HTTP Server will be installed. The default is: <code>/opt/IBM/HTTPServer</code>
Validate IHS 7 Parameters-Install Plugin	true	required	Determines whether or not the WebSphere Application Server plug-in is installed. Valid values are true or false.
Validate IHS 7 Parameters-License Acceptance	true	required	Acknowledges that the end-user agrees to the IBM International Program License Agreement.
Validate IHS 7 Parameters-Response File	see description	required	Fully qualified path where the response file that this workflow creates will be located. This file is used to drive the installation. The default is: <code>/tmp/ih7_resp.txt</code>
Validate IHS 7 Parameters-Run Admin Setup	true	required	Enables the install process to grant the Set Up Admin User write access to the necessary IBM HTTP Server and WebSphere Application Server plug-in configuration files. Valid options are true or false.
Validate IHS 7 Parameters-Set Up Admin Group	ih7admin	optional	Group name used to set up the IBM HTTP administration server on Linux and UNIX operating systems. This parameter must have a value if Create Admin User Group is set to true.
Validate IHS 7 Parameters-Set Up Admin User	ih7admin	optional	User ID used to set up the IBM HTTP administration server on Linux and UNIX operating systems. If Create Admin User Group is set to true, this parameter must have a value.
Validate IHS 7 Parameters-WebSphere Hostname	Server.Name	optional	Host name of the WebSphere Application Server machine. This parameter is required if Install Plugin is set to true. No spaces are allowed in the host name.

Input Parameters Defined in this Step: Gather Advanced Parameters for IHS and WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Validate WebSphere 7 Custom Node Parameters-Binary Archive	see description	required	Fully qualified path to the compressed software package on the target machine. The default is: <code>/opt/install/C1G35ML.tar.gz</code>
Validate WebSphere 7 Custom Node Parameters-Cell Name	ProdNode02	required	Unique cell name that does not contain any of the following special characters <code>/ \ * , ; = + ? < > & % ' " [] > # \$ ^ { }</code> . If you plan to federate into an existing cell later, make sure that this name is not the same as the existing cell name.
Validate WebSphere 7 Custom Node Parameters-Dmgr Admin Password	password	optional	Administrative user password for the Deployment Manager. When Enable Security is set to true, this parameter must contain a string that does not begin with a dash(-) or contain a space().
Validate WebSphere 7 Custom Node Parameters-Dmgr Admin User	wasadmin	optional	Deployment Manager administrative user. When Enable Security is set to true, this parameter must contain a string that does not begin with a dash(-), a period(.), or a space(). It cannot contain any of the following characters <code>/ \ * , ; = + ? < > & % ' " [] > # \$ ^ { }</code> .
Validate WebSphere 7 Custom Node Parameters-Dmgr HostName	no default	optional	Host name or IP address of the machine where the Deployment Manager is running. Specify this parameter and the Dmgr Port parameter to federate the new custom node as it is created.
Validate WebSphere 7 Custom Node Parameters-Dmgr Port	8879	optional	The SOAP port on which the Deployment Manager is listening. Specify this parameter and the Dmgr Host Name parameter to federate the new custom node as it is created.

Input Parameters Defined in this Step: Gather Advanced Parameters for IHS and WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Validate WebSphere 7 Custom Node Parameters-Enable Security	true	required	Enables administrative security on the Deployment Manager. Must be set to either true or false. If Enable Security is true, the Dmgr Admin User and Dmgr Admin Password parameters must have values.
Validate WebSphere 7 Custom Node Parameters-Extract Dir	/tmp/	required	Fully qualified path where the compressed software will be extracted on the target machine.
Validate WebSphere 7 Custom Node Parameters-Federate Later	false	optional	If false, the new custom node will be federated during profile creation. If true, you must federate it later by using the <code>addNode</code> command.
Validate WebSphere 7 Custom Node Parameters-Install Location	see description	required	Fully qualified path where WebSphere Application Server will be (or was) installed. The default is: <code>/opt/IBM/WebSphere/AppServer</code>
Validate WebSphere 7 Custom Node Parameters-License Acceptance	true	required	Acknowledges that the end-user agrees to the IBM International Program License Agreement.
Validate WebSphere 7 Custom Node Parameters-Node Name	ProdNode02	required	Unique node name that cannot contain any of the following special characters <code>/ \ * , ; = + ? < > & % ' " [] > # \$ ^ { }</code> . If you plan to federate into an existing cell later, make sure that the name is unique within that cell.

Input Parameters Defined in this Step: Gather Advanced Parameters for IHS and WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Validate WebSphere 7 Custom Node Parameters-Profile Name	ProdNode02	required	A unique profile name. It cannot begin with a period (.) and cannot contain any of the following special characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }.
Validate WebSphere 7 Custom Node Parameters-Profile Path	see description	required	Fully qualified path to the profile. The default is: /opt/IBM/WebSphere/AppServer/profiles/ProdNode03
Validate WebSphere 7 Custom Node Parameters-Profile Type	custom	required	Because this workflow creates a custom node profile, the value must be custom.
Validate WebSphere 7 Custom Node Parameters-Response File	see description	required	Fully qualified path where the response file that this workflow creates will be located. This file will then be used to drive the installation and profile creation. The default is: /tmp/custom_node_resp.txt
Validate WebSphere 7 Deployment Manager Parameters-Admin Password	password	optional	When Enable Security is set to true, this parameter must contain a string that does not begin with a dash(-) or contain a space().
Validate WebSphere 7 Deployment Manager Parameters-Admin User	wasadmin	optional	When Enable Security is set to true, this parameter must contain a string that does not begin with a dash(-), a period(.), or a space(). It cannot contain any of the following characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }.

Input Parameters Defined in this Step: Gather Advanced Parameters for IHS and WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Validate WebSphere 7 Deployment Manager Parameters-Binary Archive	see description	required	Fully qualified path to the compressed software package on the target machine. The default is: <code>/opt/install/C1G35ML.tar.gz</code>
Validate WebSphere 7 Deployment Manager Parameters-Enable Security	true	required	Enables administrative security. Must be set to either true or false. If Enable Security is true, the Admin User and Admin Password parameters must have values.
Validate WebSphere 7 Deployment Manager Parameters-Extract Dir	see description	required	Fully qualified path where the compressed software will be extracted on the target machine. The default is: <code>/opt/install</code>
Validate WebSphere 7 Deployment Manager Parameters-Install Location	see description	required	Fully qualified path where WebSphere Application Server will be (or was) installed. The default is: <code>/opt/IBM/WebSphere/AppServer</code>
Validate WebSphere 7 Deployment Manager Parameters-License Acceptance	true	required	Acknowledges that the end user agrees to the IBM International Program License Agreement.

Input Parameters Defined in this Step: Gather Advanced Parameters for IHS and WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Validate WebSphere 7 Deployment Manager Parameters-Node Name	ProdManager	required	Unique node name that cannot contain any of the following special characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }. If you plan to federate into an existing cell later, make sure that the name is unique within that cell.
Validate WebSphere 7 Deployment Manager Parameters-Profile Name	ProdDmgr	required	A unique profile name. It cannot begin with a period (.) and cannot contain any of the following special characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }.
Validate WebSphere 7 Deployment Manager Parameters-Profile Path	see description	required	Fully qualified path to the profile. The default is: <code>/opt/IBM/WebSphere/AppServer/profiles/ProdDmgr</code>
Validate WebSphere 7 Deployment Manager Parameters-Profile Type	management	required	Because this workflow creates a Deployment Manager profile, the value must be management.
Validate WebSphere 7 Deployment Manager Parameters-Response File	see description	required	Fully qualified path where the response file that this workflow creates will be located. This file will then be used to drive the installation and profile creation. The default is: <code>/tmp/dmgr_resp.txt</code>

Input Parameters Defined in this Step: Gather Advanced Parameters for IHS and WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Validate WebSphere 7 Deployment Manager Parameters-Server Type	DEPLOYMENT_MANAGER	required	Specifies the type of management profile. Specify DEPLOYMENT_MANAGER for a Deployment Manager server.
Validate WebSphere 7 Deployment Manager Parameters-Windows Admin Password	no default	required for Windows targets	This is the Administrator user password.
Validate WebSphere 7 Deployment Manager Parameters-Windows Admin User	no default	required for Windows targets	This is the Administrator user.
Web Server Config File	see description	required	Used to configure web server instances inside of WebSphere for management operational purposes. The default is: <code>/opt/IBM/HTTPServer/conf/httpd.conf</code>
Web Server Name	value of Application Name	required	Used to configure web server instances inside of WebSphere for management operational purposes.

Add WebSphere 7 Node to Existing Cell

Use this workflow in conjunction with the Provision IBM HTTP Server and WebSphere 7 Two Node Cell workflow to expand the Network Deployment cell by one node (up to a maximum of 10 nodes in the cell).

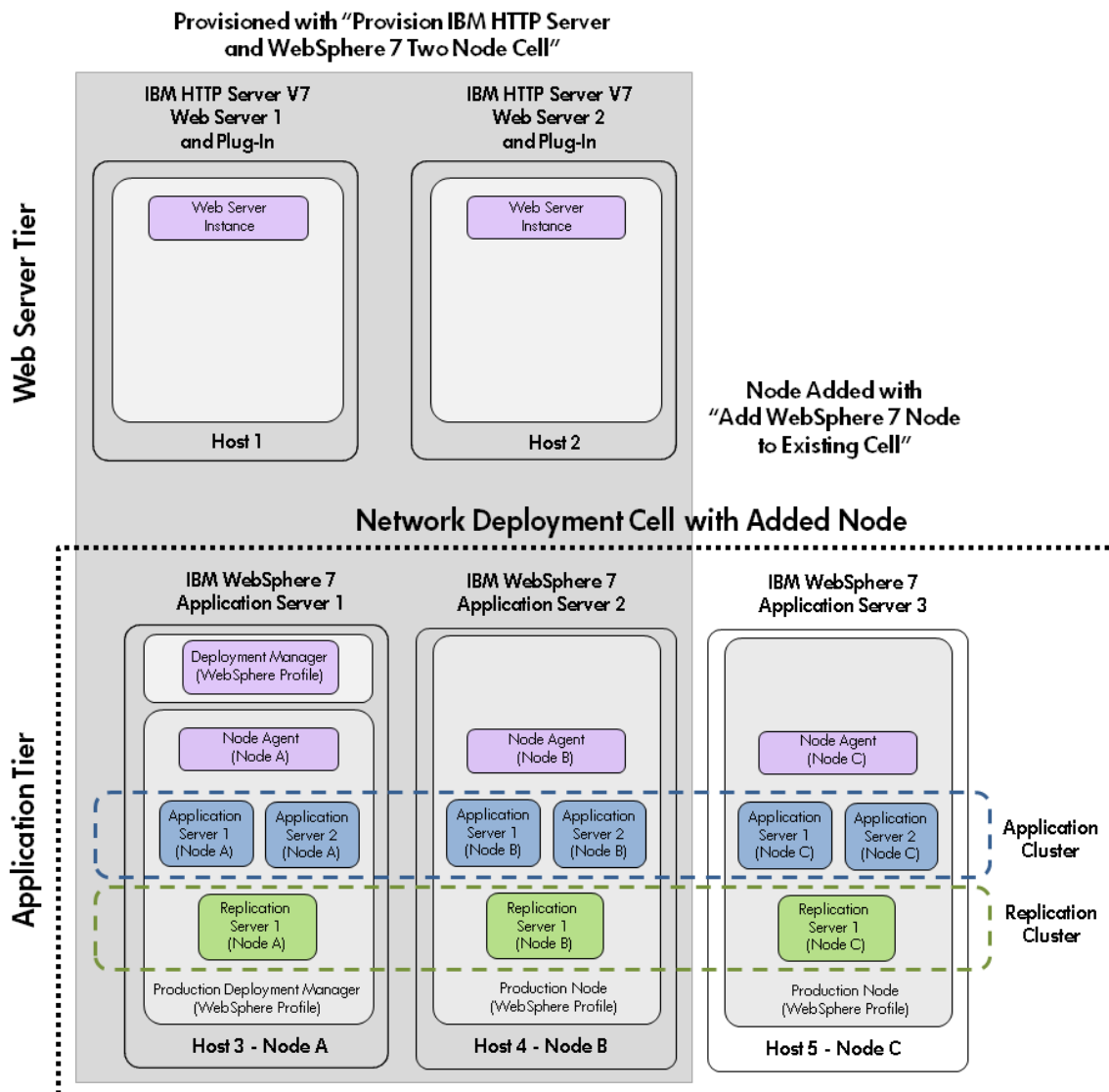
The Add WebSphere 7 Node to Existing Cell workflow does the following:

- Provisions IBM WebSphere Application Server version 7 on a target machine
- Creates and federates a custom node profile, expanding an n node Network Deployment cell to an n+1 node cell
- Expands the existing two clusters by adding cluster members to the new node
- Extends the vertically and horizontally clustered application cluster to deploy applications
- Extends the horizontally clustered replication cluster to replicate HTTP sessions from one application server to one of the other, providing session persistence

All the cluster members are configured to take part in a replication domain. The application cluster members are the clients, and the replication cluster members are the servers used to store session data.

This workflow takes advantage of composite workflows, component workflows, and bridged execution functionality within HP DMA so that some workflows become steps in a larger workflow. This gives the ability to execute complex workflows across multiple target machines using very few parameters.

Architecture Diagram



To use this workflow in your environment, see the following information:

Topic	Information Included
Prerequisites for this Workflow	List of prerequisites that must be satisfied before you can run this workflow
How this Workflow Works	Information about what the workflow does, including validation checks performed, steps executed, and a high-level process flow
How to Run this Workflow	Instructions for running this workflow in your environment
Sample Scenario	Examples of typical parameter values for this workflow
Parameters	List of input parameters for this workflow

Prerequisites for this Workflow

Before you can run the Add WebSphere 7 Node to Existing Cell workflow you must run the Provision IBM HTTP Server and WebSphere 7 Two Node Cell workflow to create a two-node cell server configuration.

Be sure that the following prerequisites are satisfied before you run the Add WebSphere 7 Node to Existing Cell workflow:

Hardware and Software Requirements

Type	Requirement
Number and Operating System of Server	1 machine running Red Hat Enterprise Linux 5.x
Number and Processor Architecture of CPU	4 cores/server and x86 architecture
Memory per CPU/Server	16GB per IBM WebSphere Application Server
Virtual Memory Settings	None
Server Configuration	None
Storage	Local disk size should be 100GB/server with most of the space allocated to the /opt file system
Product Software	IBM WebSphere Application Server Network Deployment Manager 7 64-bit binaries

Dependencies

1. This workflow requires unchallenged `sudo` access to a user (typically root) who can access all required files and directories.
2. Per the WebSphere 7 documentation, the following system libraries are required before provisioning IBM WebSphere Application Server version 7 on 64-bit Red Hat Linux:

Platform	Required Library
64-bit Red Hat Enterprise Linux version 5	compat-libstdc++-33-3.2.3-61 compat-db-4.2.52-5.1 libXp-1.0.0-8 compat-libstdc++-296-2.96-138 rpm-build-4.4.2-37.el5

Make sure that these libraries exist on each target server before running this workflow. If newer versions of these libraries are available, you can install the newer versions.

3. This workflow will install WebSphere Application Server as root because of the following IBM documented limitations:
 - Creation of a Linux service for WebSphere Application Server
 - Native registration with the operating system

- Port conflicts that may occur with other installations of WebSphere Application Server that are not registered with the operating system

If there is a need to run as a non-root user after installation, you can run a recursive `chown` under the installation root and set owner permissions accordingly.

How this Workflow Works

The following information describes how the Add WebSphere 7 Node to Existing Cell workflow works:

Overview

Use this workflow in conjunction with the Provision IBM HTTP Server and WebSphere 7 Two Node Cell workflow to expand the Network Deployment cell by one node (up to a maximum of 10 nodes in the cell).

This workflow does the following things in the order shown:

- Provisions IBM WebSphere Application Server version 7 on a target machine
- Creates and federates a custom node profile, expanding an n node Network Deployment cell to an n+1 node cell
- Expands the existing two clusters by adding cluster members to the new node
- Extends the vertically and horizontally clustered application cluster to deploy applications
- Extends the horizontally clustered replication cluster to replicate HTTP sessions from one application server to one of the other, providing session persistence

Validation Checks Performed

This workflow automatically runs a validation step after the component workflow step to verify that the component workflow successfully provisioned and configured the server and the custom node. The workflow only proceeds to the next step if the validation was successful.

Most of the validation centers on special characters and spaces in the parameters. There are also validation checks that happen at the operating system level, including file system space checks and RPM checks for Red Hat Linux.

The workflow first performs the following parameter checks:

1. None of the following characters are used in the Admin User, Cell Name, Node Name, or Profile Name parameters: / \ * , ; : = + ? | < > & % ' " [] > # \$ ^ { }
2. If Enable Security is true, Admin Password and Admin User are specified.
3. Admin Password (if specified) does not begin with a dash or contain a space.
4. Admin User (if specified) does not begin with a dash, a period, or a space.
5. Profile Name does not begin with a period.
6. Personal CertDN and Signing CertDN do not contain spaces.
7. If Ports File is specified, Validate Ports is true.
8. All specified file names are legal file names.

The workflow then performs the following operating system checks on the target machine:

1. All required libraries are present (see [Prerequisites for this Workflow](#) on page 53).
2. Sufficient disk space is available to install .
3. Sufficient disk space is available to extract the binary files from the compressed archive.

Process Flow

The Add WebSphere 7 Node to Existing Cell workflow provisions a WebSphere 7 server and creates a custom node (node agent).

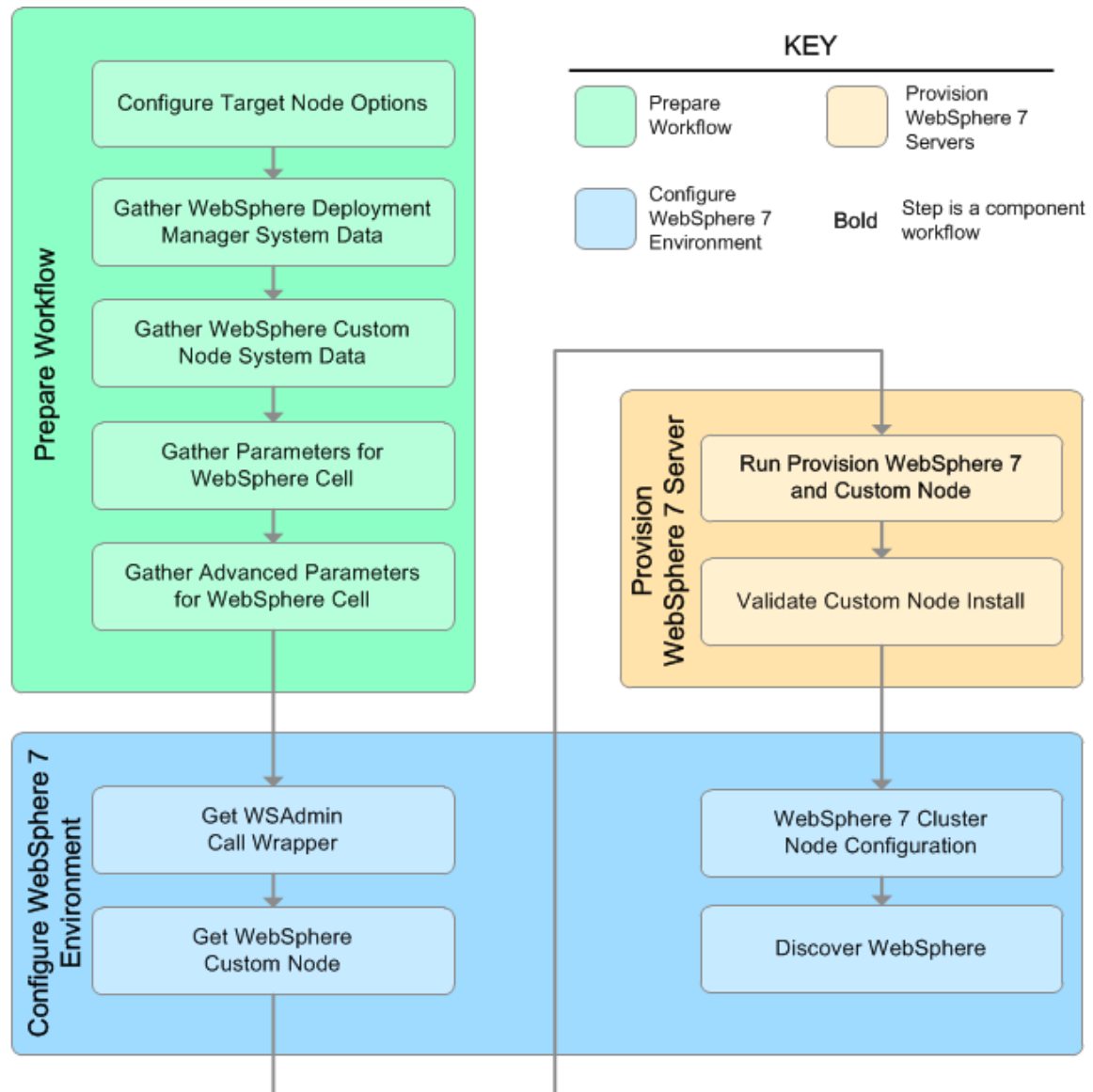
The workflow expands the two existing clusters across the new node. The first cluster, which is vertically and horizontally clustered, is set up so that applications can be deployed to it. The second cluster, which is horizontally clustered, is meant for memory-to-memory replication of HTTP sessions.

All cluster members are configured to take part in a replication domain. The application cluster members are configured as the clients and the replication cluster members are configured as the servers.

The workflow sets minimum and maximum java heap sizes to 4GB and sets the garbage collection policy to generational concurrent (gencon).

Steps Executed

The Add WebSphere 7 Node to Existing Cell workflow includes the following steps. Each step must complete successfully before the next step can start. If a step fails, the workflow reports a failure and all subsequent steps are skipped.



Steps Used in the Add WebSphere 7 Node to Existing Cell Workflow

Workflow Step	Description
Configure Target Node Options	Prepares the target machine parameters needed to provision WebSphere Application Server version 7.
Gather WebSphere Deployment Manager System Data	Retrieves the host name of the specified IBM HTTP Deployment Manager target machine in the HP DMA environment.
Gather WebSphere Custom Node System Data	Retrieves the host name of the specified IBM HTTP Server target machine in the HP DMA environment.
Gather Parameters for WebSphere Cell	Prepares the parameters needed to provision WebSphere Application Server version 7.
Gather Advanced Parameters for WebSphere Cell	Prepares the advanced parameters needed to provision and configure IBM WebSphere Application Server version 7.
Get WSAAdmin Call Wrapper	Creates the necessary call wrapper to call wsadmin to execute certain operations within the specified WebSphere environment.
Get WebSphere Custom Node	Calls WebSphere APIs to get node information.
Run Provision WebSphere 7 and Custom Node	Calls the Provision WebSphere 7 and Custom Node workflow via the HP DMA API to provision an IBM WebSphere 7 Application server.
Validate Custom Node Install	Validates that the creation and federation of the custom node were successful for the IBM WebSphere 7 Application server.
WebSphere 7 Cluster Node Configuration	Creates the cluster and cluster members for the specified WebSphere environment. Creates the replication domains, heap sizes, garbage collection policy, unmanaged nodes and web server instances.
Discover WebSphere	Audits the server's physical environment looking for WebSphere cells, clusters, and managed servers.

For parameter descriptions and defaults, see [Parameters for Add WebSphere 7 Node to Existing Cell](#) on page 62.

How to Run this Workflow

The following instructions show you how to customize and run the Add WebSphere 7 Node to Existing Cell workflow in your environment.

The workflow provides default values for some parameters. These default values are usually sufficient for a "typical" installation. You can override the defaults by specifying parameter values in the deployment. You can also expose additional parameters in the workflow, if necessary, to accomplish more advanced scenarios. Any parameters not explicitly specified in the deployment will have the default values listed in [Parameters for Add WebSphere 7 Node to Existing Cell](#) on page 62

Note: Before following this procedure, review the [Prerequisites for this Workflow](#), and ensure that all requirements are satisfied.

To use the Add WebSphere 7 Node to Existing Cell workflow:

1. Create a deployable copy of the Add WebSphere 7 Node to Existing Cell workflow (see [Create a Deployable Workflow](#) on page 18).
2. Determine the values that you will specify for the following parameters:

Input Parameters for Gather Parameters for WebSphere Cell

Parameter Name	Default Value	Required	Description
All - DMA Password	no default	required	Password for the HP DMA web services API.
All - DMA Username	no default	required	User who is capable of modifying the managed environment through the HP DMA Discovery web services API.

Tip: To avoid having to re-enter passwords whenever they change, you can create a policy to provide them to the workflow (see [How to Use a Policy to Specify Parameter Values](#) on page 100).

Note: This is the minimum set of parameters required to run this workflow. You may need to expose additional parameters depending on your provisioning objectives.

See [Parameters for Add WebSphere 7 Node to Existing Cell](#) on page 62 for detailed descriptions of all input parameters for this workflow, including default values.

3. In the workflow editor, expose any additional parameters that you need (see [How to Expose Additional Workflow Parameters](#) on page 99).
4. Save the changes to the workflow (click **Save** in the lower right corner).
5. Create a new deployment (see [Create a Deployment](#) on page 19 for instructions).
6. On the Parameters tab, specify values for the required parameters listed in step 2 and any additional parameters that you have exposed. You do not need to specify values for those

parameters whose default values are appropriate for your environment.

7. On the Targets tab, specify one or more targets for this deployment.
8. Save the deployment (click **Save** in the lower right corner).
9. Run the workflow using this deployment (see [Run Your Workflow](#) on page 20 for instructions).
Select the following targets:

Input Parameters for Configure Target Node Options

Parameter Name	Default Value	Required	Description
Provision WebSphere 7 and Custom Node System	no default	required	Target machine that will be provisioned with IBM WebSphere software and a custom node profile.
WebSphere Deployment Manager System	no default	required	Target machine that will be used to connect to the Deployment Manager.

To verify the results:

The workflow will complete and report SUCCESS on the Console if it has run successfully. If an error occurs during workflow execution, the error is logged, and the workflow terminates in the FAILURE state.

This workflow automatically runs a validation step after the component workflow step to verify that the component workflow successfully provisioned and configured the server and the custom node. The workflow only proceeds to the next step if the validation was successful.

Optional: if you want to further verify the results, perform the following steps:

1. After the workflow has completed, run the following command to check the version of WebSphere Application Server that was installed:

```
WAS_ROOT/bin/versionInfo.sh
```

Here, *WAS_ROOT* is the directory where WebSphere 7 is installed. This is the path that you specified in the WebSphere Install Location parameter.

2. Validate that the profile has been created and is running by doing the following:

- a. View the *WAS_ROOT/profiles/PROFILE_NAME/logs/AboutThisProfile.txt* file. This file is created after the creation of the profile and contains specific information about the profile.

Here, *PROFILE_NAME* is the name of the profile that you just created. This is the name that you specified in the Profile Name parameter.

- b. Change to the *WAS_ROOT/profiles/PROFILE_NAME/logs/CELL_NAME* directory, and tail the *SystemOut.log* file. Look for the following line:

```
Server CELL_NAME open for e-business
```

Here, *CELL_NAME* is the name of the WebSphere 7 cell to which this profile pertains. This is the name that you specified in the Cell Name parameter.

Sample Scenario

Use this workflow in conjunction with the Provision IBM HTTP Server and WebSphere 7 Two Node Cell workflow to expand the Network Deployment cell by one node (up to a maximum of 10 nodes in the cell).

The Add WebSphere 7 Node to Existing Cell workflow is very straightforward. The purpose is to provision a WebSphere 7 servers and to expand the Network Deployment cell by one node. Use this workflow to provision this configuration in a production environment.

This topic shows you typical parameter values used for the Add WebSphere 7 Node to Existing Cell workflow.

Input Parameters for Gather Parameters for WebSphere Cell

Parameter Name	Example Value	Description
All - DMA Password	password	Password for the HP DMA web services API.
All - DMA Username	admin	User who is capable of modifying the managed environment through the HP DMA Discovery web services API.

Tip: To avoid having to re-enter passwords whenever they change, you can create a policy to provide them to the workflow (see [How to Use a Policy to Specify Parameter Values](#) on page 100).

Parameters for Add WebSphere 7 Node to Existing Cell

The following tables describe the required and optional input parameters for this workflow. Some of these parameters may not be initially visible in a deployment (see [How to Expose Additional Workflow Parameters](#) on page 99). For most parameters, if you do not specify a value for a parameter, a default value is assigned.

Note: Only those parameters that are configurable in a standard deployment are listed here. Input parameters that must be mapped to output parameters of previous steps are not listed.

Input Parameters Defined in This Step: Configure Target Node Options

Parameter Name	Default Value	Required	Description
Provision WebSphere 7 and Custom Node System	no default	required	Target machine that will be provisioned with IBM WebSphere software and a custom node profile.
WebSphere Deployment Manager System	no default	required	Target machine that will be used to connect to the Deployment Manager.

Input Parameters Defined in This Step: Gather Parameters for WebSphere Cell

Parameter Name	Default Value	Required	Description
All - DMA Password	no default	required	Password for the HP DMA web services API.
All - DMA Username	no default	required	User who is capable of modifying the managed environment through the HP DMA Discovery web services API.

Input Parameters Defined in this Step: Gather Advanced Parameters for WebSphere Cell

Parameter Name	Default Value	Required	Description
Application Name	no default	required	Name of the application that will be used through to create the application server that will be created under the profile and modify the clusters.
Custom Node Parameters-Cell Name 1	no default	required	Name of the existing WebSphere 7 cell to which a new custom node will be added.
Custom Node Parameters-Cell Name 2	no default	required	Not used in this workflow.

Input Parameters Defined in this Step: Gather Advanced Parameters for WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
DMA URL	see description	required	URL for the HP DMA web services API. The default is: <code>/api/sop/running</code>
HTTP Access Log	see description	required	Used to configure web server instances inside of WebSphere for management operational purposes. The default is: <code>/opt/IBM/HTTPServer/ logs/access_log</code>
HTTP Error Log	see description	required	Used to configure web server instances inside of WebSphere for management operational purposes. The default is: <code>/opt/IBM/HTTPServer/ logs/error_log</code>
Install IHS for WebSphere 7-Password	password	required for Windows targets	This is the Windows Administrator user's password.
Install IHS for WebSphere 7-Username	wasadmin	required for Windows targets	This is the Windows Administrator user who will install WebSphere 7.
Install WebSphere 7 Create Profile-Password	password	required for Windows targets	This is the WebSphere 7 Administrator user's password.
Install WebSphere 7 Create Profile-Username	wasadmin	required for Windows targets	This is the WebSphere 7 Administrator user.
Instance	no default	optional	Used internally by the workflow. Caution: This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.
Node Name	no default	required	Used to configure an unmanaged node inside of WebSphere for management operational purposes.

Input Parameters Defined in this Step: Gather Advanced Parameters for WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Node OS	linux	required	Used to configure an unmanaged node inside of WebSphere for management operational purposes.
Plugin Root	see description	required	Used to configure web server instances inside of WebSphere for management operational purposes. The default is: <code>/opt/IBM/HTTPServer/Plugins</code>
Validate Existing Install Custom Node Parameters-Cell Name	ProdNode01	required	Name of the existing cell to which the new custom node will be added.
Validate Existing Install Custom Node Parameters-Dmgr Admin Password	password	optional	Administrative user password for the Deployment Manager in the existing cell to which the new custom node will be added.
Validate Existing Install Custom Node Parameters-Dmgr Admin User	wasadmin	required	Administrative user for the Deployment Manager in the existing cell to which the new custom node will be added.
Validate Existing Install Custom Node Parameters-Dmgr HostName	no default	required	Host name or IP address of the machine where the Deployment Manager is running. Specify this parameter and the Dmgr Port parameter to federate the new custom node as it is created.

Input Parameters Defined in this Step: Gather Advanced Parameters for WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Validate Existing Install Custom Node Parameters-Dmgr Port	8879	required	The SOAP port on which the Deployment Manager is listening. Specify this parameter and the Dmgr Host Name parameter to federate the new custom node as it is created.
Validate Existing Install Custom Node Parameters-Enable Security	true	required	Enables administrative security on the Deployment Manager. Must be set to either true or false. If Enable Security is true, the Dmgr Admin User and Dmgr Admin Password parameters must have values.
Validate Existing Install Custom Node Parameters-Install Location	see description	required	Fully qualified path where WebSphere Application Server will be installed. The default is: <code>/opt/IBM/WebSphere/AppServer</code>
Validate Existing Install Custom Node Parameters-Node Name	ProdNode01	required	Unique node name for the new custom node. This name cannot contain any of the following special characters <code>/ \ * , ; = + ? < > & % ' " [] > # \$ ^ { }</code> .
Validate Existing Install Custom Node Parameters-Profile Name	ProdNode01	required	A unique profile name for the new custom node profile. It cannot begin with a period (.) and cannot contain any of the following special characters <code>/ \ * , ; = + ? < > & % ' " [] > # \$ ^ { }</code> .

Input Parameters Defined in this Step: Gather Advanced Parameters for WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Validate Existing Install Custom Node Parameters-Profile Path	see description	required	Fully qualified path to the profile. The default is: <code>/opt/IBM/WebSphere/AppServer/profiles/ProdNode01</code>
Validate Existing Install Custom Node Parameters-Response File	see description	required	Fully qualified path where the response file that this workflow creates will be located. This file will then be used to drive the profile creation. The default is: <code>/tmp/custom_node_resp.txt</code>
Validate IHS 7 Parameters-Admin Auth Password	password	optional	The password used to authenticate to the IBM HTTP administration server using the WebSphere Application Server administrative console. When Create Admin Auth is set to true, this parameter must have a value. It cannot begin with a dash(-) or contain a space().
Validate IHS 7 Parameters-Admin Auth Password Confirm	password	optional	Confirms the Admin Auth Password.
Validate IHS 7 Parameters-Admin Auth User	wasadmin	optional	The user ID used to authenticate to the IBM HTTP administration server using the WebSphere Application Server administrative console. When Create Admin Auth is set to true, this parameter must have a value. It cannot begin with a dash(-), a period(.), or a space() and cannot contain any of the following characters <code>/ \ * , : ; = + ? < > & % ' " [] > # \$ ^ { }</code> .
Validate IHS 7 Parameters-Admin Port	8008	required	The port on which the HTTP administration web server will run. This is usually 8008.

Input Parameters Defined in this Step: Gather Advanced Parameters for WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Validate IHS 7 Parameters-Binary Archive	see description	required	Fully qualified path to the compressed software package on the target machine. The default is: <code>/opt/install/C1G36ML.tar.gz</code>
Validate IHS 7 Parameters-Create Admin Auth	true	required	Set this to true to create a user ID and password to authenticate to the IBM HTTP administration server using the WebSphere Application Server administrative console. If this parameter is set to true, the following parameters must have values: Admin Auth Password, Admin Auth Password Confirm, and Admin Auth User.
Validate IHS 7 Parameters-Create Admin User Group	true	required	Set to true to create a user ID and group used to set up the IBM HTTP Administration Server on Linux and UNIX operating systems.
Validate IHS 7 Parameters-Extract Dir	<code>/tmp/</code>	required	Fully qualified path where the compressed software will be extracted on the target machine.
Validate IHS 7 Parameters-Http Port	80	required	The port on which the web server will listen. Usually, this is set to 80.
Validate IHS 7 Parameters-Install Location	see description	required	Fully qualified path where IBM HTTP Server will be installed. The default is: <code>/opt/IBM/HTTPServer</code>
Validate IHS 7 Parameters-Install Plugin	true	required	Determines whether or not the WebSphere Application Server plug-in is installed. Valid values are true or false.

Input Parameters Defined in this Step: Gather Advanced Parameters for WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Validate IHS 7 Parameters-License Acceptance	true	required	Acknowledges that the end-user agrees to the IBM International Program License Agreement.
Validate IHS 7 Parameters-Response File	see description	required	Fully qualified path where the response file that this workflow creates will be located. This file is used to drive the installation. The default is: <code>/tmp/ih7_resp.txt</code>
Validate IHS 7 Parameters-Run Admin Setup	true	required	Enables the install process to grant the Set Up Admin User write access to the necessary IBM HTTP Server and WebSphere Application Server plug-in configuration files. Valid options are true or false.
Validate IHS 7 Parameters-Set Up Admin Group	ih7admin	optional	Group name used to set up the IBM HTTP administration server on Linux and UNIX operating systems. This parameter must have a value if Create Admin User Group is set to true.
Validate IHS 7 Parameters-Set Up Admin User	ih7admin	optional	User ID used to set up the IBM HTTP administration server on Linux and UNIX operating systems. If Create Admin User Group is set to true, this parameter must have a value.
Validate IHS 7 Parameters-WebSphere Hostname	Server.Name	optional	Host name of the WebSphere Application Server machine. This parameter is required if Install Plugin is set to true. No spaces are allowed in the host name.
Validate WebSphere 7 Custom Node Parameters-Binary Archive	see description	required	Fully qualified path to the compressed software package on the target machine. The default is: <code>/opt/install/C1G35ML.tar.gz</code>

Input Parameters Defined in this Step: Gather Advanced Parameters for WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Validate WebSphere 7 Custom Node Parameters-Cell Name	ProdNode03	required	Unique cell name that does not contain any of the following special characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }. If you plan to federate into an existing cell later, make sure that this name is not the same as the existing cell name.
Validate WebSphere 7 Custom Node Parameters-Dmgr Admin Password	password	optional	Administrative user password for the Deployment Manager. When Enable Security is set to true, this parameter must contain a string that does not begin with a dash(-) or contain a space().
Validate WebSphere 7 Custom Node Parameters-Dmgr Admin User	wasadmin	optional	Deployment Manager administrative user. When Enable Security is set to true, this parameter must contain a string that does not begin with a dash(-), a period(.), or a space(). It cannot contain any of the following characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }.
Validate WebSphere 7 Custom Node Parameters-Dmgr HostName	no default	optional	Host name or IP address of the machine where the Deployment Manager is running. Specify this parameter and the Dmgr Port parameter to federate the new custom node as it is created.
Validate WebSphere 7 Custom Node Parameters-Dmgr Port	8879	optional	The SOAP port on which the Deployment Manager is listening. Specify this parameter and the Dmgr Host Name parameter to federate the new custom node as it is created.
Validate WebSphere 7 Custom Node Parameters-Enable Security	true	required	Must be set to true if administrative security is enabled on the deployment manager. Valid values are true or false. If Enable Security is true, the Dmgr Admin User and Dmgr Admin Password parameters must have values.

Input Parameters Defined in this Step: Gather Advanced Parameters for WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Validate WebSphere 7 Custom Node Parameters-Extract Dir	/tmp/	required	Fully qualified path where the compressed software will be extracted on the target machine.
Validate WebSphere 7 Custom Node Parameters-Federate Later	false	optional	If false, the new custom node will be federated during profile creation. If true, you must federate it later by using the <code>addNode</code> command.
Validate WebSphere 7 Custom Node Parameters-Install Location	see description	required	Fully qualified path where WebSphere Application Server will be (or was) installed. The default is: <code>/opt/IBM/WebSphere/AppServer</code>
Validate WebSphere 7 Custom Node Parameters-License Acceptance	true	required	Acknowledges that the end-user agrees to the IBM International Program License Agreement.
Validate WebSphere 7 Custom Node Parameters-Node Name	ProdNode03	required	Unique node name that cannot contain any of the following special characters <code>/ \ * , ; = + ? < > & % ' " [] > # \$ ^ { }</code> .
Validate WebSphere 7 Custom Node Parameters-Profile Name	ProdNode03	required	A unique profile name. It cannot begin with a period (.) and cannot contain any of the following special characters <code>/ \ * , ; = + ? < > & % ' " [] > # \$ ^ { }</code> .

Input Parameters Defined in this Step: Gather Advanced Parameters for WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Validate WebSphere 7 Custom Node Parameters-Profile Path	see description	required	Fully qualified path to the profile. The default is: <code>/opt/IBM/WebSphere/AppServer/profiles/ProdNode03</code>
Validate WebSphere 7 Custom Node Parameters-Profile Type	custom	required	Because this workflow creates a custom node profile, the value must be custom.
Validate WebSphere 7 Custom Node Parameters-Response File	see description	required	Fully qualified path where the response file that this workflow creates will be located. This file will then be used to drive the installation and profile creation. The default is: <code>/tmp/custom_node_resp.txt</code>
Validate WebSphere 7 Deployment Manager Parameters-Admin Password	password	optional	When Enable Security is set to true, this parameter must contain a string that does not begin with a dash(-) or contain a space().
Validate WebSphere 7 Deployment Manager Parameters-Admin User	wasadmin	optional	When Enable Security is set to true, this parameter must contain a string that does not begin with a dash(-), a period(.), or a space(). It cannot contain any of the following characters <code>/ \ * , ; = + ? < > & % ' " [] > # \$ ^ { }</code> .

Input Parameters Defined in this Step: Gather Advanced Parameters for WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Validate WebSphere 7 Deployment Manager Parameters-Binary Archive	see description	required	Fully qualified path to the compressed software package on the target machine. The default is: <code>/opt/install/C1G35ML.tar.gz</code>
Validate WebSphere 7 Deployment Manager Parameters-Enable Security	true	required	Enables administrative security. Must be set to either true or false. If Enable Security is true, the Admin User and Admin Password parameters must have values.
Validate WebSphere 7 Deployment Manager Parameters-Extract Dir	see description	required	Fully qualified path where the compressed software will be extracted on the target machine. The default is: <code>/opt/install</code>
Validate WebSphere 7 Deployment Manager Parameters-Install Location	see description	required	Fully qualified path where WebSphere Application Server will be (or was) installed. The default is: <code>/opt/IBM/WebSphere/AppServer</code>
Validate WebSphere 7 Deployment Manager Parameters-License Acceptance	true	required	Acknowledges that the end user agrees to the IBM International Program License Agreement.

Input Parameters Defined in this Step: Gather Advanced Parameters for WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Validate WebSphere 7 Deployment Manager Parameters-Node Name	ProdManager	required	Unique node name that cannot contain any of the following special characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }. If you plan to federate into an existing cell later, make sure that the name is unique within that cell.
Validate WebSphere 7 Deployment Manager Parameters-Profile Name	ProdDmgr	required	A unique profile name. It cannot begin with a period (.) and cannot contain any of the following special characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }.
Validate WebSphere 7 Deployment Manager Parameters-Profile Path	see description	required	Fully qualified path to the profile. The default is: <code>/opt/IBM/WebSphere/AppServer/profiles/ProdDmgr</code>
Validate WebSphere 7 Deployment Manager Parameters-Profile Type	management	required	Because this workflow creates a Deployment Manager profile, the value must be management.
Validate WebSphere 7 Deployment Manager Parameters-Response File	see description	required	Fully qualified path where the response file that this workflow creates will be located. This file will then be used to drive the installation and profile creation. The default is: <code>/tmp/dmgr_resp.txt</code>

Input Parameters Defined in this Step: Gather Advanced Parameters for WebSphere Cell (continued)

Parameter Name	Default Value	Required	Description
Validate WebSphere 7 Deployment Manager Parameters-Server Type	DEPLOYMENT_MANAGER	required	Specifies the type of management profile. Specify DEPLOYMENT_MANAGER for a Deployment Manager server.
Validate WebSphere 7 Deployment Manager Parameters-Windows Admin Password	no default	required for Windows targets	This is the Administrator user password.
Validate WebSphere 7 Deployment Manager Parameters-Windows Admin User	no default	required for Windows targets	This is the Administrator user.
Web Server Config File	see description	required	Used to configure web server instances inside of WebSphere for management operational purposes. The default is: <code>/opt/IBM/HTTPServer/conf/httpd.conf</code>
Web Server Name	value of Application Name	required	Used to configure web server instances inside of WebSphere for management operational purposes.

Provision IBM HTTP Server and WebSphere 7 StandAlone Profile

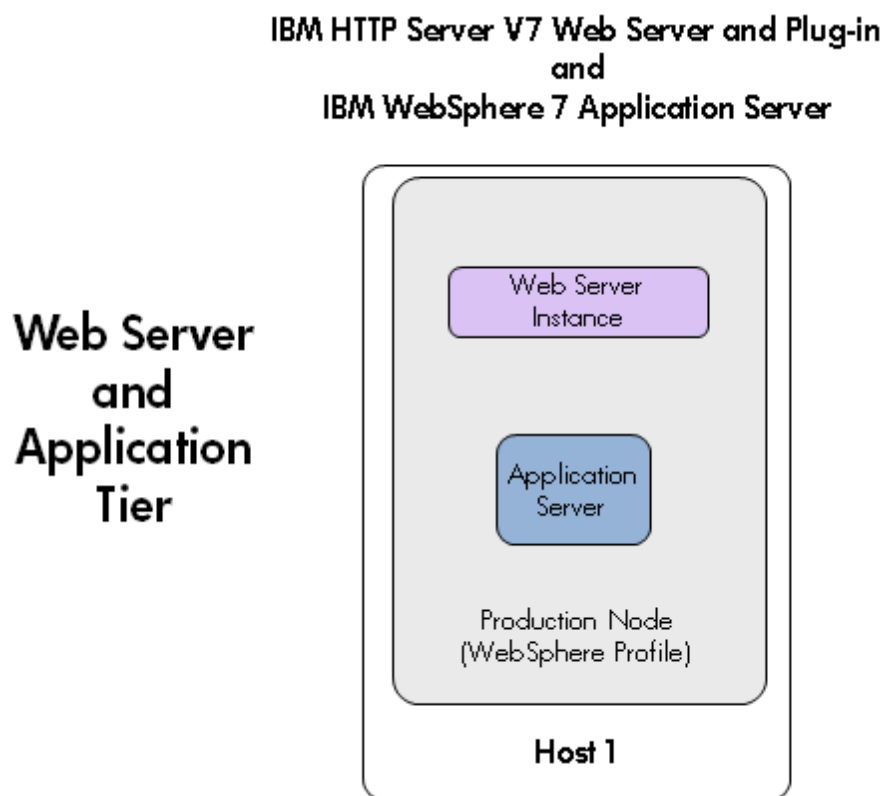
Use this workflow to provision IBM HTTP Server version 7 on a single target machine, provision IBM WebSphere Application Server version 7 on the same machine, and create a stand-alone profile. This workflow is intended for small non-production environments used for development and integration testing.

The workflow does the following:

- Provisions IBM HTTP Server version 7 on a target machine
- Provisions IBM WebSphere Application Server version 7 on the same target machine
- Creates a stand-alone profile

This workflow takes advantage of composite workflows, component workflows, and bridged execution functionality within HP DMA so that some workflows become steps in a larger workflow. This gives the ability to execute complex workflows across multiple target machines using very few parameters.

Architecture Diagram



To use this workflow in your environment, see the following information:

Topic	Information Included
Prerequisites for this Workflow	List of prerequisites that must be satisfied before you can run this workflow
How this Workflow Works	Information about what the workflow does, including validation checks performed, steps executed, and a high-level process flow
How to Run this Workflow	Instructions for running this workflow in your environment
Sample Scenario	Examples of typical parameter values for this workflow
Parameters	List of input parameters for this workflow

Prerequisites for this Workflow

Be sure that the following prerequisites are satisfied before you run the Provision HTTP Server and WebSphere 7 StandAlone Profile workflow:

Hardware and Software Requirements

Type	Requirement
Number and Operating System of Server	1 machine running Red Hat Enterprise Linux 5.x
Number and Processor Architecture of CPU	1 cores/server and x86 architecture
Memory per CPU/Server	2GB
Virtual Memory Settings	None
Server Configuration	None
Storage	Local disk size should be 20GB/server with most of the space allocated to the /opt file system
Product Software	IBM WebSphere Application Server Network Deployment Manager 7 64-bit binaries IBM HTTP Server version 7 binaries

Dependencies

1. This workflow requires unchallenged `sudo` access to a user (typically root) who can access all required files and directories.
2. Per the WebSphere 7 documentation, the following system libraries are required before provisioning IBM WebSphere Application Server version 7 on 64-bit Red Hat Linux:

Platform	Required Library
64-bit Red Hat Enterprise Linux version 5	compat-libstdc++-33-3.2.3-61 compat-db-4.2.52-5.1 libXp-1.0.0-8 compat-libstdc++-296-2.96-138 rpm-build-4.4.2-37.el5

Make sure that these libraries exist on each target server before running this workflow. If newer versions of these libraries are available, you can install the newer versions.

3. This workflow will install WebSphere Application Server as root because of the following IBM documented limitations:
 - Creation of a Linux service for WebSphere Application Server
 - Native registration with the operating system
 - Port conflicts that may occur with other installations of WebSphere Application Server that are not registered with the operating system

If there is a need to run as a non-root user after installation, you can run a recursive `chown` under the installation root and set owner permissions accordingly.

For more information about prerequisites for WebSphere 7, refer to the [WebSphere 7 Product Documentation](#) on page 92.

How this Workflow Works

The following information describes how the Provision HTTP Server and WebSphere 7 StandAlone Profile workflow works:

Overview

This workflow does the following things in the order shown:

- Provisions IBM HTTP Server version 7 on a target machine
- Provisions IBM WebSphere Application Server version 7 on the same target machine
- Creates a stand-alone profile

Validation Checks Performed

Most of the validation centers on special characters and spaces in the parameters. There are also validation checks that happen at the operating system level, including file system space checks and RPM checks for Red Hat Linux.

The workflow first performs the following parameter checks:

1. None of the following characters are used in the Admin User, Cell Name, Node Name, or Profile Name parameters: / \ * , ; : = + ? | < > & % ' " [] > # \$ ^ { }
2. If Enable Security is true, Admin Password and Admin User are specified.
3. Admin Password (if specified) does not begin with a dash or contain a space.
4. Admin User (if specified) does not begin with a dash, a period, or a space.
5. Profile Name does not begin with a period.
6. Personal CertDN and Signing CertDN do not contain spaces.
7. If Ports File is specified, Validate Ports is true.
8. All specified file names are legal file names.

The workflow then performs the following operating system checks on the target machine:

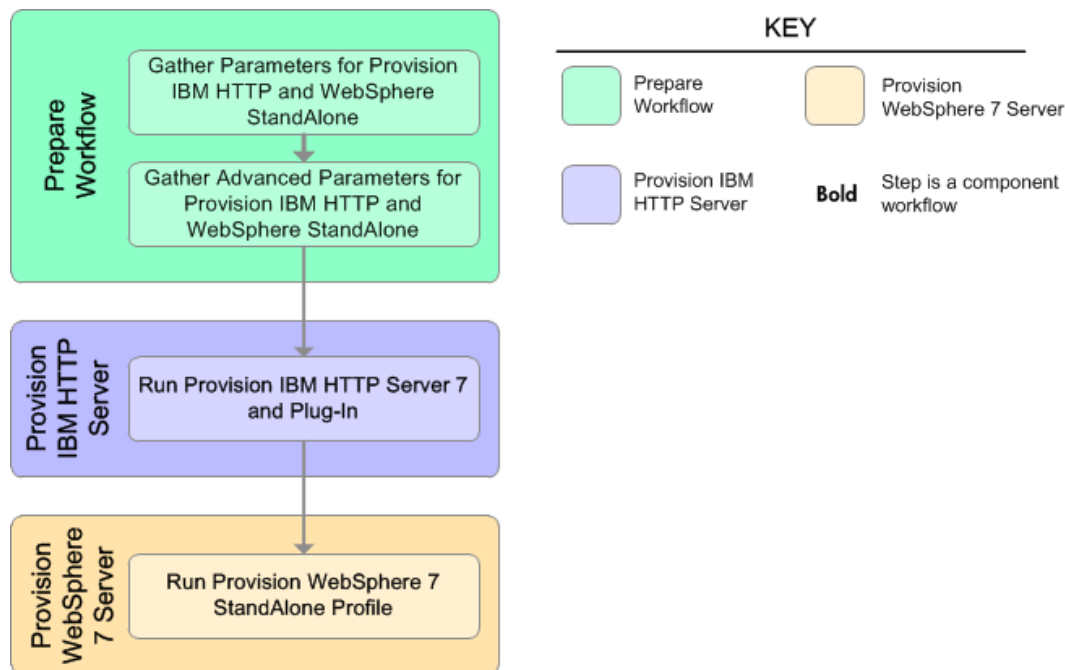
1. All required libraries are present (see [Prerequisites for this Workflow](#) on page 77).
2. Sufficient disk space is available to install .
3. Sufficient disk space is available to extract the binary files from the compressed archive.

Process Flow

The Provision HTTP Server and WebSphere 7 StandAlone Profile workflow provisions a single tier for both the web server and application server. The workflow provisions one IBM HTTP Server 7 server with a plug-in on a target machine. Next, the workflow provisions one WebSphere 7 server on the same target. Then the workflow creates a stand-alone profile.

Steps Executed

The Provision HTTP Server and WebSphere 7 StandAlone Profile workflow includes the following steps. Each step must complete successfully before the next step can start. If a step fails, the workflow reports a failure and all subsequent steps are skipped.

**Steps Used in the Provision HTTP Server and WebSphere 7 StandAlone Profile Workflow**

Workflow Step	Description
Gather Parameters for Provision IBM HTTP and WebSphere StandAlone	Prepares the parameters needed to provision IBM HTTP Server and WebSphere Application Server version 7.
Gather Advanced Parameters for Provision IBM HTTP and WebSphere StandAlone	Prepares the advanced parameters needed to provision and configure IBM HTTP Server and WebSphere Application Server version 7.
Run Provision IBM HTTP Server 7 and Plug-in	Calls the Provision IBM HTTP Server 7 and Plug-in workflow via the HP DMA API.
Run Provision WebSphere 7 StandAlone Profile	Calls the Provision WebSphere 7 StandAlone Profile via the HP DMA API.

For parameter descriptions and defaults, see [Parameters for Provision HTTP Server and WebSphere 7 StandAlone Profile](#) on page 85

How to Run this Workflow

The following instructions show you how to customize and run the Provision HTTP Server and WebSphere 7 StandAlone Profile workflow in your environment.

The workflow provides default values for some parameters. These default values are usually sufficient for a "typical" installation. You can override the defaults by specifying parameter values in the deployment. You can also expose additional parameters in the workflow, if necessary, to accomplish more advanced scenarios. Any parameters not explicitly specified in the deployment will have the default values listed in [Parameters for Provision IBM HTTP Server and WebSphere 7 Two Node Cell](#) on page 38

Note: Before following this procedure, review the [Prerequisites for this Workflow](#), and ensure that all requirements are satisfied.

To use the Provision HTTP Server and WebSphere 7 StandAlone Profile workflow:

1. Create a deployable copy of the Provision HTTP Server and WebSphere 7 StandAlone Profile workflow (see [Create a Deployable Workflow](#) on page 18).
2. Determine the values that you will specify for the following parameters:

Input Parameters for Gather Parameters for Provision IBM HTTP and WebSphere StandAlone

Parameter Name	Default Value	Required	Description
Application Name	no default	required	Name of the application that will be used through to create the application server that will be created under the profile and modify the clusters.
Cell Name	no default	required	Unique cell name that does not contain any of the following special characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }. If you plan to federate into an existing cell later, make sure that this name is not the same as the existing cell name.
DMA Password	no default	required	Password for the web service API.
DMA URL	no default	required	URL for the web service API.
DMA Username	no default	required	User capable of modifying the managed environment through the discovery web service API.
Node Name	no default	required	Unique node name that cannot contain any of the following special characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }. If you plan to federate into an existing cell later, make sure that the name is unique within that cell.

Tip: To avoid having to re-enter passwords whenever they change, you can create a policy to provide them to the workflow (see [How to Use a Policy to Specify Parameter Values](#) on page 100).

Note: This is the minimum set of parameters required to run this workflow. You may need to expose additional parameters depending on your provisioning objectives.

See [Parameters for Provision HTTP Server and WebSphere 7 StandAlone Profile](#) on page 85 for detailed descriptions of all input parameters for this workflow, including default values.

3. In the workflow editor, expose any additional parameters that you need (see [How to Expose Additional Workflow Parameters](#) on page 99).
4. Save the changes to the workflow (click **Save** in the lower right corner).
5. Create a new deployment (see [Create a Deployment](#) on page 19 for instructions).
6. On the Parameters tab, specify values for the required parameters listed in step 2 and any additional parameters that you have exposed. You do not need to specify values for those parameters whose default values are appropriate for your environment.
7. On the Targets tab, specify one or more targets for this deployment.
8. Save the deployment (click **Save** in the lower right corner).
9. Run the workflow using this deployment (see [Run Your Workflow](#) on page 20 for instructions). Select the target where you want to provision both the HTTP Server and the WebSphere 7 application server.

To verify the results:

The workflow will complete and report SUCCESS on the Console if it has run successfully. If an error occurs during workflow execution, the error is logged, and the workflow terminates in the FAILURE state.

Optional: if you want to further verify the results, perform the following steps:

1. After the workflow has completed, run the following command to check the version of WebSphere Application Server that was installed:

```
WAS_ROOT/bin/versionInfo.sh
```

Here, *WAS_ROOT* is the directory where WebSphere 7 is installed. This is the path that you specified in the WebSphere Install Location parameter.

2. Validate that the profile has been created and is running by doing the following:

- a. View the *WAS_ROOT/profiles/PROFILE_NAME/logs/AboutThisProfile.txt* file. This file is created after the creation of the profile and contains specific information about the profile.

Here, *PROFILE_NAME* is the name of the profile that you just created. This is the name that you specified in the Profile Name parameter.

- b. Change to the *WAS_ROOT/profiles/PROFILE_NAME/logs/CELL_NAME* directory, and tail the *SystemOut.log* file. Look for the following line:

```
Server CELL_NAME open for e-business
```

Here, *CELL_NAME* is the name of the WebSphere 7 cell to which this profile pertains. This is the name that you specified in the Cell Name parameter.

Sample Scenario

The Provision HTTP Server and WebSphere 7 StandAlone Profile workflow is very straightforward. The purpose is to provision IBM HTTP Server 7 on a single machine and WebSphere 7 on the same machine, and to create a stand-alone profile. Use this workflow to provision this configuration in a small development environment used for development and integration testing.

This topic shows you typical parameter values used for the Provision HTTP Server and WebSphere 7 StandAlone Profile workflow.

Input Parameters for Gather Parameters for Provision IBM HTTP and WebSphere StandAlone

Parameter Name	Example Value	Description
Application Name	DevApp	Name of the application that will be used through to create the application server that will be created under the profile and modify the clusters.
Cell Name	DevCell	Unique cell name that does not contain any of the following special characters <code>/ \ * , ; = + ? < > & % ' " [] > # \$ ^ { }</code> . If you plan to federate into an existing cell later, make sure that this name is not the same as the existing cell name.
DMA Password	password	Password for the web service API.
DMA URL	<code>/api/sop/running</code>	URL for the web service API.
DMA Username	SAadmin	User capable of modifying the managed environment through the discovery web service API.
Node Name	DevNode1	Unique node name that cannot contain any of the following special characters <code>/ \ * , ; = + ? < > & % ' " [] > # \$ ^ { }</code> . If you plan to federate into an existing cell later, make sure that the name is unique within that cell.

Tip: To avoid having to re-enter passwords whenever they change, you can create a policy to provide them to the workflow (see [How to Use a Policy to Specify Parameter Values](#) on page 100).

Parameters for Provision HTTP Server and WebSphere 7 StandAlone Profile

The following tables describe the required and optional input parameters for this workflow. Some of these parameters may not be initially visible in a deployment (see [How to Expose Additional Workflow Parameters](#) on page 99). For most parameters, if you do not specify a value for a parameter, a default value is assigned.

Note: Only those parameters that are configurable in a standard deployment are listed here. Input parameters that must be mapped to output parameters of previous steps are not listed.

Input Parameters Defined in this Step: Gather Parameters for Provision IBM HTTP and WebSphere StandAlone

Parameter Name	Default Value	Required	Description
Application Name	no default	required	Name of the application that will be used through to create the application server that will be created under the profile and modify the clusters.
Cell Name	no default	required	Unique cell name that does not contain any of the following special characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }. If you plan to federate into an existing cell later, make sure that this name is not the same as the existing cell name.
DMA Password	no default	required	Password for the web service API.
DMA URL	no default	required	URL for the web service API.
DMA Username	no default	required	User capable of modifying the managed environment through the discovery web service API.
Node Name	no default	required	Unique node name that cannot contain any of the following special characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }. If you plan to federate into an existing cell later, make sure that the name is unique within that cell.

Tip: To avoid having to re-enter passwords whenever they change, you can create a policy to provide them to the workflow (see [How to Use a Policy to Specify Parameter Values](#) on page 100).

Input Parameters Defined in this Step: Gather Advanced Parameters for Provision IBM HTTP and WebSphere StandAlone

Parameter Name	Default Value	Required	Description
Install IHS for WebSphere 7-Password	password	required for Windows targets	This is the Windows Administrator user's password.
Install IHS for WebSphere 7-Username	wasadmin	required for Windows targets	This is the Windows Administrator user who will install WebSphere 7.
Install WebSphere 7 Create Profile-Password	password	required for Windows targets	This is the WebSphere 7 Administrator user's password.
Install WebSphere 7 Create Profile-Username	wasadmin	required for Windows targets	This is the WebSphere 7 Administrator user.
Instance	no default	optional	Used internally by the workflow. Caution: This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.
Node Name	no default	required	Used to configure an unmanaged node inside of WebSphere for management operational purposes.
Validate IHS 7 Parameters-Admin Auth Password	password	optional	The password used to authenticate to the IBM HTTP administration server using the WebSphere Application Server administrative console. When Create Admin Auth is set to true, this parameter must have a value. It cannot begin with a dash(-) or contain a space().
Validate IHS 7 Parameters-Admin Auth Password Confirm	wasadmin	optional	Confirms the Admin Auth Password.

Input Parameters Defined in this Step: Gather Advanced Parameters for Provision IBM HTTP and WebSphere StandAlone (continued)

Parameter Name	Default Value	Required	Description
Validate IHS 7 Parameters-Admin Auth User	wasadmin	optional	The user ID used to authenticate to the IBM HTTP administration server using the WebSphere Application Server administrative console. When Create Admin Auth is set to true, this parameter must have a value. It cannot begin with a dash(-), a period (.), or a space() and cannot contain any of the following characters / \ * , ; = + ? < > & % ' " [] > # \$ ^ { }.
Validate IHS 7 Parameters-Admin Port	8008	required	The port on which the HTTP administration web server will run. This is usually 8008.
Validate IHS 7 Parameters-Binary Archive	see description	required	Fully qualified path to the compressed software package on the target machine. The default is: /opt/install/C1G36ML.tar.gz
Validate IHS 7 Parameters-Create Admin Auth	true	required	Set this to true to create a user ID and password to authenticate to the IBM HTTP administration server using the WebSphere Application Server administrative console. If this parameter is set to true, the following parameters must have values: Admin Auth Password, Admin Auth Password Confirm, and Admin Auth User.
Validate IHS 7 Parameters-Create Admin User Group	true	required	Set to true to create a user ID and group used to set up the IBM HTTP Administration Server on Linux and UNIX operating systems.
Validate IHS 7 Parameters-Extract Dir	/tmp/	required	Fully qualified path where the compressed software will be extracted on the target machine.
Validate IHS 7 Parameters-Http Port	80	required	The port on which the web server will listen. Usually, this is set to 80.

Input Parameters Defined in this Step: Gather Advanced Parameters for Provision IBM HTTP and WebSphere StandAlone (continued)

Parameter Name	Default Value	Required	Description
Validate IHS 7 Parameters-Install Location	see description	required	Fully qualified path where IBM HTTP Server will be installed. The default is: <code>/opt/IBM/HTTPServer</code>
Validate IHS 7 Parameters-Install Plugin	true	required	Determines whether or not the WebSphere Application Server plug-in is installed. Valid values are true or false.
Validate IHS 7 Parameters-License Acceptance	true	required	Acknowledges that the end-user agrees to the IBM International Program License Agreement.
Validate IHS 7 Parameters-Response File	see description	required	Fully qualified path where the response file that this workflow creates will be located. This file is used to drive the installation. The default is: <code>/tmp/ih7_resp.txt</code>
Validate IHS 7 Parameters-Run Admin Setup	true	required	Enables the install process to grant the Set Up Admin User write access to the necessary IBM HTTP Server and WebSphere Application Server plug-in configuration files. Valid options are true or false.
Validate IHS 7 Parameters-Set Up Admin Group	ih7admin	optional	Group name used to set up the IBM HTTP administration server on Linux and UNIX operating systems. This parameter must have a value if Create Admin User Group is set to true.
Validate IHS 7 Parameters-Set Up Admin User	ih7admin	optional	User ID used to set up the IBM HTTP administration server on Linux and UNIX operating systems. If Create Admin User Group is set to true, this parameter must have a value.

Input Parameters Defined in this Step: Gather Advanced Parameters for Provision IBM HTTP and WebSphere StandAlone (continued)

Parameter Name	Default Value	Required	Description
Validate IHS 7 Parameters-WebSphere Hostname	Server.Name	optional	Host name of the WebSphere Application Server machine. This parameter is required if Install Plugin is set to true. No spaces are allowed in the host name.
Validate WebSphere 7 Stand Alone Parameters-Admin Password	password	optional	When Enable Security is set to true, this parameter must contain a string that does not begin with a dash (-) or contain a space().
Validate WebSphere 7 Stand Alone Parameters-Admin User	wasadmin	optional	When Enable Security is set to true, this parameter must contain a string that does not begin with a dash (-), a period(.), or a space(). It cannot contain any of the following characters / \ * , : ; = + ? < > & % ' " [] > # \$ ^ { }.
Validate WebSphere 7 Stand Alone Parameters-Binary Archive	see description	required	Fully qualified path to the compressed software package on the target machine. The default is: <code>/opt/install/C1G35ML.tar.gz</code>
Validate WebSphere 7 Stand Alone Parameters-Enable Security	true	required	Enables administrative security. Must be set to either true or false. If Enable Security is true, the Admin User and Admin Password parameters must have values
Validate WebSphere 7 Stand Alone Parameters-Extract Dir	/tmp/	required	Fully qualified path where the compressed software will be extracted on the target machine

Input Parameters Defined in this Step: Gather Advanced Parameters for Provision IBM HTTP and WebSphere StandAlone (continued)

Parameter Name	Default Value	Required	Description
Validate WebSphere 7 Stand Alone Parameters-Install Location	see description	required	Fully qualified path where WebSphere Application Server will be installed. The default is: <code>/opt/IBM/WebSphere/AppServer</code>
Validate WebSphere 7 Stand Alone Parameters-License Acceptance	true	required	Acknowledges that the end user agrees to the IBM International Program License Agreement.
Validate WebSphere 7 Stand Alone Parameters-Profile Path	value of current_node_name	required	Fully qualified path to the profile. For example: <code>/opt/IBM/WebSphere/AppServer/profiles/AppServer1</code> .
Validate WebSphere 7 Stand Alone Parameters-Profile Type	standAlone	required	Because this workflow creates a stand-alone profile, the value must be standAlone.
Validate WebSphere 7 Stand Alone Parameters-Response File	see description	required	Fully qualified path where the response file that this workflow creates will be located. This file will then be used to drive the installation and profile creation. The default is: <code>/tmp/standalone_resp.txt</code>
Validate WebSphere 7 Stand Alone Parameters-Server Name	server1	required	Name of the application server that will be created under the profile.

Tip: To avoid having to re-enter passwords whenever they change, you can create a policy to provide them to the workflow (see [How to Use a Policy to Specify Parameter Values](#) on page 100).

Chapter 4

Reference Information

This chapter contains the following information:

Topic	Description
WebSphere 7 Product Documentation	Links to product documentation for the database products that these workflows support Links to the hardware and software requirements, as well as supported platforms for WebSphere 7,
HP DMA Documentation	Links to additional HP DMA documentation

WebSphere 7 Product Documentation

For the current list of hardware and software requirements, as well as supported platforms for WebSphere 7, see:

<http://www.ibm.com/software/webservers/appserv/doc/latest/prereq.html>

For WebSphere 7 product documentation, see:

<http://publib.boulder.ibm.com/infocenter/wasinfo/v7r0/index.jsp>

For IBM Red Book resources for WebSphere 7, see:

<http://publib-b.boulder.ibm.com/Redbooks.nsf/portals/WebSphere>

HP DMA Documentation

For information about using the HP DMA web interface, see the *HP DMA User Guide* and the *HP DMA Administrator Guide* (version 10.00 or later).

These documents are part of the HP DMA documentation library, which is available on the HP Software Product Manuals web site:

<http://h20230.www2.hp.com/selfsolve/manuals>

Chapter 5

Tips and Best Practices

This portion of the document contains a collection of tips and best practices that will enable you to use HP DMA more effectively. It contains the following topics:

[How this Solution is Organized](#) on next page

[How to Expose Additional Workflow Parameters](#) on page 99

[How to Use a Policy to Specify Parameter Values](#) on page 100

[How to Import a File into the Software Repository](#) on page 103

How this Solution is Organized

In HP DMA, a [workflow](#) executes a process —such as installing a software product or checking a database instance for compliance with a specific security benchmark.

A solution pack contains one or more related workflow templates.

Each workflow template has a Documentation tab that provides detailed information about that workflow.

The screenshot displays the HP Database & Middleware Automation web interface. At the top, a navigation bar includes links for Home, Automation, Reports, Environment, Solutions, and Setup. Below this, a secondary bar shows Workflows, Steps, Functions, Policies, Deployments, Run, Console, and History. The main content area is titled 'Provision IBM HTTP Server and WebSphere 7 Two Node Cell'. It features tabs for Documentation, Workflow, Deployments, and Roles. The Documentation tab is active, showing details about the workflow: Name, Tags, Type (OS), and Target level (Server). The documentation text describes the workflow's purpose and the platforms it supports (Red Hat Enterprise Linux). At the bottom, there are buttons for Copy, Export, and Extract Policy, along with a link to the HP Server Automation Application Server Provisioning Solution Pack.

Database & Middleware Automation Server: myserver.mycompany.com User: admin Logout

Home Automation Reports Environment Solutions Setup

Workflows Steps Functions Policies Deployments Run Console History

Provision IBM HTTP Server and WebSphere 7 Two Node Cell

Documentation Workflow Deployments Roles

Name: Provision IBM HTTP Server and WebSphere 7 Two Node Cell

Tags:

Type: OS

Target level: Server

Documentation:

Purpose

The purpose of this workflow is to take advantage of Master-Sub flows and bridged execution functionality within DMA, where by a given workflow can be turned into a step in a larger workflow. This gives the ability to execute complex workflows across multiple target machines with very few parameters in a single workflow. This workflow provisions IBM HTTP Server V7 on two target machines. The workflow also provisions IBM WebSphere Application Server 7 on two other target machines and creates a Deployment Manager profile, and two Custom Node profiles, thus creating a two node Network Deployment Cell. This workflow also creates two clusters, the first which is meant for a given application to be deployed to it and is both vertically and horizontally clustered. The second cluster is meant for memory to memory replication of HTTP sessions and is horizontally clustered. All the cluster members are configured to take part in a replication domain, the application cluster members are the clients and the replication cluster members are the servers. The workflow also creates unmanaged nodes and web server objects for mapping applications at deployment time as well as remote management of those two IHS web servers.

Platforms

This workflow provisions IBM HTTP Server V7 on two target machines. The workflow also provisions IBM WebSphere Application Server 7 on two other target machines and creates a Deployment Manager profile, and two Custom Node profiles, thus creating a two node Network Deployment Cell on the following operating system platforms:

- Red Hat Enterprise Linux

[HELP](#) [PDF](#)

[Copy](#) [EXPORT](#) [EXTRACT POLICY](#) [HP SERVER AUTOMATION APPLICATION SERVER PROVISIONING SOLUTION PACK](#)

A workflow consists of a sequence of steps. Each step performs a very specific task. Each step includes a documentation panel that briefly describes its function.

The screenshot displays the HP Database & Middleware Automation web interface. At the top, the header shows the application name and user information: 'Server: myserver.mycompany.com User: sukor Logout'. Below the header is a navigation menu with tabs: Home, Automation, Reports, Environment, Solutions, Setup, Workflows, Steps, Functions, Policies, Deployments, Run, Console, and History. The 'Steps' tab is selected, and the title of the current view is 'Gather Advanced Parameters for IHS and WebSphere Cell'. Below the title is a sub-menu with tabs: General, Action, Parameters, History, Workflows, Solutions, and Roles. The 'General' tab is active, showing the 'Properties' section on the left and the 'Documentation' section on the right. The 'Properties' section lists: Name: Gather Advanced Parameters for IHS and WebSphere Cell, Tags: (empty), Type: OS, Category: Script, and Targetable: ☐. The 'Documentation' section contains a 'Description' and a 'Return Code' section. The description states: 'Prepares the advanced parameters needed to provision and configure IBM HTTP Server and WebSphere Application Server V7.0.' The return code section lists: '0 = Step ran successfully' and '1 = Step failed.' At the bottom of the interface, there is a 'Copy' button on the left and a lock icon with the text 'THIS STEP IS READ ONLY' on the right.

Steps can have input and output parameters. Output parameters from one step often serve as input parameters to another step. Steps can be shared among workflows.

Parameter descriptions are displayed on the Parameters tab for each step in the workflow

Name	Value	Description
Application Name	<input type="text"/>	Required: Name of the application that will be used to
Custom Node Parameters-Cell Name 1	<input type="text"/>	Required: Unique cell name that does not contain ar
Custom Node Parameters-Cell Name 2	<input type="text"/>	Required: Unique cell name that does not contain ar
HTTP Access Log	<input type="text"/>	Required: Used to configure web server instances in
HTTP Error Log	<input type="text"/>	Required: Used to configure web server instances in
Install IHS for WebSphere 7-Password	<input type="text"/>	Required: If Windows. This is the Administrator Use
Install IHS for WebSphere 7-Username	<input type="text"/>	Required: If Windows. This is the Administrator Pas
Install WebSphere 7 Create Profile-Password	<input type="text"/>	Required: If Windows. This is the Administrator Pas
Install WebSphere 7 Create Profile-Username	<input type="text"/>	Required: If Windows. This is the Administrator Use
Instance	<input type="text"/>	Optional: Used to run remote api call to sub flow.
Node Name	<input type="text"/>	Required: Used to configure unmanaged node inside
Node OS	<input type="text"/>	Required: Used to configure unmanaged node inside
Plugin Root	<input type="text"/>	Required: Used to configure web server instances in
Validate Existing Install Custom Node Param	<input type="text"/>	Required: Administrative user password for the Depl
Validate Existing Install Custom Node Param	<input type="text"/>	Required: Deployment Manager administrative user.
Validate Existing Install Custom Node Param	<input type="text"/>	Required: Host name or IP address of the machine v
Validate Existing Install Custom Node Param	<input type="text"/>	Required: The SOAP port on which the Deployment

Parameter descriptions are displayed on the Workflow tab for each workflow.

Gather Advanced Parameters for IHS and WebSphere Cell / Custom Node Parameters-Cell Name 1

Required: Unique cell name that does not contain any of the following special characters / \ * , : ; = + ? { } & % ' " [] > < \$ ^ { } . If you plan to federate into an existing cell later, make sure that this name is not the same as the existing cell name.

Application Name: Gather Parameters for IHS and WebSphere Cell. Validate IHS 7 Parameters-Webserver Definition

Custom Node Parameters-Cell Name 1: Gather Parameters for IHS and WebSphere Cell.Blank **Click here**

Custom Node Parameters-Cell Name 2: Gather Parameters for IHS and WebSphere Cell.Blank

HTTP Access Log: Gather Parameters for IHS and

To see the parameter description here

Parameter descriptions are also displayed on the Parameters tab in the deployment (organized by step). example

The screenshot shows the 'Database & Middleware Automation' interface. The top navigation bar includes 'Home', 'Automation', 'Reports', 'Environment', 'Solutions', and 'Setup'. Below this is a secondary navigation bar with 'Workflows', 'Steps', 'Functions', 'Policies', 'Deployments' (highlighted), 'Run', 'Console', and 'History'. The main content area is titled 'Example Deployment' and has three tabs: 'Targets', 'Parameters' (selected), and 'Roles'. Under the 'Parameters' tab, the section is titled 'Gather Parameters for IHS and WebSphere Cell'. It contains four parameter groups, each with a text input field, a 'Required' description, and an 'Enter at runtime' checkbox:

- All - DMA Password:** Required: Password for the web service API.
- All - DMA Username:** Required: User capable of modifying the managed environment through the discovery web service API.
- Application Name:** Required: Name of the application that will be used through to create application servers and clusters that will be created under the profile.
- WebSphere Deployment Manager - Cell Name:** Required: Unique cell name that does not contain any of the following special characters / \ * , : ; = + ? [< > & % ' " [] > # \$ ^ { }. If you plan to federate into an existing cell later, make sure that this name is not the same as the existing cell name.

At the bottom of the form, there is a row of buttons: a red 'X DELETE' button, a blue '▶ RUN' button, a 'Restore defaults' button, a 'Copy' button, a 'Save' button, and a red 'CANCEL' button.

All parameters used by the workflows in this solution pack are described in the "Parameters" topic associated with each workflow.

Note: The workflow templates included in this solution pack are read-only and cannot be deployed. To use a workflow template, you must first create a copy of the template and then customize that copy for your environment (see [Create a Deployable Workflow](#) on page 18

How to Expose Additional Workflow Parameters

Each workflow in this solution pack has a set of input parameters. Some are required and some are optional. To run a workflow in your environment, you must specify values for a subset of these parameters when you create a deployment.

By default, only a few of the input parameters for each workflow are visible on the Deployment page, and the rest are hidden. In order to specify a value for a parameter that is currently hidden, you must first expose that parameter by changing its mapping in the workflow editor.

To expose a hidden workflow parameter:

1. In the HP DMA web interface, go to Automation > Workflows.
2. From the list of workflows, select a deployable workflow.
3. Go to the Workflow tab.
4. In the list of steps below the workflow diagram, click the ► (blue arrow) to the immediate left of the pertinent step name. This expands the list of input parameters for this step.
5. For the parameter that you want to expose, select - User Selected - from the drop-down list.
For example:

Step	Name	Required Result	Next
▼ 1	Gather Parameters for Oracle Compliance		2
	Compliance Type:	- User selected -	ⓘ
	Excluded Compliance Checks:	- User selected -	ⓘ
	Inventory Files:	- User selected -	ⓘ

6. Repeat steps 4 and 5 for all the parameters that you would like to specify in the deployment.
7. Click **Save** in the lower right corner.

How to Use a Policy to Specify Parameter Values

It is sometimes advantageous to provide parameter values by using a policy rather than explicitly specifying the values in a deployment. This approach has the following advantages:

- The policy can be used in any deployment.
- It is faster and less error-prone than specifying parameter values manually.
- For parameter values that change frequently—for example, passwords that must be changed regularly—you only need to update them in one place.

To establish a policy, you can either [Create a Policy](#) or [Extract a Policy](#) from a workflow.

After you establish the policy, you must [Reference the Policy in the Deployment](#).

For more information, see the *HP DMA User Guide*. This document is available on the HP Software Product Manuals web site: <http://h20230.www2.hp.com/selfsolve/manuals>

Create a Policy

The first step in this approach is to create a policy that provides parameter values. There are two ways to do this: (1) create a new policy, and define all attributes manually (as shown here) or (2) extract a policy from a workflow (see [Extract a Policy](#) on next page).

To create a policy that provides parameter values:

1. In the HP DMA web UI, go to Automation > Policies.
2. Click **New Policy**.
3. In the **Name** box, specify the name of the policy
4. For each parameter value that you want to provide using this policy, perform the following actions on the Attributes tab:
 - a. From the drop-down list, select the type of attribute:
 - A Text attribute contains simple text that users can view while deploying and running workflows.
 - A List attribute contains a comma-separated list of values (or a large amount of text not suitable for a Text attribute).
 - A Password attribute contains simple text, but the characters are masked so that users cannot see the text.
 - b. In the text box to the left of the Add button, specify the name of the attribute.

For your convenience, this name should be similar to the parameter name used in the pertinent workflow (or workflows).
 - c. Click **Add**.
 - d. In the new text box to the right of the attribute's name, enter a value for this attribute.

To remove an attribute, click the **Remove** button.
5. On the Roles tab, grant Read and Write permission to any additional users and groups who will

be using this policy. By default, any groups to which you belong have Read and Write permission.

6. Click the **Save** button (lower right corner).

Extract a Policy

An alternative to creating your own policy one attribute at a time is to extract the policy. This automatically creates a reusable policy that provides values for all input parameters associated with a workflow. This is a convenient way to create a policy.

To extract a policy:

1. Go to Automation > Workflows.
2. Select the Workflow that you want to work with.
3. Click the Extract Policy link at the bottom of the screen.
4. Specify values for each attribute listed.
5. *Optional:* Remove any attributes that you do not want to use.
6. *Optional:* Add any new attributes that you want to use.
7. *Optional:* On the Roles tab, select the Read box for any users or user groups that you want to be able to use this policy to provide parameter values in a Deployment. Select the Write box for any users or groups that you want to be able to modify this Policy (add or remove attributes).
8. Click **Save**.

Reference the Policy in the Deployment

After you create a policy, you can reference its attributes in a deployment.

To reference policy attributes in a deployment:

1. Create or access the deployment.
See “Deployments” in the *HP DMA User Guide* for details.
2. On the Parameters tab, perform the following steps for each parameter whose value you want to provide by referencing a policy attribute:
 - a. In the drop-down menu for that parameter, select **Policy Attribute**.
 - b. In the text box for that parameter, type any character. A drop-down list of policy attributes appears. For example:

Admin Pwd: Policy Attribute ▼

MS SQL: Provisioning.Virtual Server Name
MyParameterValues.MyAdminPassword
MyParameterValues.MyAdminUser
MyParameterValues.MyDBUser
MyParameterValues.MyDBUserPassword
Oracle Compliance.Oracle Mandatory Checks
Oracle Compliance.Oracle Recommended Checks
Oracle Provisioning.Additional Groups
Oracle Provisioning.Backup Directory
Oracle Provisioning.Base
Oracle Provisioning.Binaries Host
Oracle Provisioning.Bit Mode

- c. From the drop-down list, select the attribute that you want to reference. For example:

Admin Pwd: Policy Attribute ▼

3. Click **Save** to save your changes to the deployment.

How to Import a File into the Software Repository

Many HP DMA workflows are capable of downloading files from the software repository on the HP DMA server to the target server (or servers) where the workflow is running. The following procedure shows you how to import a file into the software repository so that it can be downloaded and deployed by a workflow.

HP DMA uses the HP Server Automation (HP SA) Software Library as its software repository.

Tip: Be sure to use unique file names for all files that you import into the software repository.

To import a file into the HP SA Software Library:

1. Launch the HP SA Client from the Windows Start Menu.

By default, the HP SA Client is located in Start → All Programs → HP Software → HP Server Automation Client

If the HP SA Client is not installed locally, follow the instructions under “Download and Install the HP SA Client Launcher” in the *HP Server Automation Single-Host Installation Guide*.
2. In the navigation pane in the HP SA Client, select Library → By Folder.
3. Select (or create) the folder where you want to store the file.
4. From the Actions menu, select **Import Software**.
5. In the Import Software dialog, click the **Browse** button to the right of the File(s) box.
6. In the Open dialog:
 - a. Select the file (or files) to import.
 - b. Specify the character encoding to be used from the Encoding drop-down list. The default encoding is English ASCII.
 - c. Click **Open**. The Import Software dialog reappears.
7. From the Type drop-down list, select **Unknown**.
8. If the folder where you want to store the files does not appear in the Folder box, follow these steps:
 - a. Click the **Browse** button to the right of the Folder box.
 - b. In the Select Folder window, select the import destination location, and click **Select**. The Import Software dialog reappears.
9. From the Platform drop-down list, select all the operating systems listed.
10. Click **Import**.

If one of the files that you are importing already exists in the folder that you specified, you will be prompted regarding how to handle the duplicate file. Press F1 to view online help that explains the options.
11. Click **Close** after the import is completed.

Chapter 6

Troubleshooting

These topics can help you address problems that might occur when you install and run the workflows in this solution pack:

- [Target Type](#) below
- [User Permissions and Related Requirements](#) below
- [Discovery in HP DMA](#) on next page

Target Type

In your deployment, make sure that you have specified the correct type of target. The workflow type and the target type must match. A workflow designed to run against an instance target, for example, cannot run against a server target.

User Permissions and Related Requirements

Roles define access permissions for organizations, workflows, steps, policies, and deployments. Users are assigned to roles, and they gain access to these automation items according to the permissions and capabilities defined for their roles.

Roles are assigned by your server management tool administrator. They are then registered in HP DMA by your HP DMA administrator.

Your HP DMA administrator will ensure that the users in your environment are assigned roles that grant them the permissions and capabilities they need to accomplish their tasks. For example:

- To create a workflow, your role must have Workflow Creator capability.
- To view a workflow, your role must have Read permission for that workflow.
- To edit a workflow, your role must have Write permission for that workflow.
- To view a deployment, your role must have Read permission for that deployment.
- To modify a deployment, your role must have Write permission for that deployment.
- To run a deployment, your role must have Execute permission for that deployment and Deploy permission for the organization where it will run.

Capabilities determine what features and functions are available and active in the HP DMA UI for each user role.

For more information, see the *HP DMA Administrator Guide*. This document is available on the HP Software Product Manuals web site: <http://h20230.www2.hp.com/selfsolve/manuals>

Discovery in HP DMA

HP DMA uses a process called “discovery” to find information about the servers, networks, and database instances on target machines in your managed environment.

You must explicitly initiate the process of discovery—it is not automatic. See the *HP DMA User Guide* for instructions. This document is available on the HP Software Product Manuals web site: <http://h20230.www2.hp.com/selfsolve/manuals>

Glossary

A

automation items

The umbrella term automation items is used to refer to those items to which role-based permissions can be assigned. Automation items include workflows, deployments, steps, and policies.

B

bridged execution

A bridged execution workflow includes some steps that run on certain targets and other steps that run on different targets. An example of a bridged execution workflow is Extract and Refresh Oracle Database via RMAN (in the Database Refresh solution pack). This workflow extracts the contents of a database on one target (the Source) and creates a new database with the same contents on another target (the Destination). This workflow is useful when you want to clone a database - for example, to move it from a traditional IT infrastructure location into a private cloud. Bridged execution workflows are supported on HP DMA version 9.11 (and later).

C

capability

Capabilities are collections of related privileges. There are three capabilities defined in HP DMA. Login Access capability enables a user to log in to the web interface. This capability does not guarantee that this user can view any

organizations or automation items—permissions are required to access those items. Workflow Creator capability enables a user to create new workflows and make copies of other workflows. Administrator capability enables a user to perform any action and view all organizations. If you have Administrator capability, you do not need Workflow Creator capability. The Administrator can assign any of these capabilities to one or more roles registered roles.

connector

HP DMA includes a Connector component that enables it to communicate with your server management tool. You must configure the Connector before you can run an workflow against a target.

cross-platform

Cross-platform database refresh involves converting the data from one type of byte ordering to another. This is necessary, for example, if you want to load a database dump file on a little-endian Linux target that was created on a big-endian Solaris server.

D

deployment

Deployments associate a workflow with a target environment in which a workflow runs. You can customize a deployment by specifying values for any workflow parameters that are designated - User Selected - in the workflow. You must save a deployment before you can run the workflow. You can re-use a saved deployment as many times as you like.

destination

In a database refresh scenario, the contents of a database dump file are loaded into the DESTINATION database.

DESTINATION

In a database refresh scenario, the contents of a database dump file are loaded into the DESTINATION database.

F

function

Functions are reusable pieces of code that can be included in automation steps. Any common routine or operation that multiple steps perform is a good candidate for a function. Functions can be tagged with keywords indicating the language in which they are written and the operating system with which they work. Functions are "injected" into the step code just prior to step execution.

I

input parameters

A workflow has a set of required parameters for which you must specify a value. The required parameters are a subset of all the parameters associated with that workflow. The remaining parameters are considered optional. You can specify a value for an optional parameter by first exposing it using the workflow editor and then specifying the value when you create a deployment.

M

mapping

An input parameter is said to be "mapped" when its value is linked to an output parameter from a previous step in the workflow or to a metadata field. Mapped parameters are not visible on the Deployment page. You can "unmap" a

parameter by specifying - User Selected - in the workflow editor. This parameter will then become visible on the Deployment page.

O

Oracle Data Pump

Oracle Data Pump is a utility that enables you to move data or metadata from one database to another. You can use Data Pump to move a complete database or a subset of a database.

organization

An organization is a logical grouping of servers. You can use organizations to separate development, staging, and production resources - or to separate logical business units.

P

parameters

Parameters are pieces of information - such as a file system path or a user name - that a step requires to carry out its action. Values for parameters that are designated User Selected in the workflow can be specified in the deployment. Parameters that are marked Enter at Runtime in the deployment must be specified on the target system when the workflow runs.

policy

Policies are reusable sets of attributes that can be used as parameter values in deployments. Deployments can reference policy attributes to change the automation behavior. Policies provide values for input parameters. They can contain fixed values or reference Custom Fields. Policies enable HP DMA to manage groups of hundreds or thousands of servers at a time without the need to configure each individual server.

R

raw devices

In Sybase ASE version 15, you can create and mount database devices on raw bound devices. This enables Sybase ASE to use direct memory access from your address space to the physical sectors on the disk. This can improve performance by reducing memory copy operations from the user address space to the operating system kernel buffers.

Recovery Manager (RMAN)

Oracle Recovery Manager (RMAN) is a backup and recovery tool included in Oracle Database Enterprise Edition (and related products). RMAN enables you to efficiently backup and restore data files, control files, server parameter files, and archived redo log files. It provides block-level corruption detection during both the backup and restore phases. It is optimized for performance and space consumption.

role

Each HP DMA user has one or more roles. Roles are used to grant users permission to log in to and to access specific automation items and organizations. Roles are defined in your server management tool. Before you can associate a role with an automation item or organization, however, you must register that role in HP DMA.

S

software repository

The software repository is where the workflow will look for any required files that are not found on the target server. If you are using HP DMA with HP Server Automation (SA), this repository is the SA Software Library.

solution pack

A solution pack contains one or more related workflow templates. These templates are read-only and cannot be deployed. To run one of the workflows included in a solution pack, you must first create a deployable copy of that template and then customize that copy for your environment. Solution packs are organized by function - for example: database patching or application server provisioning.

source

In a database refresh scenario, the contents of the SOURCE database are extracted and stored in a file (or multiple files).

SOURCE

In a database refresh scenario, the contents of the SOURCE database are extracted and stored in a file (or multiple files).

source database

In the context of MS SQL database refresh, the "source database" is the database from which the backup file is created.

steps

Steps contains the actual code used to perform a unit of work detailed in a workflow.

T

target instance

In the context of MS SQL database refresh, the term "target instance" refers to the SQL Server instance where the database that will be restored resides.

W

workflow

A workflow automates the process followed for an operational procedure. Workflows contain steps, which are linked together to form business logic for a common task. Workflows connect existing tasks in order to perform a new business process by building on existing best practices and processes.

workflow editor

The workflow editor is the tool that you use to assemble steps into workflows. You can map each input parameter to output parameters of previous steps or built-in metadata (such as the server name, instance name, or database name). You can also specify User Selected to expose a parameter in the deployment; this enables the person who creates the deployment to specify a value for that parameter.

workflow templates

A workflow template is a read-only workflow that cannot be deployed. To run one of the workflows included in a solution pack, you must first create a deployable copy of the workflow template and then customize that copy for your environment.