

HP Database and Middleware Automation

For Linux, Solaris, AIX, and Windows®

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Application Server Release Management User Guide

for WebSphere and JBoss

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Contents

Contents	3
About HP DMA Solution Packs	5
Audience	6
Document Map	7
Important Terms	8
Chapter 1: The Application Server Release Management Solution	9
What this Solution Includes	10
Supported Products and Platforms	11
Prerequisites	12
Chapter 2: Workflow Details	13
WebSphere - Code Release	15
Prerequisites for this Workflow	16
How this Workflow Works	17
How to Run this Workflow	22
Sample Scenario	25
Parameters for WebSphere - Code Release	30
WebSphere - Code Release on Cluster	36
Prerequisites for this Workflow	37
How this Workflow Works	38
How to Run this Workflow	43
Sample Scenario	46
Parameters for WebSphere - Code Release on Cluster	50
JBoss - Code Release	55
Prerequisites for this Workflow	56
How this Workflow Works	57
How to Run this Workflow	62
Sample Scenario	65
Parameters for JBoss - Code Release	68
Chapter 3: Reference Information	70

WebSphere Product Documentation	70
JBoss Product Documentation	70
HP DMA Documentation	71
Chapter 4: Tips and Best Practices	72
How a Solution Pack is Organized	73
How to Expose Additional Workflow Parameters	77
How to Use a Policy to Specify Parameter Values	78
Create a Policy	78
Extract a Policy	79
Reference the Policy in the Deployment	80
How to Import a File into the Software Repository	81
Chapter 5: Troubleshooting	83
Target Type	83
User Permissions and Related Requirements	83
Discovery in HP DMA	84
Glossary	85

About HP DMA Solution Packs

HP Database and Middleware Automation (HP DMA) software automates administrative tasks like provisioning and configuration, compliance, patching, and release management for databases and application servers. When performed manually, these day-to-day operations are error-prone, time consuming, and difficult to scale.

HP DMA automates these daily, mundane, and repetitive administration tasks that take up 60-70% of a database or application server administrator's day. Automating these tasks enables greater efficiency and faster change delivery with higher quality and better predictability.

HP DMA provides role-based access to automation content. This enables you to better utilize resources at every level:

- End-users can deliver routine, yet complex, DBA and middleware tasks.
- Operators can execute expert level tasks across multiple servers including provisioning, patching, configuration, and compliance checking.
- Subject matter experts can define, enforce, and audit full stack automation across network, storage, server, database, and middleware.

An HP DMA workflow performs a specific automated task—such as provisioning database or application servers, patching database or application servers, or checking a database or application server for compliance with a specific standard. You specify environment-specific information that the workflow requires by configuring its parameters.

Related HP DMA workflows are grouped together in solution packs. When you purchase or upgrade HP DMA content, you are granted access to download specific solution packs.

Audience

This solution is designed for:

- IT architects and engineers who are responsible for planning, implementing, and maintaining application server environments using JBoss Application Server Enterprise Application Platform (EAP) or WildFly (JBoss).
- 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 or JBoss and its requirements (see links to the [WebSphere Product Documentation](#) on page 70 or [JBoss Product Documentation](#) on page 70).

Document Map

The following table shows you how to navigate this guide:

Topic	Description
The Application Server Release Management Solution	General information about this solution, including what it contains and what it does.
Workflow Details	Information about the WebSphere and JBoss 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 and JBoss 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 consists 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.

- A **deployment** associates a workflow with the targets (servers, instances, or databases) where the workflow will run. To run a workflow, you execute a specific deployment. A deployment is associated with one workflow; a workflow can have many deployments, each with its own targets and parameter settings.
- 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 85.

Chapter 1: The Application Server Release Management Solution

The release management solution provides tools that you can use to manage the configuration of your WebSphere or JBoss Application Server. It makes your provisioned WebSphere or JBoss system useable.

These tools enable you to deploy a list of application files (.war and .ear) into IBM WebSphere and JBoss application servers. They also enable users to configure the JVM settings according to the requirements defined by the application class file.

By consistently using the tools provided in this solution, you can quickly, efficiently, and accurately configure your WebSphere or JBoss Application Server environment. You maintain flexibility over the WebSphere or JBoss environment by configuring environment-specific information through the input parameters.

What this Solution Includes

The Application Server Release Management solution pack contains the following WebSphere and JBoss release management workflows:

Workflow Name	Purpose
WebSphere - Code Release	This workflow automates application deployments in IBM WebSphere on a standalone setup. In addition to deployment automation, this workflow can update JVM Generic Arguments and JVM System Properties on the Web Server, and also provides install options for application deployments.
WebSphere - Code Release on Cluster	This workflow automates the deployment of applications in IBM WebSphere on a cluster setup. In addition to deployment, this workflow can update the JVM Generic Arguments and JVM System Properties on the Web Server, and also provides install options for the deployment of applications.
JBoss - Code Release	This workflow automates the deployment of applications in a JBoss Application Server. In addition to deployment, this workflow can update the JVM Generic Arguments and JVM System Properties on the Web Server, and also provides install options for the deployment of applications.

Supported Products and Platforms

The WebSphere and JBoss release management workflows are supported on Red Hat Enterprise Linux, Solaris, and Windows platforms.

Product Platform

This solution pack is available for WebSphere 8.0, 8.5, and 8.5.5. These versions will be referred to simply as WebSphere throughout.

This solution pack is also available for JBoss Application Server Enterprise Application Platform (EAP) or WildFly. These will be referred to simply as JBoss throughout.

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 Support web site:

<https://softwaresupport.hp.com/>

Hardware Requirements

For HP DMA server hardware requirements, see the *HP DMA Installation Guide* and the *HP DMA Release Notes*.

HP Software Requirements

The latest HP DMA solution packs require the latest HP DMA platform. To use the latest solution packs, update the HP DMA platform. HP DMA 10.22 solution packs are supported on HP DMA 10.22 (and later).

Prerequisites

WebSphere Prerequisites

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

- You must have a working WebSphere Network Deployment cell version 8.0, or 8.5.x, with the Deployment Manager available for communication.
- You must run the Discover WebSphere workflow before you run the release management workflows. The Discover WebSphere workflow audits the server's physical environment for WebSphere cells, clusters, and application servers and stores the configuration information in the HP DMA environment.

JBoss Prerequisites

The following prerequisites must be satisfied before you can run the JBoss release management workflow in this solution pack:

- The JBoss Application Server must be installed beforehand.

Note: Be sure to review the additional prerequisites for each workflow.

Chapter 2: Workflow Details

The Application Server Release Management solution pack contains the following WebSphere and JBoss release management workflows. You can run these workflows ad-hoc for custom WebSphere or JBoss installations or create reusable deployments to standardize WebSphere or JBoss installations in your environment.

Workflow Name	Purpose
WebSphere - Code Release	This workflow automates application deployments in IBM WebSphere on a standalone setup. In addition to deployment automation, this workflow can update JVM Generic Arguments and JVM System Properties on the Web Server, and also provides install options for application deployments.
WebSphere - Code Release on Cluster	This workflow automates the deployment of applications in IBM WebSphere on a cluster setup. In addition to deployment, this workflow can update the JVM Generic Arguments and JVM System Properties on the Web Server, and also provides install options for the deployment of applications.
JBoss - Code Release	This workflow automates the deployment of applications in a JBoss Application Server. In addition to deployment, this workflow can update the JVM Generic Arguments and JVM System Properties on the Web Server, and also provides install options for the deployment of applications.

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 release management 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 Run 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 11).

- 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.

WebSphere - Code Release

This workflow automates application deployments in IBM WebSphere. In addition to deployment automation, this workflow can update JVM Generic Arguments and JVM System Properties on the Web Server, and also provides install options for application deployments.

Some install options are provided as parameters for the workflow, or, users can specify install options within a file for each of the applications to be deployed (Note that user-specified parameter values take the highest precedence). This workflow provides application deployment verification by providing the URLs. For successful application deployments, verifications and a list of the applications are maintained in the history file. In cases of unsuccessful application deployments, the workflow rolls back the deployment and restores the last successfully deployed application (if any).

The supported applications are of type :

- .war files
- .ear files

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 WebSphere - Code Release workflow.

Product Platform

This workflow is available for WebSphere 8.0, or 8.5.x.

Dependencies

This workflow has the following dependencies:

- You must have a working WebSphere Network Deployment cell version 8.0, or 8.5.x, with the Deployment Manager available for communication.
- You must run the Discover WebSphere workflow before you run the release management workflows. The Discover WebSphere workflow audits the server's physical environment for WebSphere cells, clusters, and application servers and stores the configuration information in the HP DMA environment.

For more information about prerequisites for WebSphere, refer to the [WebSphere Product Documentation](#) on page 70.

How this Workflow Works

The following information describes how the WebSphere - Code Release workflow works:

Overview

This workflow does the following things in the order shown:

1. Initially, the workflow inputs all parameters, set defaults for optional parameters, and validates all parameters. If input files do not exist in the specified locations, they are downloaded from the software repository. The workflow performs a checksum to verify that the archive files should be deployed in the Application Server on a standalone setup.
2. Next, the workflow creates the installation options and the call wrapper that will be used to execute commands within a WebSphere environment. The workflow updates the JVM setting and then creates a backup. The workflow deploys the specified Application Archive files in the Application Server on a standalone setup.
3. If the application deployment succeeds, the workflow tests the URLs for the web servers and copies the application archives.
4. If the application deployment fails, the workflow rolls back the deployment and restores the last successfully deployed application (if any).
5. Finally, the workflow cleans up downloaded files based on the Cleanup on Success and Cleanup on Failure parameters.

Validation Checks Performed

The workflow performs the following checks on the input parameters:

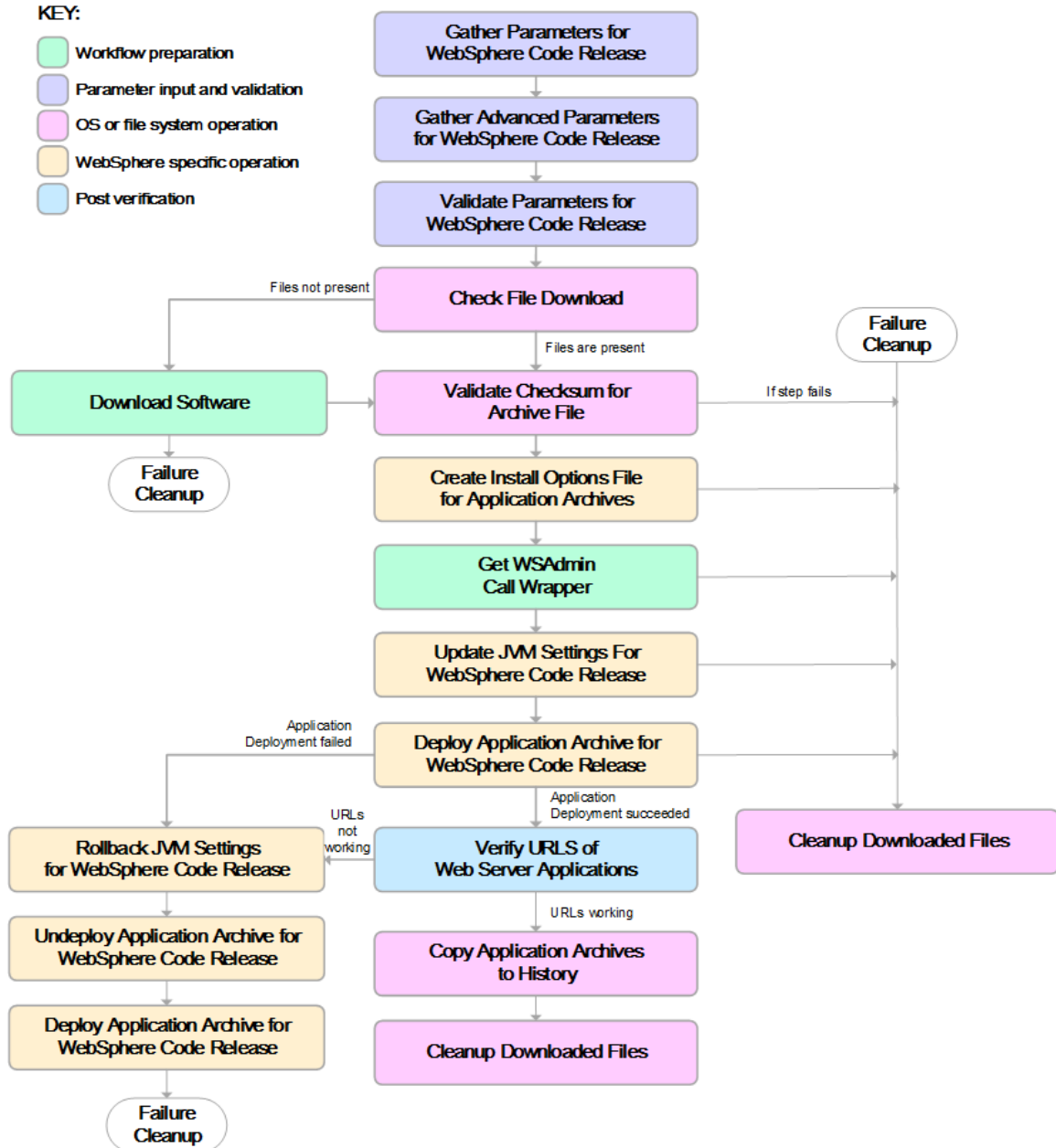
Enable Security	Must be true or false
If Enable Security is true	WebSphere Admin Username must be specified WebSphere Admin Password must be specified
WebSphere Admin Username	Cannot contain the following characters / \ * , ; = + ? < > & % ' " [] # \$ ^ { } Cannot begin with a dash (-), period (.), or space ()
WebSphere Admin Password	Cannot begin with a dash (-) Cannot contain a space ()
Code Release Staging Location Code Release History Location	Must be valid absolute paths Cannot have the same values
Application Archive File List Md5 Checksum	There must be a checksum for each Application Archive file The Application Archive files must be type .ear or .war and have valid absolute paths Checksums must be valid hexadecimal numbers

The WebSphere - Code Release workflow also checks the environment for the following:

- The WebSphere container type must be APPLICATION_SERVER.
- The WebSphere Home exists.

Steps Executed

The WebSphere - Code Release 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 subsequent steps are skipped, except for the Cleanup Downloaded Files step.



Steps Used in the WebSphere - Code Release Workflow

Workflow Step	Description
Gather Parameters for WebSphere Code Release	This step gathers mandatory input parameters (user-provided) used to deploy a list of application archives in a IBM WebSphere Application Server on a standalone setup.
Gather Advanced Parameters for WebSphere Code Release	This step gathers the advanced input parameters (user-provided) used to deploy an application archive for a WebSphere Application Server. Input parameters specified in this step are optional. Appropriate default values are specified.
Validate Parameters for WebSphere Code Release	This step validates the basic and advanced parameters provided by the user, and checks the prerequisites for deploying a list of application archives for an IBM WebSphere Application Server on a standalone setup.
Check File Download	This step checks for the existence of a file before downloading from the HP Server Automation software repository. <ul style="list-style-type: none"> • Checks if file is in the expected location. • If the file is not in the expected location, generates a list of files for file download.
Download Software	This step downloads a list of files to a specified location on the target server.
Validate Checksum for Archive File	This step verifies the checksum for the archive files and archive setting file (if any) to ensure that the file has not changed and that the correct archives are deployed in the Application Server.
Create Install Options File for Application Archives	This step creates a setting file that includes the install options for the list of application archive files being deployed by the application server.
Get WSAAdmin Call Wrapper	This step creates the necessary call wrapper to call <code>wsadmin</code> to execute certain operations within a given WebSphere environment.
Update JVM Settings For WebSphere Code Release	This step updates the JVM setting of the IBM WebSphere Application server. It also performs a backup of the IBM WebSphere profile configuration.

Steps Used in the WebSphere - Code Release Workflow, continued

Workflow Step	Description
Deploy Application Archive for WebSphere Code Release	Using the user-provided Application Archive files: This step deploys the list of application archives in the IBM WebSphere Application Server on a standalone setup.
If the application deployment succeeds, the following steps are executed	
Verify URLs of Web Server Applications	This step verifies that the URLs are working, and looks for return status code values of 200 for success.
Copy Application Archives to History	This step copies the list of files from the staging location to the history location.
Cleanup Downloaded Files	For workflow success—and if Cleanup on Success is set to True (default)—this step removes all downloaded files and archives. Dependencies: Run as file/directory owner.
If the application deployment fails, the following steps are executed	
Rollback JVM Settings for WebSphere Code Release	This step restores a backup of the IBM WebSphere profile configuration.
Undeploy Application Archive for WebSphere Code Release	This step uninstalls the list of application archives from an IBM WebSphere Application Server on a standalone setup.
Deploy Application Archive for WebSphere Code Release	Using the backup of the Application Archive files: This step deploys the list of application archives in the IBM WebSphere Application Server on a standalone setup.
Cleanup Downloaded Files	For workflow failure—and if Cleanup on Failure is set to True (default)—this step removes all downloaded files and archives. Dependencies: Run as file/directory owner.

For parameter descriptions and defaults, see [Parameters for WebSphere - Code Release](#) on page 30.

How to Run this Workflow

The following instructions show you how to customize and run the WebSphere - Code Release workflow in your environment.

Tip: For detailed instructions to run HP DMA workflows—using the Run Oracle Compliance Audit workflow as an example—see *HP DMA Quick Start Tutorial*.

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.

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

To use the WebSphere - Code Release workflow:

1. Create a deployable copy of the workflow (see "Create a Deployable Workflow" in *HP DMA Quick Start Tutorial*).
2. Determine the values that you will specify for the following parameters:

Parameters Defined in this Step: Gather Parameters for WebSphere - Code Release

Parameter Name	Default Value	Required	Description
Application Archive File List	no default	required	Comma-separated list of the Application Archive files to be deployed. Example: xxx.war or yyy.ear
Code Release History Location	no default	required	Fully qualified path name of the location where the application archive will be saved (for history purposes) on the target machine. This location cannot be the same as the Code Release Staging Location.
Code Release Staging Location	no default	required	Fully qualified path name of the location where the application archive will be saved on the target machine. This location cannot be the same as the Code Release History Location.
Enable Security	no default	required	Indicates whether security will be enabled. Valid values are True or False. If True then WebSphere Admin Password and WebSphere Admin User must have values.

Parameters Defined in this Step: Gather Parameters for WebSphere - Code Release , continued

Parameter Name	Default Value	Required	Description
MD5 Checksum	no default	required	Comma-separated list of the MD5 Checksum of the Application Archive files to be deployed.
Test URLs	no default	required	Comma-separated list of URLs used to test whether or not the list of applications deployed successfully. Example: http://mytestdb.com , http://yourtest.com

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 78).

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

See [Parameters for WebSphere - Code Release](#) on page 30 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. 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" in *HP DMA Quick Start Tutorial* 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" in *HP DMA Quick Start Tutorial* for instructions).

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:

Use the WebSphere administrative console interface to check that the web server is configured.

Sample Scenario

This topic shows you typical parameter values for different use cases for the WebSphere - Code Release workflow. For a complete list of all parameters used in this workflow, including default values, see [Parameters for WebSphere - Code Release](#) on page 30.

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 78).

Scenario 1: Install an application archive (for example stockanalysis.war) on a running IBM WebSphere Application Server on a standalone setup.

In this scenario we will deploy the stockanalysis.war file on a running IBM WebSphere Application Server. We will install the application using the default installation options. If the application archive files are not present in the Code Release Staging Location, then they will be downloaded from the SA Repository.

Parameters Defined in this Step: Gather Parameters for WebSphere - Code Release

Parameter Name	Example Value	Description
Application Archive File List	stockanalysis.war	Comma-separated list of the Application Archive files to be deployed. Example: xxx.war or yyy.ear
JBoss Code Release History Location	/opt/IBM/was/history	Fully qualified path name of the location where the application archive will be saved (for history purposes) on the target machine. This location cannot be the same as the Code Release Staging Location.
JBoss Home	/tmp/IBM/was/staging	Fully qualified path name of the location where the application archive will be saved on the target machine. This location cannot be the same as the Code Release History Location.
Enable Security	False	Indicates whether security will be enabled. Valid values are True or False. If True then WebSphere Admin Password and WebSphere Admin User must have values.
MD5 Checksum	4477e994e9d457ad2214a3d36b1bb16b	Comma-separated list of the MD5 Checksum of the Application Archive files to be deployed.
Test URLs	http://<server:port>/stockanalysis/<xyx.html>	Comma-separated list of URLs used to test whether or not the list of applications deployed successfully. Example: http://mytestdb.com , http://yourtest.com

Scenario 2: Install an application archive (for example stockanalysis.war) on a running IBM WebSphere Application Server on a standalone setup.

In this scenario we will deploy the stockanalysis.war file on a running IBM WebSphere Application Server. We will install the application using the default installation options. The JVM settings are also applied to the Application server. If the application archive files are not present in the Code Release Staging Location, then they will be downloaded from the SA Repository.

Parameters Defined in this Step: Gather Parameters for WebSphere - Code Release

Parameter Name	Example Value	Description
Application Archive File List	stockanalysis.war	Comma-separated list of the Application Archive files to be deployed. Example: xxx.war or yyy.ear
Code Release History Location	/opt/IBM/was/history	Fully qualified path name of the location where the application archive will be saved (for history purposes) on the target machine. This location cannot be the same as the Code Release Staging Location.
Code Release Staging Location	/tmp/IBM/was/staging	Fully qualified path name of the location where the application archive will be saved on the target machine. This location cannot be the same as the Code Release History Location.
Enable Security	False	Indicates whether security will be enabled. Valid values are True or False. If True then WebSphere Admin Password and WebSphere Admin User must have values.
MD5 Checksum	4477e994e9d457ad2214a3d36b1bb16b	Comma-separated list of the MD5 Checksum of the Application Archive files to be deployed. Also includes the MD5 Checksum of the Archive Setting file.
Test URLs	http://<server:port>/stockanalysis/<xyx.html>	Comma-separated list of URLs used to test whether or not the list of applications deployed successfully. Example: http://mytestdb.com , http://yourtest.com

Parameters Defined in this Step: Gather Advanced Parameters for WebSphere - Code Release

Parameter Name	Example Value	Description
JVM Generic Arguments	<ul style="list-style-type: none"> Dclient.encoding.override=UTF-8 Dsun.rmi.dgc.client.gcInterval=36000000 Dsun.rmi.dgc.server.gcInterval=36000000 	Specifies the JVM generic arguments. Provide values as standard JVM settings.
JVM System Properties	stockanalysis_home, /opt/stockanalysis/bin, Home path for the stock analysis	Specifies the JVM System Properties. Provide the string in the following format: 'PropertyName, PropertyValue PropertyName, PropertyValue'

Scenario 3: Install an application archive (for example stockanalysis.war) on a running IBM WebSphere Application Server on a standalone setup.

In this scenario we deploy the stockanalysis.war file on a running IBM WebSphere Application Server. We will install the application using the default installation options. This scenario provides the install options to deploy the application archive in a file. If the Application Archive Files and the Archive Setting File are not present in the Code Release Staging Location, then they will be downloaded from the SA Repository.

Parameters Defined in this Step: Gather Parameters for WebSphere - Code Release

Parameter Name	Example Value	Description
Application Archive File List	stockanalysis.war	Comma-separated list of the Application Archive files to be deployed. Example: xxx.war or yyy.ear
Code Release History Location	/opt/IBM/was/history	Fully qualified path name of the location where the application archive will be saved (for history purposes) on the target machine. This location cannot be the same as the Code Release Staging Location.
Code Release Staging Location	/tmp/IBM/was/staging	Fully qualified path name of the location where the application archive will be saved on the target machine. This location cannot be the same as the Code Release History Location.

Parameters Defined in this Step: Gather Parameters for WebSphere - Code Release , continued

Parameter Name	Example Value	Description
Enable Security	False	Indicates whether security will be enabled. Valid values are True or False. If True then WebSphere Admin Password and WebSphere Admin User must have values.
MD5 Checksum	4477e994e9d457ad2214a3d36b1bb16, 1eff908bedaa416c104f6b4a9a268233	Comma-separated list of the MD5 Checksum of the Application Archive files to be deployed. Also includes the MD5 Checksum of the Archive Setting file.
Test URLs	http://<server:port>/stock/<xyx.html>	Comma-separated list of URLs used to test whether or not the list of applications deployed successfully. Example: http://mytestdb.com , http://yourtest.com

Parameters Defined in this Step: Gather Advanced Parameters for WebSphere - Code Release

Parameter Name	Example Value	Description
Archive Settings File	archive.setting	<p>The file containing the install options for all the archive files.</p> <p>Sample Archive Settings File content:</p> <pre>stockanalysis.war = { Precompile JavaServer Pages files = No -contextroot /stock }</pre> <p>Options for providing the key are:</p> <ul style="list-style-type: none">• Provide the key in plain English. The key supported is the parameter name in the step Gather Advanced Parameters for WebSphere Code Release. The parameter should be provided without the Archive Install Option (for example, the parameter Archive Install Option Precompile JavaServer Pages is provided in the file as Precompile JavaServer Pages files).• Provide the key and value as supported by IBM WebSphere. For example, <code>-contextroot /stock</code>

Parameters for WebSphere - Code Release

The following tables describe the required and optional input parameters for this workflow. For most parameters, if you do not specify a value for a parameter, a default value is assigned.

Parameters Defined in this Step: Gather Parameters for WebSphere - Code Release

Parameter Name	Default Value	Required	Description
Application Archive File List	no default	required	Comma-separated list of the Application Archive files to be deployed. Example: xxx.war or yyy.ear
Code Release History Location	no default	required	Fully qualified path name of the location where the application archive will be saved (for history purposes) on the target machine. This location cannot be the same as the Code Release Staging Location.
Code Release Staging Location	no default	required	Fully qualified path name of the location where the application archive will be saved on the target machine. This location cannot be the same as the Code Release History Location.
Enable Security	no default	required	Indicates whether security will be enabled. Valid values are True or False. If True then WebSphere Admin Password and WebSphere Admin User must have values.
MD5 Checksum	no default	required	Comma-separated list of the MD5 Checksum of the Application Archive files to be deployed.
Test URLs	no default	required	Comma-separated list of URLs used to test whether or not the list of applications deployed successfully. Example: http://mytestdb.com , http://yourtest.com

Parameters Defined in this Step: Gather Advanced Parameters for WebSphere - Code Release

Parameter Name	Default Value	Required	Description
Archive Install Option Allow Dispatching Includes to Remote Resources	no default	optional	Specifies whether or not an application can dispatch includes to resources across web modules in different Java virtual machines in a managed node environment through the standard request dispatcher mechanism. Possible values are Yes or No.
Archive Install Option Allow Servicing Includes from Remote Resources	no default	optional	Specifies whether or not an enterprise application can service an include request from an application. Possible values are Yes or No.
Archive Install Option Application Build ID	no default	optional	Specifies an uneditable string that identifies the Build ID version of the application.
Archive Install Option Asynchronous Request Dispatch Type	no default	optional	Specifies whether or not web modules can dispatch requests concurrently on separate threads, and if so, whether the server or client dispatches the requests. Concurrent dispatching can improve servlet response time.
Archive Install Option Business Level Application Name	no default	optional	Specifies that either the product creates a new business-level application name with the enterprise application that you are installing, or, makes the enterprise application a composition unit of an existing business-level application.
Archive Install Option Create MBeans for Resources	no default	optional	Specifies whether or not to create MBeans for resources such as servlets or JSP files within an application when the application starts. The default behavior is to create MBeans. Possible values are Yes or No.
Archive Install Option Deploy Enterprise Beans	no default	optional	Specifies whether or not the EJBDeploy tool runs during application installation. Possible values are Yes or No.

Parameters Defined in this Step: Gather Advanced Parameters for WebSphere - Code Release , continued

Parameter Name	Default Value	Required	Description
Archive Install Option Distribute Application	no default	optional	Specifies whether or not the product expands application binaries in the installation location during installation and deletes application binaries during uninstallation. The default is to enable application distribution. Application binaries for installed applications are expanded to the directory specified. Possible values are Yes or No.
Archive Install Option File Permission	no default	optional	Specifies access permissions for application binaries for installed applications that are expanded to the directory specified. Possible values are .*=755 or *.*.dll=755#.**.so=755#.**.a=755#.**.sl =755 or *.*.htm=755#.**.html=755#.**.gif=755# *.*.jpg=755
Archive Install Option Override Class Reloading Settings for Web and EJB Modules	no default	optional	Specifies whether or not the product run time detects changes to application classes when the application is running. If enabled, and application classes are changed, then the application is stopped and restarted to reload updated classes. Possible values are Yes or No.
Archive Install Option Precompile JavaServer Pages Files	no default	optional	Specifies whether or not to precompile JavaServer Pages (JSP) files as a part of installation. The default is not to precompile JSP files. Possible values are Yes or No.

Parameters Defined in this Step: Gather Advanced Parameters for WebSphere - Code Release , continued

Parameter Name	Default Value	Required	Description
Archive Install Option Process Embedded Configuration	no default	optional	Specifies whether or not the embedded configuration should be processed. An embedded configuration consists of files such as resource.xml, variables.xml, and deployment.xml. You can collect WebSphere Application Server-specific deployment information and store it in the application EAR file. You can then install the EAR file into a WebSphere Application Server configuration using application management interfaces. Possible values are Yes or No.
Archive Install Option Reload Interval in Seconds	no default	optional	Specifies the number of seconds to scan the application's file system for updated files. The default is the value of the reloading interval attribute in the IBM extension (META-INF/ibm-application-ext.xmi) file of the EAR file. The reloading interval attribute takes effect only if class reloading is enabled. To enable reloading, specify a value greater than zero (for example, 1 to 2147483647). To disable reloading, specify zero (0). The range is from 0 to 2147483647.
Archive Install Option Use Binary Configuration	no default	optional	Specifies whether or not the application server uses the binding, extensions, and deployment descriptors located with the application deployment document, the deployment.xml file (default), or those located in the enterprise archive (EAR) file. Select this setting for applications installed on Version 6.0 or later deployment targets only. Possible values are Yes or No.

Parameters Defined in this Step: Gather Advanced Parameters for WebSphere - Code Release , continued

Parameter Name	Default Value	Required	Description
Archive Install Option Validate Install	no default	optional	Specifies whether or not the product examines the application references specified during application installation or updating and, if validation is enabled, warns users about incorrect references or fails the operation. Valid values are Off, Warn and Fail. Specify Off for no resource validation, Warn for warning messages about incorrect resource references, or Fail to stop operations that fail as a result of incorrect resource references.
Archive Settings File	no default	optional	The file containing the install options for all the archive files.
Cleanup on Failure	True	optional	Determines whether or not to remove downloaded and extracted files. This parameter also cleans up the installed directory upon failure of the workflow.
Cleanup on Success	True	optional	Determines whether or not to remove downloaded and extracted files. This parameter also cleans up the installed directory upon successful execution of the workflow.
JVM Generic Arguments	no default	optional	Specifies the JVM generic arguments. Provide values as standard JVM settings.
JVM System Properties	no default	optional	Specifies the JVM System Properties. Provide the string in the following format: 'PropertyName, PropertyValue PropertyName, PropertyValue'
Web Service Password	no default	required	Password for the Web Service API.
Web Service URL	dma.url	required	URL for the HP DMA Discovery web service API. Example: https://example.com/8443/dma

Parameters Defined in this Step: Gather Advanced Parameters for WebSphere - Code Release , continued

Parameter Name	Default Value	Required	Description
Web Service User	dma.user	required	A user capable of modifying the HP DMA managed environment by using the web service API.
WebSphere Admin Password	no default	optional	The password for a user in a group that can change the state of a given application server. Only required if global security is enabled. It cannot not begin with a dash (-) or contain a space ().
WebSphere Admin Username	no default	optional	The user account for a user in a group that can change the state of a given application server. Only required if global security is enabled. It cannot begin with a dash (-), a period (.), or a space (). It cannot contain any of the following characters / \ * , ; = + ? < > & % ' " [] # \$ ^ { }.

WebSphere - Code Release on Cluster

This workflow automates the deployment of applications in IBM WebSphere. In addition to deployment, this workflow can update the JVM Generic Arguments and JVM System Properties on the Web Server, and also provides install options for the deployment of applications.

Some of the install options are provided as parameters to the workflow, or users can specify install options within a file for each of the applications to be deployed. Note, though, that the value provided for parameters takes higher precedence. This workflow supports the verification of the application deployments by providing the URLs.

For successful application deployments, verifications and a list of the applications are maintained in the History file. In cases of unsuccessful application deployments, the workflow rolls back the deployment and restores the last successfully deployed application (if any).

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 WebSphere - Code Release on Cluster workflow.

Product Platform

This workflow automates application deployments in IBM WebSphere 8 or WebSphere 8.5.x.

Dependencies

This workflow has the following dependencies:

- A working WebSphere Network Deployment cell, whose Deployment Manager is available for communication
- You must run the Discover WebSphere workflow before running this workflow. The Discover WebSphere workflow audits the server's physical environment for WebSphere cells, clusters, and application servers and then stores the configuration information in the HP DMA environment.

For more information about prerequisites for WebSphere, refer to the [WebSphere Product Documentation](#) on page 70.

How this Workflow Works

The following information describes how the WebSphere - Code Release On Cluster workflow works:

Overview

This workflow does the following things in the order shown:

1. Initially, the workflow inputs all parameters, set defaults for optional parameters, validates all parameters, and determines all members of the cluster. If input files do not exist in the specified locations, they are downloaded from the software repository. The workflow performs a checksum to verify that the archive files should be deployed in the Application Server on a cluster setup.
2. Next, the workflow creates the installation options and the call wrapper that will be used to execute commands within a WebSphere environment. The workflow updates the JVM setting and then creates a backup. The workflow deploys the specified Application Archive files in the Application Server on a cluster setup.
3. If the application deployment succeeds, the workflow tests the URLs for the web servers and copies the application archives.
4. If the application deployment fails, the workflow rolls back the deployment and restores the last successfully deployed application (if any).
5. Finally, the workflow cleans up downloaded files based on the Cleanup on Success and Cleanup on Failure parameters.

Validation Checks Performed

The workflow performs the following checks on the input parameters:

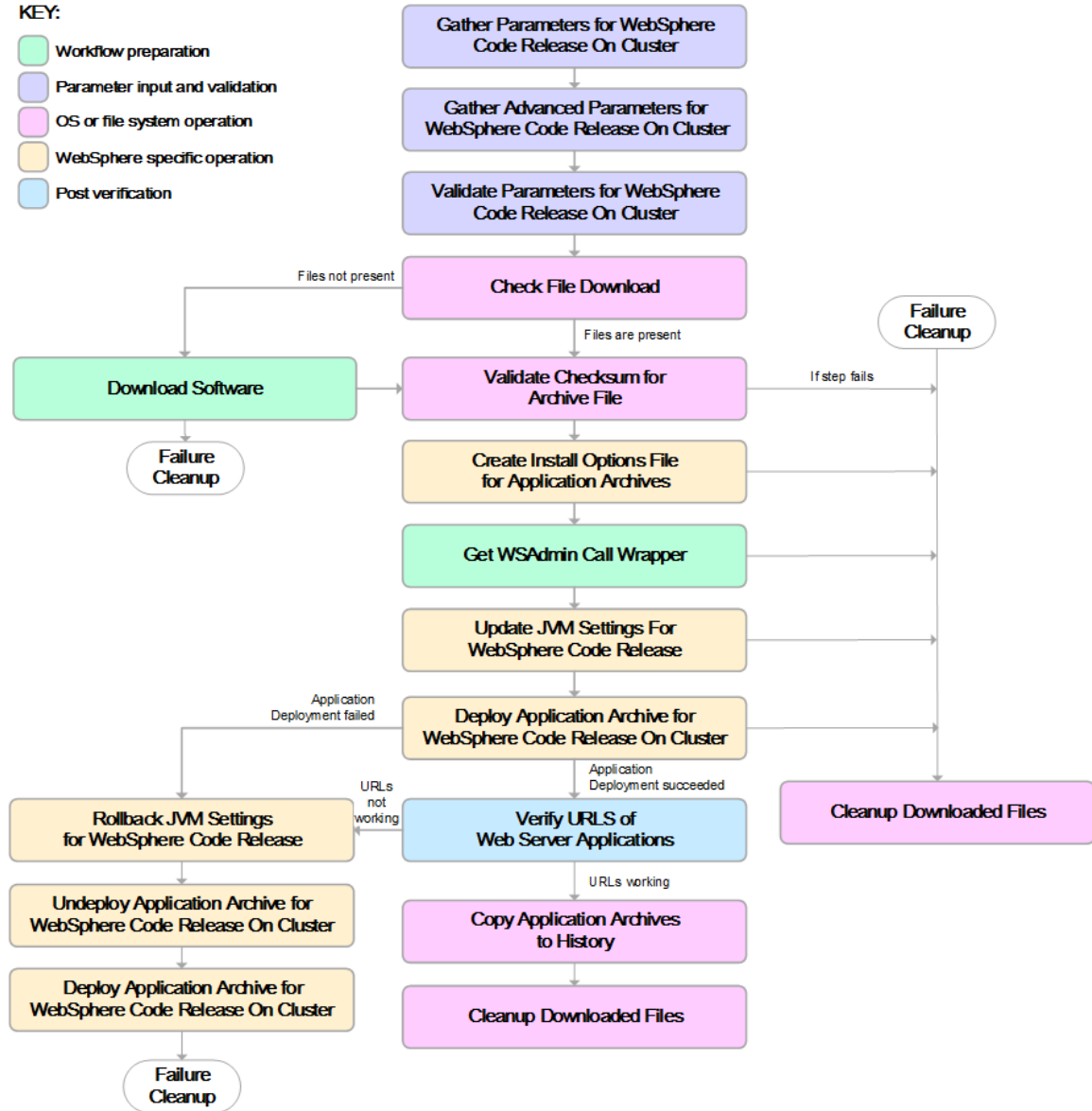
Enable Security	Must be true or false
If Enable Security is true	WebSphere Admin Username must be specified WebSphere Admin Password must be specified
WebSphere Admin Username	Cannot contain the following characters / \ * , ; = + ? < > & % ' " [] # \$ ^ { } Cannot begin with a dash (-), period (.), or space ()
WebSphere Admin Password	Cannot begin with a dash (-) Cannot contain a space ()
Code Release Staging Location Code Release History Location	Must be valid absolute paths Cannot have the same values
Application Archive File List Md5 Checksum	There must be a checksum for each Application Archive file The Application Archive files must be type .ear or .war and have valid absolute paths Checksums must be valid hexadecimal numbers

The WebSphere - Code Release On Cluster workflow also checks the environment for the following:

- The WebSphere container type must be cluster.
- The WebSphere Home exists.

Steps Executed

The 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 subsequent steps are skipped, except for the Cleanup Downloaded Files step.



Steps Used in the WebSphere - Code Release Workflow

Workflow Step	Description
Gather Parameters for WebSphere Code Release On Cluster	This step gathers mandatory input parameters (user-provided) used to deploy a list of application archives in a IBM WebSphere Application Server on a cluster setup.
Gather Advanced Parameters for WebSphere Code Release On Cluster	This step gathers the advanced input parameters (user-provided) used to deploy an application archive for a WebSphere Application Server on a cluster setup. Input parameters specified in this step are optional. Appropriate default values are specified.
Validate Parameters for WebSphere Code Release On Cluster	This step validates the basic and advanced parameters provided by the user, and checks the prerequisites for deploying a list of application archives for an IBM WebSphere Application Server on a cluster setup.
Check File Download	This step checks for the existence of a file before downloading from the HP Server Automation software repository. <ul style="list-style-type: none"> • Checks if file is in the expected location. • If the file is not in the expected location, generates a list of files for file download.
Download Software	This step downloads a list of files to a specified location on the target server.
Validate Checksum for Archive File	This step verifies the checksum for the archive files and archive setting file (if any) to ensure that the file has not changed and that the correct archives are deployed in the Application Server.
Create Install Options File for Application Archives	This step creates a setting file that includes the install options for the list of application archive files being deployed by the application server.
Get WSAdmin Call Wrapper	This step creates the necessary call wrapper to call <code>wsadmin</code> to execute certain operations within a given WebSphere environment.
Update JVM Settings For WebSphere Code Release	This step updates the JVM setting of the IBM WebSphere Application server. It also performs a backup of the IBM WebSphere profile configuration.
Deploy Application Archive for WebSphere Code Release On Cluster	Using the user-provided Application Archive files: This step deploys the list of application archives in the IBM WebSphere Application Server on a cluster setup.

Steps Used in the WebSphere - Code Release Workflow, continued

Workflow Step	Description
If the application deployment succeeds, the following steps are executed	
Verify URLs of Web Server Applications	This step verifies that the URLs are working, and looks for return status code values of 200 for success.
Copy Application Archives to History	This step copies the list of files from the staging location to the history location.
Cleanup Downloaded Files	For workflow success—and if Cleanup on Success is set to True (default)—this step removes all downloaded files and archives. Dependencies: Run as file/directory owner.
If the application deployment fails, the following steps are executed	
Rollback JVM Settings for WebSphere Code Release	This step restores a backup of the IBM WebSphere profile configuration.
Undeploy Application Archive for WebSphere Code Release On Cluster	This step uninstalls the list of application archives from a IBM WebSphere Application Server on a cluster setup.
Deploy Application Archive for WebSphere Code Release	Using the backup of the Application Archive files: This step deploys the list of application archives in the IBM WebSphere Application Server on a cluster setup.
Cleanup Downloaded Files	For workflow failure—and if Cleanup on Failure is set to True (default)—this step removes all downloaded files and archives. Dependencies: Run as file/directory owner.

For parameter descriptions and defaults, see [Parameters for WebSphere - Code Release on Cluster](#) on page 50.

How to Run this Workflow

The following instructions show you how to customize and run the WebSphere - Code Release on Cluster workflow in your environment.

Tip: For detailed instructions to run HP DMA workflows—using the Run Oracle Compliance Audit workflow as an example—see *HP DMA Quick Start Tutorial*.

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.

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

To use the WebSphere - Code Release on Cluster workflow:

1. Create a deployable copy of the workflow (see "Create a Deployable Workflow" in *HP DMA Quick Start Tutorial*).
2. Determine the values that you will specify for the following parameters:

Parameters Defined in this Step: Gather Parameters for WebSphere - Code Release

Parameter Name	Default Value	Required	Description
Application Archive File List	no default	required	Comma-separated list of the Application Archive files to be deployed. Example: xxx.war or yyy.ear
Code Release History Location	no default	required	Fully qualified path name of the location where the application archive will be saved (for history purposes) on the target machine. This location cannot be the same as the Code Release Staging Location.
Code Release Staging Location	no default	required	Fully qualified path name of the location where the application archive will be saved on the target machine. This location cannot be the same as the Code Release History Location.

Parameters Defined in this Step: Gather Parameters for WebSphere - Code Release , continued

Parameter Name	Default Value	Required	Description
Enable Security	no default	required	Indicates whether security will be enabled. Valid values are True or False. If True then WebSphere Admin Password and WebSphere Admin User must have values.
MD5 Checksum	no default	required	Comma-separated list of the MD5 Checksum of the Application Archive files to be deployed.
Test URLs	no default	required	Comma-separated list of URLs used to test whether or not the list of applications deployed successfully. Example: http://mytestdb.com , http://yourtest.com

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 78).

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

See [Parameters for WebSphere - Code Release on Cluster](#) on page 50 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. 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" in *HP DMA Quick Start Tutorial* 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" in *HP DMA Quick Start Tutorial* for instructions).

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:

Use the WebSphere administrative console interface to check that the web server is configured.

Sample Scenario

This topic shows you typical parameter values for different use cases for the WebSphere - Code Release on Cluster workflow. For a complete list of all parameters used in this workflow, including default values, see [Parameters for WebSphere - Code Release on Cluster](#) on page 50.

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 78).

Scenario 1: Install an application archive (for example stockanalysis.war) on a running IBM WebSphere Application Server on a standalone setup.

In this scenario we will deploy the stockanalysis.war file on a running IBM WebSphere Application Server. We will install the application using the default installation options. If the application archive files are not present in the Code Release Staging Location, then they will be downloaded from the SA Repository.

Parameters Defined in this Step: Gather Parameters for WebSphere - Code Release

Parameter Name	Default Value	Description
Application Archive File List	stockanalysis.war	Comma-separated list of the Application Archive files to be deployed. Example: xxx.war or yyy.ear
Code Release History Location	/opt/IBM/was/history	Fully qualified path name of the location where the application archive will be saved (for history purposes) on the target machine. This location cannot be the same as the Code Release Staging Location.
Code Release Staging Location	/tmp/IBM/was/staging	Fully qualified path name of the location where the application archive will be saved on the target machine. This location cannot be the same as the Code Release History Location.
Enable Security	False	Indicates whether security will be enabled. Valid values are True or False. If True then WebSphere Admin Password and WebSphere Admin User must have values.
MD5 Checksum	4477e994e9d457ad2214a3d36b1bb16b	Comma-separated list of the MD5 Checksum of the Application Archive files to be deployed.
Test URLs	http://<server:port>/stockanalysis/<xyx.html>	Comma-separated list of URLs used to test whether or not the list of applications deployed successfully. Example: http://mytestdb.com , http://yourtest.com

Scenario 2: Install an application archive (for example stockanalysis.war) on a running IBM WebSphere Application Server on a standalone setup.

In this scenario we will deploy the stockanalysis.war file on a running IBM WebSphere Application Server. We will install the application using the default installation options. The JVM settings are also applied to the Application server. If the application archive files are not present in the Code Release Staging Location, then they will be downloaded from the SA Repository.

Parameters Defined in this Step: Gather Parameters for WebSphere - Code Release

Parameter Name	Default Value	Description
Application Archive File List	stockanalysis.war	Comma-separated list of the Application Archive files to be deployed. Example: xxx.war or yyy.ear
Code Release History Location	/opt/IBM/was/history	Fully qualified path name of the location where the application archive will be saved (for history purposes) on the target machine. This location cannot be the same as the Code Release Staging Location.
Code Release Staging Location	/tmp/IBM/was/staging	Fully qualified path name of the location where the application archive will be saved on the target machine. This location cannot be the same as the Code Release History Location.
Enable Security	False	Indicates whether security will be enabled. Valid values are True or False. If True then WebSphere Admin Password and WebSphere Admin User must have values.
MD5 Checksum	4477e994e9d457ad2214a3d36b1bb16b	Comma-separated list of the MD5 Checksum of the Application Archive files to be deployed. Also includes the MD5 Checksum of the Archive Setting file.
Test URLs	http://<server:port>/stockanalysis/<xyx.html>	Comma-separated list of URLs used to test whether or not the list of applications deployed successfully. Example: http://mytestdb.com , http://yourtest.com

Parameters Defined in this Step: Gather Advanced Parameters for WebSphere - Code Release

Parameter Name	Default Value	Description
JVM Generic Arguments	<ul style="list-style-type: none"> Dclient.encoding.override=UTF-8 Dsun.rmi.dgc.client.gcInterval=3600000000 Dsun.rmi.dgc.server.gcInterval=3600000000 	Specifies the JVM generic arguments. Provide values as standard JVM settings.
JVM System Properties	stockanalysis_home, /opt/stockanalysis/bin, Home path for the stock analysis	Specifies the JVM System Properties. Provide the string in the following format: 'PropertyName, PropertyValue PropertyName, PropertyValue'

Scenario 3: Install an application archive (for example stockanalysis.war) on a running IBM WebSphere Application Server on a standalone setup.

In this scenario we deploy the stockanalysis.war file on a running IBM WebSphere Application Server. We will install the application using the default installation options. This scenario provides the install options to deploy the application archive in a file. If the Application Archive Files and the Archive Setting File are not present in the Code Release Staging Location, then they will be downloaded from the SA Repository.

Parameters Defined in this Step: Gather Parameters for WebSphere - Code Release

Parameter Name	Default Value	Description
Application Archive File List	stockanalysis.war	Comma-separated list of the Application Archive files to be deployed. Example: xxx.war or yyy.ear
Code Release History Location	/opt/IBM/was/history	Fully qualified path name of the location where the application archive will be saved (for history purposes) on the target machine. This location cannot be the same as the Code Release Staging Location.
Code Release Staging Location	/tmp/IBM/was/staging	Fully qualified path name of the location where the application archive will be saved on the target machine. This location cannot be the same as the Code Release History Location.
Enable Security	False	Indicates whether security will be enabled. Valid values are True or False. If True then WebSphere Admin Password and WebSphere Admin User must have values.

Parameters Defined in this Step: Gather Parameters for WebSphere - Code Release , continued

Parameter Name	Default Value	Description
MD5 Checksum	4477e994e9d457ad 2214a3d36b1bb16, 1eff908bedaa416c1 04f6b4a9a268233	Comma-separated list of the MD5 Checksum of the Application Archive files to be deployed. Also includes the MD5 Checksum of the Archive Setting file.
Test URLs	http://<server:port>/ stock/<xyx.html>	Comma-separated list of URLs used to test whether or not the list of applications deployed successfully. Example: http://mytestdb.com , http://yourtest.com

Parameters Defined in this Step: Gather Advanced Parameters for WebSphere - Code Release

Parameter Name	Default Value	Description
Archive Settings File	archive.setting	<p>The file containing the install options for all the archive files.</p> <p>Sample Archive Settings File content:</p> <pre>stockanalysis.war = { Precompile JavaServer Pages files = No -contextroot /stock }</pre> <p>Options for providing the key are:</p> <ul style="list-style-type: none"> • Provide the key in plain English. The key supported is the parameter name in the step Gather Advanced Parameters for WebSphere Code Release. The parameter should be provided without the Archive Install Option (for example, the parameter Archive Install Option Precompile JavaServer Pages is provided in the file as Precompile JavaServer Pages files). • Provide the key and value as supported by IBM WebSphere. For example, -contextroot /stock

Parameters for WebSphere - Code Release on Cluster

The following tables describe the required and optional input parameters for this workflow. For most parameters, if you do not specify a value for a parameter, a default value is assigned.

Parameters Defined in this Step: Gather Parameters for WebSphere - Code Release on Cluster

Parameter Name	Default Value	Required	Description
Application Archive File List	no default	required	Comma-separated list of the Application Archive files to be deployed. Example: xxx.war or yyy.ear
Code Release History Location	no default	required	Fully qualified path name of the location where the application archive will be saved (for history purposes) on the target machine. This location cannot be the same as the Code Release Staging Location.
Code Release Staging Location	no default	required	Fully qualified path name of the location where the application archive will be saved on the target machine. This location cannot be the same as the Code Release History Location.
Enable Security	no default	required	Indicates whether security will be enabled. Valid values are True or False. If True then WebSphere Admin Password and WebSphere Admin User must have values.
MD5 Checksum	no default	required	Comma-separated list of the MD5 Checksum of the Application Archive files to be deployed.
Test URLs	no default	required	Comma-separated list of URLs used to test whether or not the list of applications deployed successfully. Example: http://mytestdb.com , http://yourtest.com

Parameters Defined in this Step: Gather Advanced Parameters for WebSphere - Code Release on Cluster

Parameter Name	Default Value	Required	Description
Archive Install Option Allow Dispatching Includes to Remote Resources	no default	optional	Specifies whether or not an application can dispatch includes to resources across web modules in different Java virtual machines in a managed node environment through the standard request dispatcher mechanism. Possible values are Yes or No.
Archive Install Option Allow Servicing Includes from Remote Resources	no default	optional	Specifies whether or not an enterprise application can service an include request from an application. Possible values are Yes or No.
Archive Install Option Application Build ID	no default	optional	Specifies an uneditable string that identifies the Build ID version of the application.
Archive Install Option Asynchronous Request Dispatch Type	no default	optional	Specifies whether or not web modules can dispatch requests concurrently on separate threads, and if so, whether the server or client dispatches the requests. Concurrent dispatching can improve servlet response time.
Archive Install Option Business Level Application Name	no default	optional	Specifies that either the product creates a new business-level application name with the enterprise application that you are installing, or, makes the enterprise application a composition unit of an existing business-level application.
Archive Install Option Create MBeans for Resources	no default	optional	Specifies whether or not to create MBeans for resources such as servlets or JSP files within an application when the application starts. The default behavior is to create MBeans. Possible values are Yes or No.
Archive Install Option Deploy Enterprise Beans	no default	optional	Specifies whether or not the EJBDeploy tool runs during application installation. Possible values are Yes or No.

Parameters Defined in this Step: Gather Advanced Parameters for WebSphere - Code Release on Cluster, continued

Parameter Name	Default Value	Required	Description
Archive Install Option Distribute Application	no default	optional	Specifies whether or not the product expands application binaries in the installation location during installation and deletes application binaries during uninstallation. The default is to enable application distribution. Application binaries for installed applications are expanded to the directory specified. Possible values are Yes or No.
Archive Install Option File Permission	no default	optional	Specifies access permissions for application binaries for installed applications that are expanded to the directory specified. Possible values are <code>.*=755</code> or <code>.*\.*.dll=755#.*\.*.so=755#.*\.*.a=755#.*\.*.sl=755</code> or <code>.*\.*.htm=755#.*\.*.html=755#.*\.*.gif=755#.*\.*.jpg=755</code>
Archive Install Option Override Class Reloading Settings for Web and EJB Modules	no default	optional	Specifies whether or not the product run time detects changes to application classes when the application is running. If enabled, and application classes are changed, then the application is stopped and restarted to reload updated classes. Possible values are Yes or No.
Archive Install Option Precompile JavaServer Pages Files	no default	optional	Specifies whether or not to precompile JavaServer Pages (JSP) files as a part of installation. The default is not to precompile JSP files. Possible values are Yes or No.
Archive Install Option Process Embedded Configuration	no default	optional	Specifies whether or not the embedded configuration should be processed. An embedded configuration consists of files such as <code>resource.xml</code> , <code>variables.xml</code> , and <code>deployment.xml</code> . You can collect WebSphere Application Server-specific deployment information and store it in the application EAR file. You can then install the EAR file into a WebSphere Application Server configuration using application management interfaces. Possible values are Yes or No.

Parameters Defined in this Step: Gather Advanced Parameters for WebSphere - Code Release on Cluster, continued

Parameter Name	Default Value	Required	Description
Archive Install Option Reload Interval in Seconds	no default	optional	Specifies the number of seconds to scan the application's file system for updated files. The default is the value of the reloading interval attribute in the IBM extension (META-INF/ibm-application-ext.xmi) file of the EAR file. The reloading interval attribute takes effect only if class reloading is enabled. To enable reloading, specify a value greater than zero (for example, 1 to 2147483647). To disable reloading, specify zero (0). The range is from 0 to 2147483647.
Archive Install Option Use Binary Configuration	no default	optional	Specifies whether or not the application server uses the binding, extensions, and deployment descriptors located with the application deployment document, the deployment.xml file (default), or those located in the enterprise archive (EAR) file. Select this setting for applications installed on Version 6.0 or later deployment targets only. Possible values are Yes or No.
Archive Install Option Validate Install	no default	optional	Specifies whether or not the product examines the application references specified during application installation or updating and, if validation is enabled, warns users about incorrect references or fails the operation. Valid values are Off, Warn and Fail. Specify Off for no resource validation, Warn for warning messages about incorrect resource references, or Fail to stop operations that fail as a result of incorrect resource references.
Archive Settings File	no default	optional	The file containing the install options for all the archive files.
Cleanup on Failure	True	optional	Determines whether or not to remove downloaded and extracted files. This parameter also cleans up the installed directory upon failure of the workflow.
Cleanup on Success	True	optional	Determines whether or not to remove downloaded and extracted files. This parameter also cleans up the installed directory upon successful execution of the workflow.
JVM Generic Arguments	no default	optional	Specifies the JVM generic arguments. Provide values as standard JVM settings.

Parameters Defined in this Step: Gather Advanced Parameters for WebSphere - Code Release on Cluster, continued

Parameter Name	Default Value	Required	Description
JVM System Properties	no default	optional	Specifies the JVM System Properties. Provide the string in the following format: 'PropertyName, PropertyValue PropertyName, PropertyValue'
Web Service Password	no default	required	Password for the Web Service API.
Web Service URL	dma.url	required	URL for the HP DMA Discovery web service API. Example: https://example.com/8443/dma
Web Service User	dma.user	required	A user capable of modifying the HP DMA managed environment by using the web service API.
WebSphere Admin Password	no default	optional	The password for a user in a group that can change the state of a given application server. Only required if global security is enabled. It cannot begin with a dash (-) or contain a space ().
WebSphere Admin Username	no default	optional	The user account for a user in a group that can change the state of a given application server. Only required if global security is enabled. It cannot begin with a dash (-), a period (.), or a space (). It cannot contain any of the following characters / \ * , ; = + ? < > & % ' " [] # \$ ^ { }.

JBoss - Code Release

This workflow automates the deployment of applications in a JBoss Application Server. In addition to deployment, this workflow can update the JVM Generic Arguments and JVM System Properties on the Web Server, and also provides install options for the deployment of applications.

Some of the install options are provided as parameters to the workflow, or users can specify install options within a file for each of the applications to be deployed. Note, though, that the value provided for parameters takes higher precedence. This workflow supports the verification of the application deployments by providing the URLs.

For successful application deployments, verifications and a list of the applications are maintained in the History file. In cases of unsuccessful application deployments, the workflow rolls back the deployment and restores the last successfully deployed application (if any).

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 JBoss - Code Release workflow.

Product Platform

This workflow deploys an application archive on the Red Hat Enterprise Linux platform only .

Dependencies

This workflow requires the JBoss Application Server to be installed beforehand.

For more information about prerequisites for JBoss - Code Release, refer to the [JBoss Product Documentation](#) on page 70.

How this Workflow Works

The following information describes how the JBoss - Code Release workflow works:

Overview

This workflow does the following things in the order shown:

1. Initially, the workflow inputs all parameters, set defaults for optional parameters, and validates all parameters. If input files do not exist in the specified locations, they are downloaded from the software repository. The workflow performs a checksum to verify that the archive files should be deployed in the Application Server.
2. Next, the workflow creates the installation options. The workflow updates the JVM settings (if any) and then takes a configuration backup. The workflow deploys the specified Application Archive files in the Application Server.
3. If the application deployment succeeds, the workflow tests the URLs for the web servers and copies the application archives.
4. If the application deployment fails, the workflow rolls back the deployment and restores the last successfully deployed application (if any).
5. Finally, the workflow cleans up downloaded files based on the Cleanup on Success and Cleanup on Failure parameters.

Validation Checks Performed

The workflow performs the following checks on the input parameters:

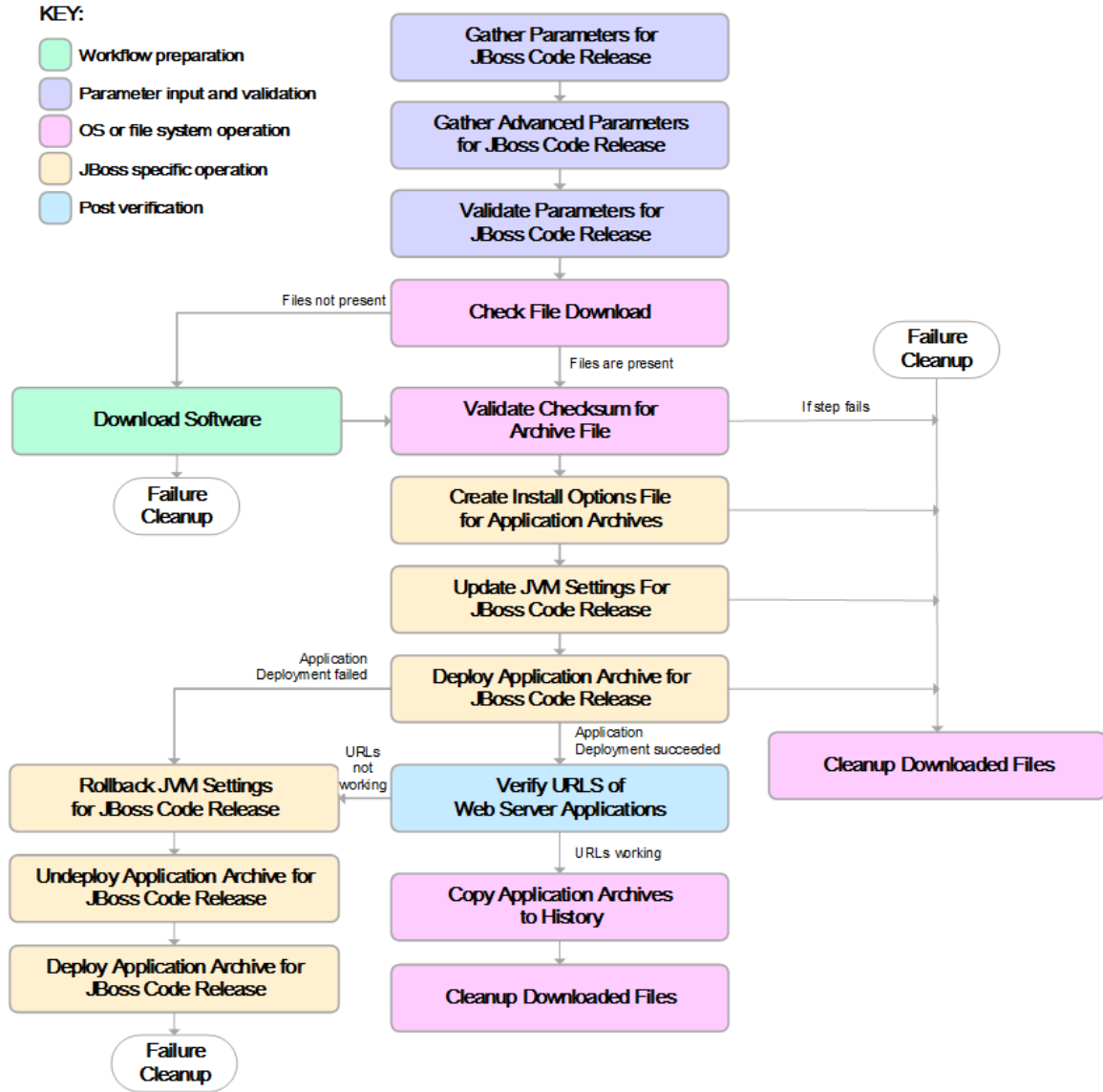
JBoss Home Application Archive File List MD5 Checksum JBoss Code Release History Location JBoss Staging Location	Required parameters must have values specified
Archive Install Option Force Deploy	If set to True (Yes, Y, or T), Archive Install Option All Server Groups and Archive Install Option Server Groups are not specified
Application Archive File List Md5 Checksum	There must be a checksum for each Application Archive file The Application Archive files must be type .ear or .war and have valid absolute paths Checksums must be valid hexadecimal numbers
JBoss Staging Location JBoss Code Release History Location	Must be valid absolute paths Cannot have the same values

The JBoss - Code Release workflow also checks the environment for the following:

- The operating system is supported.
- The JBoss version is EAP 6.x or later.
- The JBoss installation location is valid.

Steps Executed

The JBoss - Code Release 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 subsequent steps are skipped, except for the Cleanup Downloaded Files step.



Steps Used in the JBoss- Code Release Workflow

Workflow Step	Description
Gather Parameters for JBoss Code Release	This step gathers mandatory input parameters (user-provided) used to deploy a list of application archives in a JBoss Application Server.
Gather Advanced Parameters for JBoss Code Release	This step gathers the advanced input parameters (user-provided) used to deploy an application archive for a JBoss Application Server. Input parameters specified in this step are optional.
Validate Parameters for JBoss Code Release	This step validates the basic and advanced parameters provided by the user, and checks the prerequisites for deploying a list of application archives for a JBoss Application Server.
Check File Download	This step checks for the existence of a file before downloading from the HP Server Automation software repository. <ul style="list-style-type: none"> • Checks if file is in the expected location. • If the file is not in the expected location, generates a list of files for file download.
Download Software	This step downloads a list of files to a specified location on the target server.
Validate Checksum for Archive File	This step verifies the checksum for the archive files and archive setting file (if any) to ensure that the file has not changed and that the correct archives are deployed in the Application Server.
Create Install Options File for Application Archives	This step creates a setting file that includes the install options for the list of application archive files being deployed by the application server.
Update JVM Settings For JBoss Code Release	This step updates the JVM settings for the JBoss Application Server, and also performs a backup of the JBoss server configuration.
Deploy Application Archive for JBoss Code Release	Using the user-provided Application Archive files: This step deploys the list of application archives (.war and .ear) in a JBoss Application Server.
If the application deployment succeeds, the following steps are executed	
Verify URLs of Web Server Applications	This step verifies that the URLs are working, and looks for return status code values of 200 for success.
Copy Application Archives to History	This step copies the list of files from the staging location to the history location.

Steps Used in the JBoss- Code Release Workflow, continued

Workflow Step	Description
Cleanup Downloaded Files	For workflow success—and if Cleanup on Success is set to True (default)—this step removes all downloaded files and archives. Dependencies: Run as file/directory owner.
If the application deployment fails, the following steps are executed	
Rollback JVM Settings for JBoss Code Release	This step restores the backup of a JBoss Application server configuration.
Undeploy Application Archive for JBoss Code Release	This step uninstalls the list of application archives from a JBoss Application Server.
Deploy Application Archive for JBoss Code Release	Using the backup of the Application Archive files: This step deploys the list of application archives (.war and .ear) in a JBoss Application Server.
Cleanup Downloaded Files	For workflow failure—and if Cleanup on Failure is set to True (default)—this step removes all downloaded files and archives. Dependencies: Run as file/directory owner.

For parameter descriptions and defaults see, [Parameters for JBoss - Code Release](#) on page 68.

How to Run this Workflow

The following instructions show you how to customize and run the JBoss - Code Release workflow in your environment.

Tip: For detailed instructions to run HP DMA workflows—using the Run Oracle Compliance Audit workflow as an example—see *HP DMA Quick Start Tutorial*.

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.

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

To use the JBoss - Code Release workflow:

1. Create a deployable copy of the workflow (see "Create a Deployable Workflow" in *HP DMA Quick Start Tutorial*).
2. Determine the values that you will specify for the following parameters:

Parameters Defined in this Step: Gather Parameters for JBoss - Code Release

Parameter Name	Default Value	Required	Description
Application Archive File List	no default	required	Comma-separated list of the Application Archive files to be deployed. Example: xxx.war or yyy.ear
JBoss Code Release History Location	/opt/hp/dma/jboss/history	required	Fully qualified path name of the location where the application archive will be saved (for history purposes) on the target machine. This location cannot be the same as the Code Release Staging Location.

Parameters Defined in this Step: Gather Parameters for JBoss - Code Release , continued

Parameter Name	Default Value	Required	Description
JBoss Home	/opt/jboss	required	The location of the JBoss installation.
JBoss Staging Location	/tmp/jboss/stage	required	The temporary location in which to store the application archive. Note that the workflow will fail if the directory does not exist in the location specified.
MD5 Checksum	no default	required	Comma-separated list of the MD5 Checksum of the Application Archive files to be deployed.
Test URLs	no default	required	Comma-separated list of URLs used to test whether or not the list of applications deployed successfully. Example: http://mytestdb.com , http://yourtest.com

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 78).

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

See [Parameters for JBoss - Code Release](#) on page 68 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. 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" in *HP DMA Quick Start Tutorial* 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" in *HP DMA Quick Start Tutorial* for instructions).

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:

Use the WebSphere administrative console interface to check that the web server is configured.

Sample Scenario

This topic shows you typical parameter values for different use cases for the JBoss - Code Release workflow. For a complete list of all parameters used in this workflow, including default values, see [Parameters for JBoss - Code Release](#) on page 68.

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 78).

Scenario 1: Install an application archive (for example `stockanalysis.war`) on a running JBoss Application Server on a standalone setup.

In this scenario we will deploy the `stockanalysis.war` file on a running JBoss Application Server. We will install the application using the default installation options. If the application archive files are not present in the Code Release Staging Location, then they will be downloaded from the SA Repository.

Parameters Defined in this Step: Gather Parameters for JBoss - Code Release

Parameter Name	Example Value	Description
Application Archive File List	<code>stockanalysis.war</code>	Comma-separated list of the Application Archive files to be deployed. Example: <code>xxx.war</code> or <code>yyy.ear</code>
JBoss Code Release History Location	<code>/opt/hp/dma/jboss/history</code>	Fully qualified path name of the location where the application archive will be saved (for history purposes) on the target machine. This location cannot be the same as the Code Release Staging Location.
JBoss Staging Location	<code>/tmp/jboss/stage</code>	The temporary location in which to store the application archive. Note that the workflow will fail if the directory does not exist in the location specified.
JBoss Home	<code>/opt/jboss/wildfly-9.0.0.Alpha1/</code>	The location of the JBoss installation.
MD5 Checksum	<code>4477e994e9d457ad2214a3d36b1bb16b</code>	Comma-separated list of the MD5 Checksum of the Application Archive files to be deployed.
Test URLs	<code>http://<server:port>/stockanalysis/<xyx.html></code>	Comma-separated list of URLs used to test whether or not the list of applications deployed successfully. Example: http://mytestdb.com , http://yourtest.com

Scenario 2: Install an application archive (for example stockanalysis.war) on a running JBoss Application Server on a standalone setup.

In this scenario we will deploy the stockanalysis.war file on a running JBoss Application Server. We will install the application using the default installation options. The JVM settings are also applied to the Application server. If the application archive files are not present in the Code Release Staging Location, then they will be downloaded from the SA Repository.

Parameters Defined in this Step: Gather Parameters for JBoss - Code Release

Parameter Name	Example Value	Description
Application Archive File List	stockanalysis.war	Comma-separated list of the Application Archive files to be deployed. Example: xxx.war or yyy.ear
JBoss Code Release History Location	/opt/hp/dma/jboss/history	Fully qualified path name of the location where the application archive will be saved (for history purposes) on the target machine. This location cannot be the same as the Code Release Staging Location.
JBoss Staging Location	/opt/hp/dma/jboss/history	The temporary location in which to store the application archive. Note that the workflow will fail if the directory does not exist in the location specified.
JBoss Home	/opt/jboss/wildfly-9.0.0.Alpha1/	The location of the JBoss installation.
MD5 Checksum	4477e994e9d457ad2214a3d36b1bb16b	Comma-separated list of the MD5 Checksum of the Application Archive files to be deployed. Also includes the MD5 Checksum of the Archive Setting file.
Test URLs	http://<server:port>/stockanalysis/<xyx.html>	Comma-separated list of URLs used to test whether or not the list of applications deployed successfully. Example: http://mytestdb.com , http://yourtest.com

Parameters Defined in this Step: Gather Advanced Parameters for JBoss - Code Release

Parameter Name	Example Value	Description
JVM Generic Arguments	<ul style="list-style-type: none">• Dclient.encoding.override=UTF-8• Dsun.rmi.dgc.client.gcInterval=36000000• Dsun.rmi.dgc.server.gcInterval=36000000	Specifies the JVM generic arguments. Provide values as standard JVM settings.
JVM System Properties	stockanalysis_home, /opt/stockanalysis/bin, Home path for the stock analysis	Specifies the JVM System Properties. Provide the string in the following format: 'PropertyName, PropertyValue PropertyName, PropertyValue'

Parameters for JBoss - Code Release

The following tables describe the required and optional input parameters for this workflow. For most parameters, if you do not specify a value for a parameter, a default value is assigned.

Determine the values that you will specify for the following parameters:

Parameters Defined in this Step: Gather Parameters for JBoss - Code Release

Parameter Name	Default Value	Required	Description
Application Archive File List	no default	required	Comma-separated list of the Application Archive files to be deployed. Example: xxx.war or yyy.ear
JBoss Code Release History Location	/opt/hp/dma/jboss/history	required	Fully qualified path name of the location where the application archive will be saved (for history purposes) on the target machine. This location cannot be the same as the Code Release Staging Location.
JBoss Home	/opt/jboss	required	The location of the JBoss installation.
JBoss Staging Location	/tmp/jboss/stage	required	The temporary location in which to store the application archive. Note that the workflow will fail if the directory does not exist in the location specified.
MD5 Checksum	no default	required	Comma-separated list of the MD5 Checksum of the Application Archive files to be deployed.
Test URLs	no default	required	Comma-separated list of URLs used to test whether or not the list of applications deployed successfully. Example: http://mytestdb.com , http://yourtest.com

Parameters Defined in this Step: Gather Advanced Parameters for JBoss - Code Release

Parameter Name	Default Value	Required	Description
Archive Install Option All Server Groups	no default	optional	This parameter specifies whether or not the deployment is applicable to all available server groups. Note: This argument is unavailable in standalone mode.
Archive Install Option Force Deploy	True	optional	This parameter specifies whether or not the existing application is replaced by the new one. A value of True replaces the application, and a value of False ensures that it is not replaced.
Archive Install Option Runtime Name	no default	optional	Specifies the runtime name of the deployment.
Archive Install Option Server Groups	no default	optional	This parameter specifies a comma-separated list of server group names to which the deployment should apply. Note: This argument is unavailable in standalone mode.
Archive Settings File	no default	optional	The file containing the install options for all the archive files.
Cleanup on Failure	True	optional	Determines whether or not to remove downloaded and extracted files. This parameter also cleans up the installed directory upon failure of the workflow.
Cleanup on Success	True	optional	Determines whether or not to remove downloaded and extracted files. This parameter also cleans up the installed directory upon successful execution of the workflow.
JVM Generic Arguments	no default	optional	Specifies the JVM generic arguments. Provide values as standard JVM settings.
JVM System Properties	no default	optional	Specifies the JVM System Properties. Provide the string in the following format: 'PropertyName, PropertyValue PropertyName, PropertyValue'

Chapter 3: Reference Information

This chapter contains the following information:

Topic	Description
WebSphere Product Documentation	Links to product documentation for IBM WebSphere Application Server Network Deployment (WebSphere), the hardware and software requirements, as well as supported platforms
JBoss Product Documentation	Links to product documentation for JBoss Application Server Enterprise Application Platform (EAP) or WildFly (JBoss), the hardware and software requirements, as well as supported platforms
HP DMA Documentation	Links to additional HP DMA documentation

WebSphere Product Documentation

For the current list of hardware and software requirements, as well as supported platforms for IBM HTTP Server, see:

<http://www-01.ibm.com/support/docview.wss?uid=swg27006921>

For WebSphere 8 product documentation, see:

<http://publib.boulder.ibm.com/infocenter/wasinfo/v8r0/index.jsp>

<http://pic.dhe.ibm.com/infocenter/wasinfo/v8r5/index.jsp>

For IBM Red Book resources for WebSphere, see:

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

Note: The links to the documents listed here were correct as of the publication of this guide.

JBoss Product Documentation

For the current list of hardware and software requirements, as well as supported platforms for JBoss Application Server, see:

The following JBoss product documentation is available online:

Red Hat JBoss Enterprise Application Platform (EAP) and/or Enterprise Web Platform (EWP) version 5.1.1

- Product Documentation Home: <http://docs.redhat.com/docs/en-US/index.html>
- Hardware and Software Requirements: https://access.redhat.com/documentation/en-US/JBoss_Enterprise_Application_Platform/5/html/Installation_Guide/index.html

JBoss Application Server 7 Community version

- Product Documentation Home: <https://docs.jboss.org/author/display/AS71/Documentation>
- Hardware and Software Requirements: <https://docs.jboss.org/author/display/AS71/Getting+Started+Guide>

JBoss Enterprise Application Platform (EAP) version

- Product Documentation Home: <http://www.jboss.org/products/eap/overview/>
- Hardware and Software Requirements: <http://www.jboss.org/products/eap/get-started/>

JBoss WildFly version

- Product Documentation Home: <http://www.wildfly.org/>
- Hardware and Software Requirements: <https://docs.jboss.org/author/display/WFLY8/Admin+Guide>

Note: The links to the documents listed here were correct as of the publication of this guide.

HP DMA Documentation

For information about using the HP DMA web interface, see the *HP DMA User Guide*, the *HP DMA Administrator Guide*, and the *HP DMA Quick Start Tutorial*.

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

<https://softwaresupport.hp.com/>

Chapter 4: 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 a Solution Pack is Organized](#) on the next page
- [How to Expose Additional Workflow Parameters](#) on page 77
- [How to Use a Policy to Specify Parameter Values](#) on page 78
- [How to Import a File into the Software Repository](#) on page 81

How a Solution Pack is Organized

Note: This topic uses the Run Oracle Compliance Audit workflow in the Database Compliance solution pack as an example. The information provided here, however, pertains to any solution pack.

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. The top navigation bar includes 'Home', 'Automation', 'Reports', 'Environment', 'Solutions', and 'Setup'. A secondary navigation bar lists 'Workflows', 'Steps', 'Functions', 'Policies', 'Deployments', 'Run', 'Console', and 'History'. The main content area is titled 'My Copy of Run Oracle Compliance Audit' and features several tabs: 'Documentation' (selected), 'Workflow', 'History', 'Deployments', and 'Roles'. Below the tabs, there are input fields for 'Name' (My Copy of Run Oracle Compliance Audit), 'Tags', 'Type' (Oracle), and 'Target level' (Instance). The 'Documentation' section is expanded, showing three sub-sections: 'Purpose', 'Description', and 'Parameters'. The 'Purpose' section states the audit's goal and lists benchmarks like CIS Security Configuration Benchmark for Oracle Database Server 11g, CIS Security Benchmark for Oracle 9i/10g, PCI Data Security Standard, and SOX. The 'Description' section explains the workflow's process. At the bottom, there are action buttons: 'DELETE', 'EXPORT', 'EXTRACT POLICY', 'DEPLOY', 'Copy', 'Save', and 'CANCEL'. A 'HELP PDF EDIT' link is also present.

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. The main navigation bar includes 'Home', 'Automation', 'Reports', 'Environment', 'Solutions', and 'Setup'. A secondary navigation bar shows 'Workflows', 'Steps', 'Functions', 'Policies', 'Deployments', 'Run', 'Console', and 'History'. The current view is titled 'Get Oracle Home' and features several tabs: 'General', 'Action', 'Parameters', 'History', 'Workflows', 'Solutions', and 'Roles'. The 'General' tab is active, showing two main sections: 'Properties' and 'Documentation'.
Properties:
Name: Get Oracle Home
Tags:
Type: Oracle
Category: Script
Targetable:
Documentation:
Description:
Get the value of ORACLE_HOME from the appropriate source:
- The /etc/oratab or /var/opt/oracle/oratab file on UNIX
- The registry on Windows
Dependencies: None
Input Parameters: None
Output Parameters:
- Oracle Home = The fully qualified name of the ORACLE_HOME
- Oracle SID = The Oracle server (instance) ID
Return Code:
0 = Step was successful
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.

The screenshot shows the 'Parse Oracle Inventory' workflow with the 'Parameters' tab selected. The interface includes a navigation bar with 'Home', 'Automation', 'Reports', 'Environment', 'Solutions', and 'Setup'. Below the navigation bar are tabs for 'Workflows', 'Steps', 'Functions', 'Policies', 'Deployments', 'Run', 'Console', and 'History'. The main content area has sub-tabs for 'General', 'Action', 'Parameters', 'History', 'Workflows', 'Solutions', and 'Roles'. The 'Parameters' tab is active, displaying a list of parameters categorized into 'INPUT PARAMETERS' and 'OUTPUT PARAMETERS'. Each parameter has a status icon: a blue 'x' for input parameters and a red 'x' for output parameters. A legend at the bottom indicates that a red 'x' means 'Parameter is in use and cannot be removed'.

Category	Parameter Name	Status
INPUT PARAMETERS	Inventory Files	Available
	Oracle Account	Available
	Oracle Home	Available
	Server Wrapper	Available
OUTPUT PARAMETERS	CRS Account	In Use
	CRS Active Version	In Use
	CRS Group	In Use
	CRS Home	In Use
	CRS Home Name	In Use
	CRS Nodes	In Use
	Cluster Nodes	In Use
	Inventory Groups	Available
	Inventory Locations	Available

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

The screenshot shows a workflow table with four steps. Step 8, 'Get Listener Names', is expanded to show its parameters. A callout box on the left provides a detailed description for the 'Get Listener Names / Oracle SIDs' parameter. A red arrow points from the callout to the parameter name in the workflow table. Another red arrow points to a blue information icon next to the 'Oracle SIDs' value in the workflow table, with the text 'Click here' next to it.

Step ID	Step Name	Duration	Order
7	Prepare Oracle Instance	0	3, 8
8	Get Listener Names	0	3, 9
9	Audit Unix or Linux OS Specific Settings	0	3, 10
10	Audit Installation and Patch	0	11, 12

Get Listener Names / Oracle SIDs
Optional: Comma delimited list of ORACLE_SIDs, at least one of which a resulting listener must service. If blank, listeners are not limited to those servicing any specific ORACLE_SID.

To see the parameter description here

Listener Homes: Prepare Oracle Instance.Oracle Home
Oracle SIDs: Get Oracle Home.Oracle SID

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

hp Database & Middleware Automation

Home Automation Reports Environment Solutions Setup

Workflows Steps Functions Policies Deployments Run Console History

Run Oracle Compliance CIS

Targets Parameters Roles

Gather Parameters for Oracle Compliance

Compliance Type: Fixed Value ▾
Compliance type that will be audited by the workflow. Compliance types supported: CIS, PCI, SOX. Will be defaulted to CIS.

Excluded Compliance Checks: Fixed Value ▾
Optional: Checks to exclude from of Compliance Checks

Inventory Files: Fixed Value ▾
Optional: Comma separated list of fully qualified Oracle inventory files. If not specified, default to /etc/orainst.loc, /var/opt/oracle/orainst.loc, or %ProgramFiles%\Oracle\Inventory.

Gather Advanced Parameters for Oracle Compliance

Email Addresses to Receive Report: Fixed Value ▾
*Optional. Provided an email address or multiple email addresses separated by commas without spaces that you would like to receive an email of the results of the compliance tests run against the target specified.

[X DELETE](#) [▶ RUN](#) [Restore defaults](#) [Copy](#) [Save](#) or [CANCEL](#)


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.





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 Support web site: <https://softwaresupport.hp.com/>

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 the 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 Password: Policy Attribute ▼

- Discovery.Web Service Password
- DTE - Policy.Password
- MyParameterValues.MyAdminPassword**
- MyParameterValues.MyAdminUser
- MyParameterValues.MyDBUser
- MyParameterValues.MyDBUserPassword
- oracle software.oracle software

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

Admin Password: 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 Business Service Automation → HP Server Automation Client

If the HP SA Client is not installed locally, follow the instructions under “Installing the SA Client Launcher” in the *User Guide: Server Automation*, available on the HP Software Support web site: <https://softwaresupport.hp.com/>

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 5: 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 the 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 the HP Server Automation 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 Support web site: <https://softwaresupport.hp.com/>

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 Support web site:
<https://softwaresupport.hp.com/>

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 HP Server Automation. 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.

custom field

Custom Fields are used to customize workflows or show information about the environment. Custom Fields can be used in workflow steps to automatically supply information that is specific to an organization, server, instance, or database.

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.

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

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.

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 HP Server Automation. Before you can associate a role with an automation item or organization, however, you must register that role in HP DMA.

S

smart group

Smart Groups are dynamic groups of servers, instances, or databases defined by some criteria. They are used to specify targets for deployments. As information about an environment object changes, its membership in the groups is re-evaluated.

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.

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.