



HP Database and Middleware Automation

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Windows®

SQL Server Database Refresh

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The following table indicates changes made to this document since the last released major edition.

Document Changes

| Chapter | Version | Changes |
|---|---------|---|
| Title Page Legal Notices | 10.01 | Updated version number, software release date, document release date, and copyright date range. |
| Import the Solution Pack | 10.01 | Updated the HP DMA web user interface URL to reference the correct default port (8443) for SSL communication. |
| Title Page Legal Notices | 10.10 | Updated version number, software release date, document release date, and copyright date range. |

Document Changes, continued

| Chapter | Version | Changes |
|---|-----------|---|
| Supported Products and Platforms | 10.10 | Added support for SQL Server 2012. |
| Title Page Legal Notices | 10.20 | Updated version number, software release date, document release date, and copyright date range. |
| Quick Start Tutorial Workflow Details | 10.20 | Removed the Quick Start chapter. In the "How to Run this Workflow" sections, pointed to the <i>HP DMA Quick Start Tutorial</i> . |
| Workflow Details | 10.20.100 | Added capability to specify the Windows domain user at runtime for the SQL Server workflows. |
| Title Page Legal Notices Entire guide | 10.21 | Updated version number, software release date, document release date, and copyright date range. Updated document template. |
| Supported Products and Platforms | 10.21 | Updated supported versions of SQL Server. |
| Title Page Legal Notices | 10.22 | Updated version number, software release date, document release date, and copyright date range. |
| Title Page Legal Notices Entire guide | 10.30 | Updated version number, software release date, document release date, and copyright date range. Updated to new documentation template. |

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<http://h20230.www2.hp.com/sc/solutions/index.jsp>

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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 people who are responsible for the following types of tasks:

- Performing routine database backup and restore operations
- Restoring a database from a database backup file
- Copying production database data into a Dev/Test/Staging database environment

Minimal SQL Server knowledge is required to run the workflows in this solution pack using the default settings.

To customize this solution, however, you should be familiar with the following SQL Server processes:

- Database administration
- Database migration
- Database backup and restore

You should also have hands-on experience upgrading or downgrading a large database (see [HP DMA Documentation](#) on page 52).

Document Map

The following table shows you how to navigate this guide:

| Topic | Description |
|--|--|
| The SQL Server Database Refresh Solution | General information about this solution, including what it contains and what it does. |
| Workflow Details | Information about the Microsoft SQL Server (SQL Server) database refresh workflows included in this solution, including: prerequisites, how the workflows work, how to run them, sample scenarios, and a list of input parameters. |
| Reference Information | Links to current SQL Server 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 66.

Chapter 1: The SQL Server Database Refresh Solution

The HP Database and Middleware Automation Database Refresh solution contains three SQL Server workflows:

| Workflow Name | Purpose |
|--|---|
| Backup MS SQL Database | Backs up the contents of a SQL Server database into a file. |
| Restore MS SQL Database | Restores a specific database in the target SQL Server instance from an existing database backup file that you provide. |
| Backup and Restore MS SQL Database | Backs up the contents of a SQL Server database (the source database) into a file (the backup file), and loads the contents of that file into a new or existing database in the specified SQL Server instance (the target instance). |

Although minimal SQL Server knowledge is required to run these workflows using the default settings, the workflows are highly customizable and can support complex environment-specific deployment scenarios.

The remaining topics in this chapter provide the following contextual information about these workflows:

- [Supported Products and Platforms](#) on the next page
- [Prerequisites for this Solution](#) on page 13

Supported Products and Platforms

The SQL Server database refresh workflow support the following database refresh scenarios on Windows platforms:

| Backup File Version | Target Instance Version |
|---------------------|---|
| SQL Server 2014 | SQL Server 2014 |
| SQL Server 2012 | SQL Server 2012, SQL Server 2014 |
| SQL Server 2008 R2 | SQL Server 2008 R2, SQL Server 2012, SQL Server 2014 |
| SQL Server 2008 | SQL Server 2008, SQL Server 2008 R2, SQL Server 2012, SQL Server 2014 |

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*.

For SQL Server hardware and software requirements, see the [SQL Server Product Documentation](#) on page 52.

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 10.30 solution packs are supported on HP DMA 10.30 (and later).

Prerequisites for this Solution

The following prerequisites must be satisfied before you can run the SQL Server workflows in this solution pack:

1. The source database must exist before the [Backup MS SQL Database](#) workflow or the [Backup and Restore MS SQL Database](#) workflow runs.
2. The target instance must exist before the [Restore MS SQL Database](#) workflow or the [Backup and Restore MS SQL Database](#) workflow runs.
3. The service login for the SQL Server service must have read (for backup or restore) and write (for backup) permissions on the backup file and the directory where it is stored.
4. There must be sufficient space available to store the backup file, restore the database, or both.
5. The server management agent must have login access to the SQL Server instance where the source database resides (for backup), the target instance (for restore), or both (for backup and restore). It must also have permission to perform database consistency check (DBCC) commands on the pertinent database.
6. There must be sufficient space available on the source and target database servers. The workflow checks for this, and will fail if sufficient space is not available.
7. The Backup Encryption Password parameter is required when the database backup file is encrypted with a password.

Additional Considerations

- If database transactions occur on the source database after you create the dump file, you should apply the latest transaction log dump to the target database after you run the workflow. Otherwise, these transactions will be missing from the target database.
- It is good practice to run basic database consistency checks (DBCCs) on the source database before you create the database backup to ensure that there are no internal errors in the database. If you find errors in the source database, be sure to fix them before you create the database backup. This workflow does not have the ability to diagnose or remediate problems in the database prior to performing the database backup.

Caution: Performing frequent database backup or restore operations can hamper system performance and impede target database usage.

Note: There are also specific prerequisites for each workflow.

Chapter 2: Workflow Details

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.

Tip: Input parameters are described in the "Parameters" topic for each workflow.

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.
To perform a simple database refresh, you can use the default values for most parameters. To use more advanced features of this solution, you will need to expose additional parameters.
2. Specify the values for those parameters. You do this when you create a deployment.

Note: Each of these steps is explained in greater detail in the "How to Use this Workflow" topic for each workflow.

The information presented here assumes the following:

- HP DMA is installed and operational.
- At least one suitable database (for backup) or SQL Server instance (for restore) is available.
- 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.

Backup MS SQL Database

This workflow enables you to backup a SQL Server database into file (the backup file) that is stored either locally or on a network share.

You can specify various options for the backup operation, including whether the backup file is compressed or encrypted with a password.

The workflow performs extensive validation checks prior to and immediately after the backup operation to ensure that the backup file is valid. The workflow will perform an additional integrity check on the backup file if you set the Perform Integrity Check parameter to YES.

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 Scenarios | Examples of typical parameter values for this workflow |
| Parameters for Backup MS SQL Database | List of input parameters for this workflow |

The process of deploying and running this workflow is the same for all scenarios, but the parameters required will differ depending on the specific scenario that you are implementing.

The workflow provides default values for most parameters. These default values are usually sufficient for a "typical" database backup. You can override the defaults by specifying parameter values in the deployment. You can also expose additional parameters in the workflow, if necessary, to accomplish more advanced scenarios.

Any parameters not explicitly specified in the deployment will have the default values listed in [Parameters for Backup MS SQL Database](#) on page 23 .

Prerequisites for this Workflow

The following prerequisites must be satisfied before you can run the [Backup MS SQL Database](#) workflow:

1. The service login for the SQL Server service must have read and write permissions on the backup path.
2. The server management agent must have login access to the SQL Server instance in which the target database resides. It must also have permission to perform database consistency check (DBCC) commands on the target database.
3. There must be sufficient space available on the target data and log disks. The workflow checks for this, and will fail if sufficient space is not available.

Additional Considerations

For information about prerequisites for SQL Server, refer to the [SQL Server Product Documentation](#) on page 52.

How this Workflow Works

This topic contains information about the [Backup MS SQL Database](#) workflow:

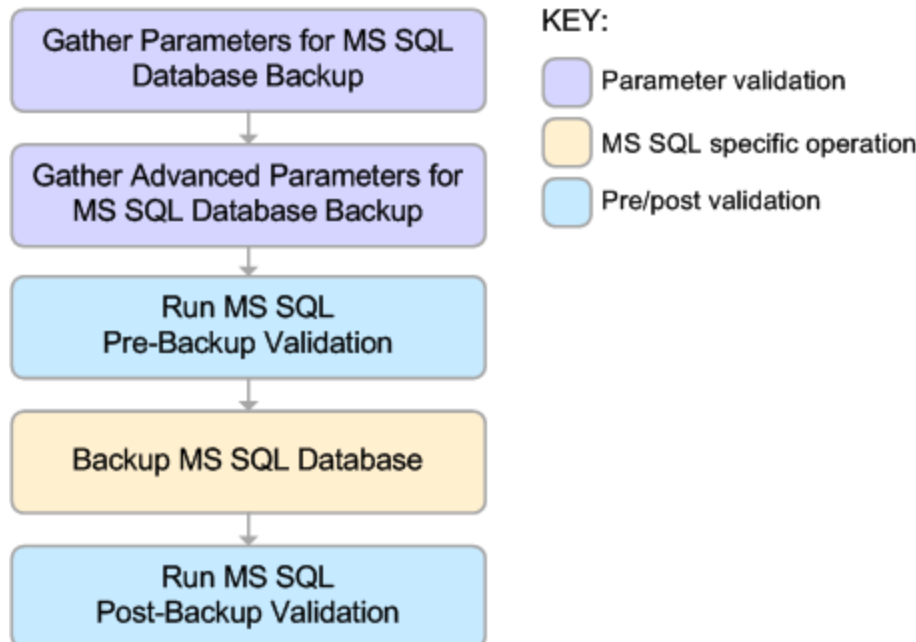
Validation Checks Performed

The workflow checks the following things prior to dumping the database. If any of these checks fails, the workflow fails.

1. All required parameters have values. If any required parameter does not have a value—either a value that you specify or a default value—the workflow fails in the Run MS SQL Pre-Backup Validation step.
2. The Target Backup Path is accessible, either locally or on a network share.
If the Target Backup Path is on a network share, the Windows Share User has read and write access the share.
3. The target database exists, and the workflow can connect to it.
4. Adequate disk space is available to store the database backup file.
5. If the Target Backup Path does not currently exist, it will be created prior to creating the backup file.

Steps Executed

The [Backup MS SQL Database](#) workflow includes the following steps. Each step must complete successfully before the next step can start. If a step fails, the workflow reports a failure, and all subsequent steps are skipped.



Process Flow

This workflow performs the following tasks:

1. Performs the preliminary [validation checks](#) described above.
2. Performs the database backup operation to create the backup file.
3. Performs post-backup validation checks to ensure that all required parameters had valid values.
4. If Perform Integrity Check was set to YES, performs an integrity check on the backup file.

Tips and Best Practices

It is good practice to run basic database consistency checks (DBCCs) on the source database before running this workflow to ensure that there are no internal errors in the database.

If you find errors in the source database, be sure to fix them before running this workflow. The workflow does not have the ability to diagnose or remediate problems in the database prior to performing the database backup.

How to Run this Workflow

This topic explains how to customize and run the [Backup MS SQL Database](#) workflow in your environment.

Note: Prior to running this workflow, review the [Prerequisites for this Workflow](#), and ensure that all requirements are satisfied.

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

To customize and run the Backup MS SQL Database 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 parameter. This is the minimum set of parameters required to run this workflow.

| Parameter Name | Default Value | Description |
|--------------------|---------------|--|
| Target Backup Path | no default | <p>Where the database backup file will be stored, either locally or on a network share. You can specify both the path and file name, or you can specify only the path.</p> <ul style="list-style-type: none">• If you specify a file name, it must end in .bak.• If you do not specify a file name, the backup file name will have the following form: <code><dataBaseName>_<dateTime>.bak</code> where <code><dataBaseName></code> represents the name of the target database specified when the workflow runs, and <code><dateTime></code> is the date and time when the Run MS SQL Pre-Backup Validation step is executed. <p>If the file will be stored on a network share, the Windows Share User must have read and write access to that share.</p> <p>Note: Windows Share User is not exposed by default—see How to Expose Additional Workflow Parameters on page 59.</p> |

See [Parameters for Backup MS SQL Database](#) on page 23 for detailed descriptions of all input parameters for this workflow, including default values.

3. In the workflow editor, expose any additional parameters that you need (see [How to Expose Additional Workflow Parameters](#) on page 59). You will specify values for those parameters when you create the deployment or at runtime.
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 (or set the type to Runtime Value) 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, specifying any runtime parameters (see "Run Your Workflow" in *HP DMA Quick Start Tutorial* for instructions).

The workflow will complete and report "Success" on the Console if it has run successfully. If an invalid parameter value is specified, an error is logged, and the workflow terminates in the "Failure" state.

Sample Scenarios

This topic shows you how to use various parameters to achieve the following database backup scenarios in your environment using the [Backup MS SQL Database](#) workflow:

Scenario 1: Create a Backup File that is Not Encrypted or Compressed

This is the simplest SQL Server database backup scenario. In this example, the backup file is stored on a network share.

| Step Name | Parameter Name | Example Value |
|---|------------------------|--|
| Gather Parameters for MS SQL Database Backup | Target Backup Path | \\WIN-DOMAIN-CTRL\Backups |
| Gather Advanced Parameters for MS SQL Database Backup | Windows Share Password | WinSharePwd 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 60). |
| | Windows Share User | WIN\Administrator |

Be sure that the default values for all remaining parameters are appropriate for your environment (see [Parameters for Backup MS SQL Database](#) on page 23).

Scenario 2: Create a Backup File that is Encrypted and Compressed

This scenario requires you to specify the encryption password and compression option for the database backup file. In this example, the backup file is stored in locally on the server that hosts the target database.

| Step Name | Parameter Name | Example Value |
|---|----------------------------|----------------------------------|
| Gather Parameters for MS SQL Database Backup | Target Backup Path | c:\Backups\mytestdb_03122012.bak |
| Gather Advanced Parameters for MS SQL Database Backup | Backup Encryption Password | EncryptMyBackup |
| | Compress Backup File | YES |

Be sure that the default values for all remaining parameters are appropriate for your environment (see [Parameters for Backup MS SQL Database](#) on page 23).

Scenario 3: Create a Backup File, Perform an Integrity Check, and Configure Windows Domain User Using Runtime Parameters

This scenario runs an integrity check on the backup file after the backup is performed. In this example, the backup file is stored locally on the server that hosts the target database.

Note: You may want to run this workflow against a MS SQL instance that can only be accessed by a Windows user with a temporary password. By using a runtime parameter for the password, you can ensure that the password used is always the latest.

To specify the Windows domain user at the time you execute a deployment with runtime parameters, perform the following additional steps:

1. When you make a copy of the workflow, expand the appropriate step, and then set the Windows domain user parameters—Instance Account and Instance Password—to **- User selected -**.
2. When you create a deployment from the copy of the workflow, set the parameter types to **Runtime Value**.
3. When you execute the deployment, specify the Windows domain user account and password.

| Step Name | Parameter Name | Example Value |
|---|-------------------------|---|
| Gather Parameters for MS SQL Database Backup | Target Backup Path | c:\Backups\mytestdb_03122012.bak |
| Gather Advanced Parameters for MS SQL Database Backup | Perform Integrity Check | YES |
| | Instance Account | Domain\DomainUserAcct Note: Enter at runtime. |
| | Instance Password | DomainUserPswd Note: Enter at runtime. |

Be sure that the default values for all remaining parameters are appropriate for your environment (see [Parameters for Backup MS SQL Database](#) on the next page).

Parameters for Backup MS SQL Database

The following tables describe the required and optional input parameters for this workflow. Most of these parameters are not initially visible in a deployment (see [How to Expose Additional Workflow Parameters](#) on page 59). 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 MS SQL Database Backup

| Parameter Name | Default Value | Required | Description |
|--------------------|---------------|----------|--|
| Target Backup Path | no default | required | <p>Where the database backup file will be stored, either locally or on a network share. You can specify both the path and file name, or you can specify only the path.</p> <ul style="list-style-type: none"> If you specify a file name, it must end in <code>.bak</code>. If you do not specify a file name, the backup file name will have the following form: <code><dataBaseName>_<dateTime>.bak</code> where <code><dataBaseName></code> represents the name of the target database specified when the workflow runs, and <code><dateTime></code> is the date and time when the Run MS SQL Pre-Backup Validation step is executed. <p>If the file will be stored on a network share, the Windows Share User must have read and write access to that share.</p> <p>Note: Windows Share User is not exposed by default—see How to Expose Additional Workflow Parameters on page 59.</p> |

Additional Parameters Defined in this Step: Gather Advanced Parameters for MS SQL Database Backup

| Parameter Name | Default Value | Required | Description |
|----------------------------|---------------|----------|---|
| Backup Description | no default | optional | Text that describes this backup (up to 255 characters). |
| Backup Encryption Password | no default | optional | <p>To encrypt the backup file with a password, specify the password in this parameter.</p> <p>If you perform the backup using a password, you must also specify that password when you perform the restore.</p> |
| Backup Name | no default | optional | The name of this backup (up to 128 characters). |

Additional Parameters Defined in this Step: Gather Advanced Parameters for MS SQL Database Backup, continued

| Parameter Name | Default Value | Required | Description |
|-------------------------|---------------|----------|---|
| Compress Backup File | NO | optional | <p>If you specify YES, the backup file will be compressed. Valid values: YES or NO.</p> <p>Compression is supported on SQL Server 2008 Enterprise and later. If you are running SQL 2005, and this parameter is set to YES, the workflow will ignore this value and continue without compression.</p> |
| Expiration Date | no default | optional | <p>Date and time when the backup file expires and the backup data is no longer considered relevant. After this date and time, SQL Server is not prevented from overwriting this backup file.</p> <p>The Expiration Date must be specified in a format compatible with the configured system datetime format.</p> <p>If both the Retention Days and the Expiration Date parameters are specified, the Retention Days parameter takes precedence.</p> |
| Instance Account | no default | optional | The Windows account that will perform the backup operation. |
| Instance Password | no default | optional | The password for the Windows account that will perform the backup operation. |
| Perform Integrity Check | NO | optional | If you specify YES, the workflow will perform an integrity check on the database backup file. Valid values: YES or NO. |
| Retention Days | no default | optional | <p>Number of days after which the backup data is no longer considered relevant. After this number of days, SQL Server is not prevented from overwriting this backup file.</p> <p>If both the Retention Days and the Expiration Date parameters are specified, the Retention Days parameter takes precedence.</p> |
| Windows Share Password | no default | optional | Password for the user specified in Windows Share User. |
| Windows Share User | no default | optional | Windows user who can access the specified Windows network share and who will own (and write) the backup file. |

Restore MS SQL Database

This workflow enables you to restore a SQL Server database from a previously created database backup file that is stored locally, on a network share, or in the software repository.

If the database does not exist in the target instance, the workflow will create it. If the database already exists, you can specify whether you want the workflow to overwrite its contents. You can also specify whether existing database users should be re-created after the restore operation—in which case, any users included in the backup file are ignored.

Note: The parameters required to activate these options are hidden by default (see [How to Expose Additional Workflow Parameters](#) on page 59).

This workflow also provides a "simulation mode" where the Run MS SQL Pre-Restore Validation step is executed, but the restore is not performed. This is useful for testing or troubleshooting your parameter values.

The workflow performs extensive validation checks prior to and immediately after the restore operation to ensure that both the backup file and the restored database are valid.

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 Scenarios | Examples of typical parameter values for this workflow |
| Parameters for Restore MS SQL Database | List of input parameters for this workflow |

The process of deploying and running this workflow is the same for all scenarios, but the parameters required will differ depending on the specific scenario that you are implementing.

The workflow provides default values for most parameters. These default values are usually sufficient for a "typical" database restore. You can override the defaults by specifying parameter values in the deployment. You can also expose additional parameters in the workflow, if necessary, to accomplish more advanced scenarios.

Any parameters not explicitly specified in the deployment will have the default values listed in [Parameters for Restore MS SQL Database](#) on page 34 .

Prerequisites for this Workflow

The following prerequisites must be satisfied before you can run the [Restore MS SQL Database](#) workflow:

1. The service login for the SQL Server service must have read and write permissions on the backup file.
2. The server management agent must have login access to the target SQL Server instance. It must also have permission to create a new database and perform database consistency check (DBCC) commands on the restored database.
3. There must be sufficient space available on the target data and log disks. The workflow checks for this, and will fail if sufficient space is not available.

Additional Considerations

For information about prerequisites for SQL Server, refer to the [SQL Server Product Documentation](#) on page 52.

How this Workflow Works

This topic contains information about the [Restore MS SQL Database](#) workflow:

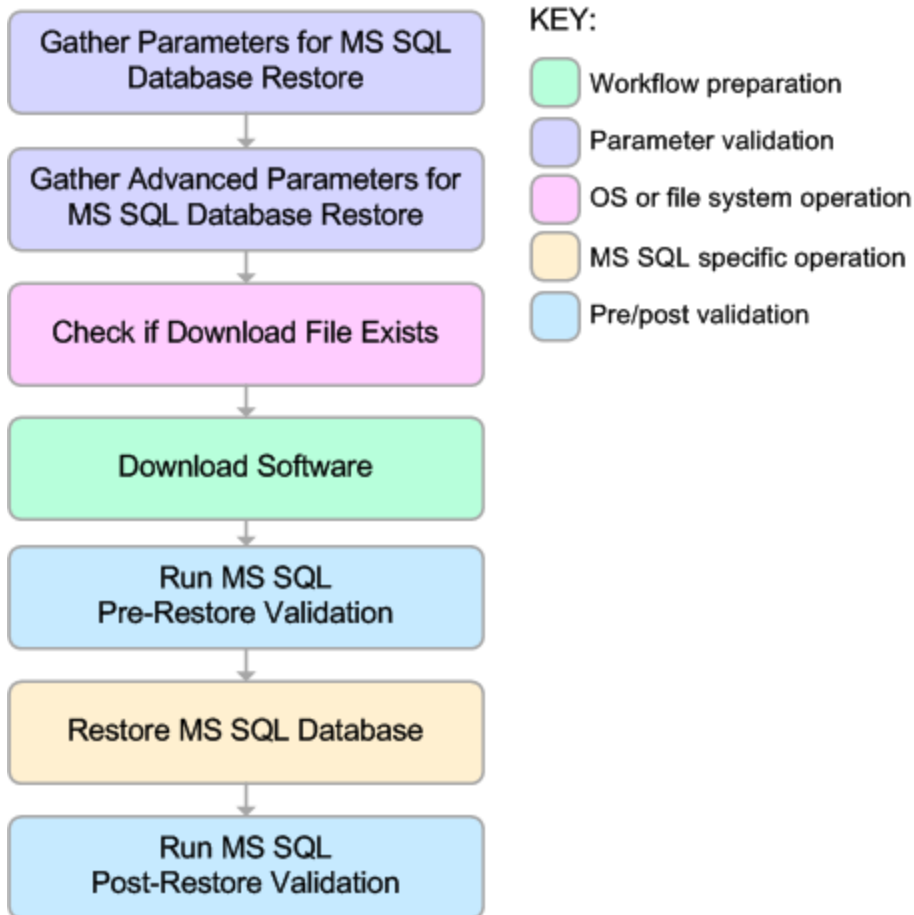
Validation Checks Performed

The workflow checks the following things prior to dumping the database. If any of these checks fails, the workflow fails.

1. All required parameters have values. If any required parameter does not have a value—either a value that you specify or a default value—the workflow fails in the Run MS SQL Pre-Restore Validation step.
2. The specified backup file either exists in the Download Target Destination directory or can be downloaded from the software repository.
3. The backup file is compatible with the target instance.
4. If the Custom Database Name parameter is specified, this database name complies with SQL Server database naming conventions.
5. The Download Target Destination is accessible, either locally or on a network share.
If the Download Target Destination is on a network share, the Windows Share User has read and write access the to share.
6. The target instance exists, and the workflow can connect to it.
7. Adequate disk space is available to restore the data and log files.
8. If custom paths are specified for the data or log files, the Run MS SQL Pre-Restore Validation step checks that they exist (and creates them if they don't), and ensures that the quantity of paths specified match the quantity of files in the backup file.

Steps Executed

The [Restore MS SQL Database](#) workflow includes the following steps. Each step must complete successfully before the next step can start. If a step fails, the workflow reports a failure, and all subsequent steps are skipped.



Process Flow

This workflow performs the following tasks:

1. Performs the preliminary [validation checks](#) described above.
2. If Preserve Users and Roles was set to YES, creates the Roles Creation Script and the Users Creation Script script.
3. If not in simulation mode, performs the database restore operation to load the contents of the backup file.
4. Performs post-restore validation checks to ensure that the restored database is sound.
5. If Preserve Users and Roles was set to YES, re-creates any existing database users and roles.
6. If Reindex Restored Database was set to YES, re-indexes the database.

Tips and Best Practices

It is good practice to run basic database consistency checks (DBCCs) on the source database before you create the database backup to ensure that there are no internal errors in the database.

If you find errors in the source database, be sure to fix them before you create the database backup. This workflow does not have the ability to diagnose or remediate problems in the database prior to performing the database backup.

How to Run this Workflow

This topic explains how to customize and run the [Restore MS SQL Database](#) workflow in your environment.

Note: Prior to running this workflow, review the [Prerequisites for this Workflow](#), and ensure that all requirements are satisfied.

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

To customize and run the Restore MS SQL Database 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. This is the minimum set of parameters required to run this workflow.

| Parameter Name | Default Value | Description |
|-----------------------------|---------------|--|
| Database Backup File | no default | <p>Path where the database backup file is (or will be) stored, either locally or on a network share.</p> <p>If the file already exists locally or on a network share, specify the file name in this parameter and the path in the Download Target Destination parameter.</p> <p>If the file does not yet exist locally or on a network share, it will be downloaded into this location from the software repository.</p> <p>If the file is (or will be) stored on a network share, the Windows Share User must have read and write access to that share.</p> <p>Note: Windows Share User and Windows Share Password are not exposed by default—see How to Expose Additional Workflow Parameters on page 59.</p> |
| Download Target Destination | no default | <p>The directory where the database backup file will be stored.</p> <p>If the database backup file does not yet exist in this directory, it will be downloaded from the software repository and stored in this directory.</p> |

See [Parameters for Restore MS SQL Database](#) on page 34 for detailed descriptions of all input parameters for this workflow, including default values.

3. In the workflow editor, expose any additional parameters that you need (see [How to Expose Additional Workflow Parameters](#) on page 59). You will specify values for those parameters when you create the deployment or at runtime.
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 (or set the type to Runtime Value) 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, specifying any runtime parameters (see "Run Your Workflow" in *HP DMA Quick Start Tutorial* for instructions).

The workflow will complete and report "Success" on the Console if it has run successfully. If an invalid parameter value is specified, an error is logged, and the workflow terminates in the "Failure" state.

Sample Scenarios

This topic shows you how to use various parameters to achieve the following database backup scenarios in your environment using the [Restore MS SQL Database](#) workflow:

Scenario 1: Restore from a Backup File that is Not Encrypted or Compressed

This is the simplest SQL Server database restore scenario. In this example, the backup file has been stored on a network share (or will be downloaded from the software repository and stored on the share).

Note that the Windows Share User and Windows Share Password are specified in this scenario. This is not required, but it facilitates the disk space check on the network path. If you do not specify this parameter, this check is skipped.

| Step Name | Parameter Name | Example Value |
|--|-----------------------------|--|
| Gather Parameters for MS SQL Database Restore | Database Backup File | mytestdb_03122012.bak |
| | Download Target Destination | \\WIN-DOMAIN-CTRL\Backups |
| Gather Advanced Parameters for MS SQL Database Restore | Windows Share Password | WinSharePwd 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 60). |
| | Windows Share User | WIN\Administrator |

Be sure that the default values for all remaining parameters are appropriate for your environment (see [Parameters for Restore MS SQL Database](#) on page 34).

Scenario 2: Restore from a Backup File that is Encrypted and Compressed

This scenario requires you to specify the encryption password for the database backup file. The workflow automatically handles the compression, so there is no need to specify the compression parameter. In this example, the backup file is stored locally on the server where the target instance resides.

| Step Name | Parameter Name | Example Value |
|--|----------------------------|----------------------------------|
| Gather Parameters for MS SQL Database Restore | Database Backup File | c:\Backups\mytestdb_03122012.bak |
| Gather Advanced Parameters for MS SQL Database Restore | Backup Encryption Password | EncryptMyBackup |

Be sure that the default values for all remaining parameters are appropriate for your environment (see [Parameters for Restore MS SQL Database](#) on the next page).

Scenario 3: Overwrite an Existing Database, Restore Users, and Configure Windows Domain User Using Runtime Parameters

This scenario overwrites an existing database and restores any existing users after the restore is performed. In this example, the backup file is stored locally on the server where the target database resides.

Note: You may want to run this workflow against a MS SQL instance that can only be accessed by a Windows user with a temporary password. By using a runtime parameter for the password, you can ensure that the password used is always the latest.

To specify the Windows domain user at the time you execute a deployment with runtime parameters, perform the following additional steps:

1. When you make a copy of the workflow, expand the appropriate step, and then set the Windows domain user parameters—Instance Account and Instance Password—to **- User selected -**.
2. When you create a deployment from the copy of the workflow, set the parameter types to **Runtime Value**.
3. When you execute the deployment, specify the Windows domain user account and password.

| Step Name | Parameter Name | Example Value |
|--|-----------------------------|---|
| Gather Parameters for MS SQL Database Restore | Database Backup File | c:\Backups\mytestdb_03122012.bak |
| Gather Advanced Parameters for MS SQL Database Restore | Overwrite Existing Database | YES |
| | Preserve Users and Roles | YES |
| | Instance Account | Domain\DomainUserAcct Note: Enter at runtime. |
| | Instance Password | DomainUserPswd Note: Enter at runtime. |

Be sure that the default values for all remaining parameters are appropriate for your environment (see [Parameters for Restore MS SQL Database](#) on the next page).

Parameters for Restore MS SQL Database

The following tables describe the required and optional input parameters for this workflow. Most of these parameters are not initially visible in a deployment (see [How to Expose Additional Workflow Parameters](#) on page 59). 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 MS SQL Database Restore

| Parameter Name | Default Value | Required | Description |
|-----------------------------|---------------|----------|--|
| Database Backup File | no default | required | <p>Path where the database backup file is (or will be) stored, either locally or on a network share.</p> <p>If the file already exists locally or on a network share, specify the file name in this parameter and the path in the Download Target Destination parameter.</p> <p>If the file does not yet exist locally or on a network share, it will be downloaded into this location from the software repository.</p> <p>If the file is (or will be) stored on a network share, the Windows Share User must have read and write access to that share.</p> <div style="border: 1px solid gray; padding: 5px; background-color: #f0f0f0;"> <p>Note: Windows Share User and Windows Share Password are not exposed by default—see How to Expose Additional Workflow Parameters on page 59.</p> </div> |
| Download Target Destination | no default | required | <p>The directory where the database backup file will be stored.</p> <p>If the database backup file does not yet exist in this directory, it will be downloaded from the software repository and stored in this directory.</p> |

Additional Parameters Defined in this Step: Gather Advanced Parameters for MS SQL Database Restore

| Parameter Name | Default Value | Required | Description |
|----------------------------|---------------|----------|--|
| Backup Encryption Password | no default | optional | To decrypt a backup file that was encrypted with a password, specify the password in this parameter. |
| Data File Locations | no default | optional | <p>Comma-delimited list of directories or full file paths for each data file in the backup file.</p> <p>Use Run Simulation Only mode to discover the number of data files in the backup file. If this parameter is not specified, the original data file names and paths will be used.</p> |

Additional Parameters Defined in this Step: Gather Advanced Parameters for MS SQL Database Restore , continued

| Parameter Name | Default Value | Required | Description |
|-----------------------------|---------------|----------|---|
| Database Name | no default | optional | To restore the database from the backup file using a different database name, specify that name here. If this parameter is not specified, the original database name will be used. |
| Instance Account | no default | optional | The Windows account that will perform the restore operation. |
| Instance Password | no default | optional | The password for the Windows account that will perform the restore operation. |
| Log File Locations | no default | optional | Comma-delimited list of directories or full file paths for each log file in the backup file. Use Run Simulation Only mode to discover the number of log files in backup file. If this parameter is not specified, the original log file names and paths will be used. |
| Overwrite Existing Database | NO | optional | If set to YES, and the database already exists, the workflow will overwrite the database. Valid values: YES or NO. If set to NO, and the database already exists, the workflow will fail. |
| Preserve Users and Roles | NO | optional | If set to YES, and the database already exists, the workflow will try to preserve the database users and role. Valid values: YES or NO. |
| Reindex Restored Database | NO | optional | If set to YES, the workflow will re-index the database after the restore operation is successfully completed. Valid values: YES or NO. Re-indexing improves database performance. More specifically , it recreates all the table look-ups and performance tunes them according to the new environment. This is important when you are restoring a database in a new environment that it has never seen before. |
| Run Simulation Only | NO | optional | If set to YES, the workflow will only run the Pre-Restore Validation step. It will not attempt to restore the database. Use this mode to discover the original data and log files used for the database backup. Valid values: YES or NO. |

Backup and Restore MS SQL Database

This workflow enables you to backup the contents of a SQL Server database (the source database) into a file and restore a database in another instance (the target instance) using the contents of that backup file. The source database and target instance are specified at run time.

This is a bridged execution workflow. The first group of steps performs the backup on the specified source database. The second group of steps performs the restore on the specified database in the specified target instance.

You can specify various options, including whether the backup file is compressed or encrypted with a password.

Note: Bridged execution workflows work on one target level (server, instance, or database). This workflow runs on the database level at all times. When choosing a target instance at run time, you will actually see a list of databases that reside on each instance. You can select any database in the target instance where you want to perform the restore.

If you specify the RESTORE - Database Name parameter, the workflow will use that database. If you do not specify the RESTORE - Database Name parameter, the workflow will use the original database name from the backup.

If the database specified in the Database Name parameter does not exist in the target instance, the workflow will create it. If the database already exists, you can specify whether you want the workflow to overwrite its contents. You can also specify whether existing database users should be re-created after the restore operation—in which case, any users included in the backup file are ignored .

This workflow also provides a "simulation mode" where the Run MS SQL Pre-Restore Validation step is executed, but the restore is not performed. This is useful for testing or troubleshooting your parameter values.

The workflow performs extensive validation checks prior to and immediately after both the backup and restore operations to ensure that both the backup file and the restored database are valid.

See [Parameters for Backup and Restore MS SQL Database](#) on page 48 for a list of backup and restore options that you can specify. Many of these parameters are hidden by default (see [How to Expose Additional Workflow Parameters](#) on page 59).

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 Scenarios | Examples of typical parameter values for this workflow |
| Parameters for Backup and Restore MS SQL Database | List of input parameters for this workflow |

The process of deploying and running this workflow is the same for all scenarios, but the parameters required will differ depending on the specific scenario that you are implementing.

The workflow provides default values for most parameters. These default values are usually sufficient for a "typical" database backup and restore. You can override the defaults by specifying parameter values in the deployment. You can also expose additional parameters in the workflow, if necessary, to accomplish more advanced scenarios.

Any parameters not explicitly specified in the deployment will have the default values listed in [Parameters for Backup and Restore MS SQL Database](#) on page 48 .

Prerequisites for this Workflow

The following prerequisites must be satisfied before you can run the [Restore MS SQL Database](#) workflow:

1. The service login for the SQL Server service must have read and write permissions on the location where the backup file will be stored.
2. The server management agent must have login access to the target SQL Server instance. It must also have permission to create a new database and perform database consistency check (DBCC) commands on the restored database.
3. There must be sufficient space available to create the backup file and restore the database (including both data and logs). The workflow checks for this, and will fail if sufficient space is not available.

Additional Considerations

For information about prerequisites for SQL Server, refer to the [SQL Server Product Documentation](#) on page 52.

How this Workflow Works

This topic contains information about the [Backup and Restore MS SQL Database](#) workflow:

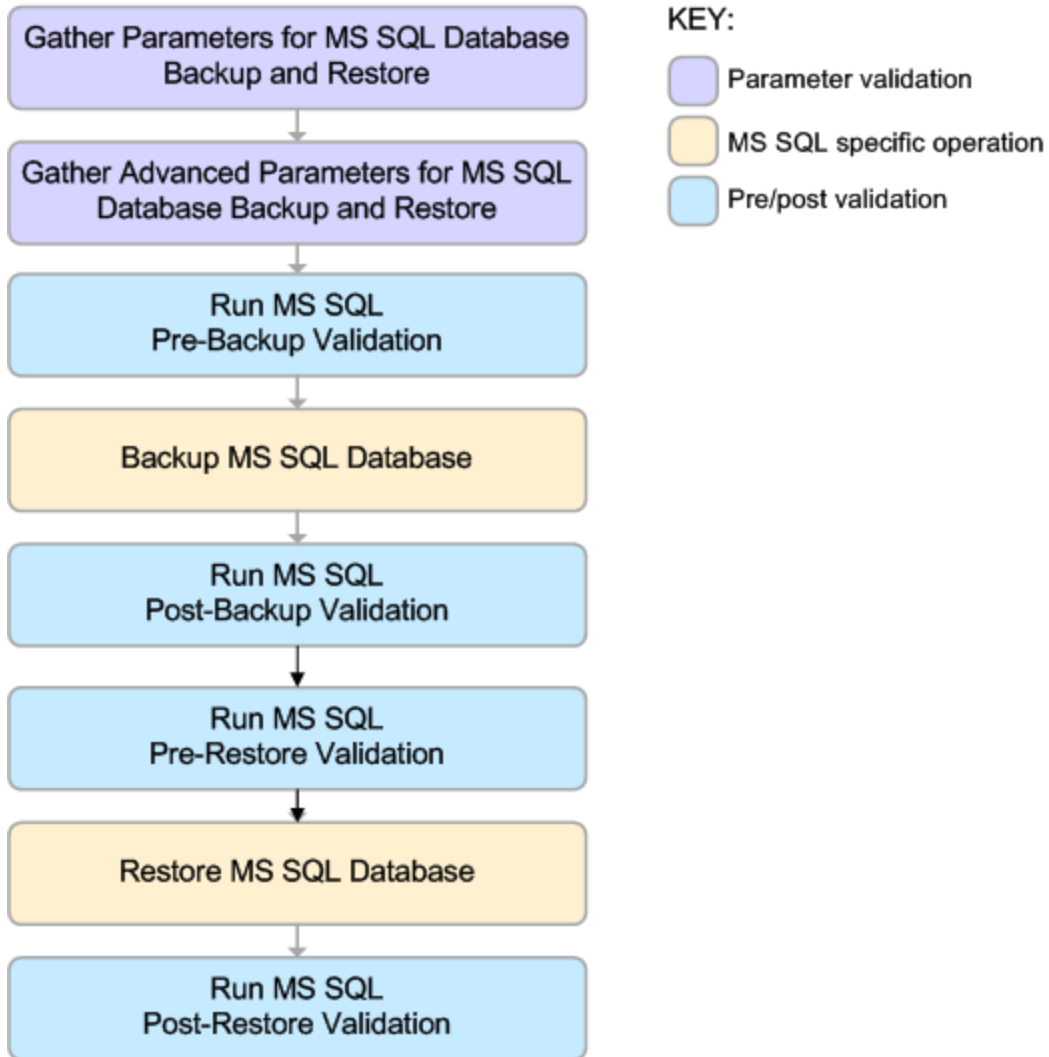
Validation Checks Performed

The workflow checks the following things prior to dumping the database. If any of these checks fails, the workflow fails.

1. All required parameters have values. If any required parameter does not have a value—either a value that you specify or a default value—the workflow fails in either the Run MS SQL Pre-Backup Validation step or the Run MS SQL Pre-Restore Validation step.
2. The Working Path is accessible, either locally or on a network share.
If the Working Path is on a network share, the BACKUP - Windows Share User has read and write access the share.
3. The source database is compatible with the target instance.
4. If the RESTORE - Database Name parameter is specified, this database name complies with SQL Server database naming conventions.
5. The target instance exists, and the workflow can connect to it.
6. Adequate disk space is available to backup and restore the data and log files.

Steps Executed

The [Backup and Restore MS SQL Database](#) workflow includes the following steps. Each step must complete successfully before the next step can start. If a step fails, the workflow reports a failure, and all subsequent steps are skipped.



Process Flow

This workflow performs the following tasks:

1. Performs the preliminary [validation checks](#) described above.
2. If RESTORE - Preserve Users and Roles was set to YES, creates the Roles Creation and Users Creation scripts.
3. Performs the database backup operation to create the backup file.
4. Performs post-backup validation checks to ensure that all required parameters had valid values.
5. If BACKUP - Perform Integrity Check was set to YES, performs an integrity check on the backup file.
6. If not in simulation mode, performs the database restore operation to load the contents of the backup file.
7. Performs post-restore validation checks to ensure that the restored database is sound.
8. If RESTORE - Preserve Users and Roles was set to YES, re-creates any existing database users and roles.
9. If RESTORE - Reindex Restored Database was set to YES, re-indexes the database.

Tips and Best Practices

It is good practice to run basic database consistency checks (DBCCs) on the source database before you create the database backup to ensure that there are no internal errors in the database.

If you find errors in the source database, be sure to fix them before you run this workflow. This workflow does not have the ability to diagnose or remediate problems in the database prior to performing the database backup.

How to Run this Workflow

This topic explains how to customize and run the [Backup and Restore MS SQL Database](#) workflow in your environment.

Note: Prior to running this workflow, review the [Prerequisites for this Workflow](#), and ensure that all requirements are satisfied.

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

To customize and run the Backup and Restore MS SQL Database 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 parameter. This is the minimum set of parameters required to run this workflow.

| Parameter Name | Default Value | Description |
|----------------|---------------|--|
| Working Path | no default | <p>The directory where the database backup file will be stored. This can be a directory or a full file path. This path must be accessible to both the source and target servers.</p> <p>Be sure to specify this parameter in network share notation (for example: \\<network share>\). A network path can be located on a target server, but it should always be referenced using network share notation instead of local folder notation (for example: C:\<folder>).</p> <p>You specify this parameter in the deployment.</p> |

See [Parameters for Backup and Restore MS SQL Database](#) on page 48 for detailed descriptions of all input parameters for this workflow, including default values.

3. In the workflow editor, expose any additional parameters that you need (see [How to Expose Additional Workflow Parameters](#) on page 59). You will specify values for these parameters when you create the deployment or at runtime.
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).
 - a. On the Targets tab, select all the target servers—both source and destination—that will participate in this database refresh. The targets that you select here will be available in the Target Parameters drop-down menus on the Run page (see [step 7](#)).
 - b. On the Parameters tab, specify values (or set the type to Runtime Value) for the required parameters listed in [step 2](#) and any additional parameters that you exposed in [step 3](#). You do not need to specify values for those parameters whose default values are appropriate for your environment.
6. Save the deployment (click **Save** in the lower right corner).
7. Run the workflow using this deployment, specifying any runtime parameters (see "Run Your

Workflow" in *HP DMA Quick Start Tutorial* for instructions).

On the Run page, select the following targets from the respective drop-down menus:

| Parameter Name | Default | Description |
|-----------------|------------|--|
| Source Database | no default | The database from which the backup file will be created. You specify this parameter at run time. |
| Target Instance | no default | The instance where the database will be restored from the backup file. You specify this parameter at run time. Note: Bridged execution workflows work on one target level (server, instance, or database). This workflow runs on the database level at all times. When choosing a target instance at run time, you will actually see a list of databases that reside on each instance. You can select any database in the target instance where you want to perform the restore. If you specify the RESTORE - Database Name parameter, the workflow will use that database. If you do not specify the RESTORE - Database Name parameter, the workflow will use the original database name from the backup. |

The workflow will complete and report "Success" on the Console if it has run successfully. If an invalid parameter value is specified, an error is logged, and the workflow terminates in the "Failure" state.

Sample Scenarios

This topic shows you how to use various parameters to achieve the following database backup scenarios in your environment using the [Backup and Restore MS SQL Database](#) workflow:

Scenario 1: Backup and Restore Using a Backup File that is Not Encrypted or Compressed

This is the simplest SQL Server database backup and restore scenario. In this example, the backup file is stored on a network share.

| Step Name | Parameter Name | Example Value |
|--|-----------------|---------------------------|
| Gather Parameters for MS SQL Database Backup and Restore | Source Database | Specified at run time. |
| | Target Instance | Specified at run time. |
| | Working Path | \\WIN-DOMAIN-CTRL\Backups |

Be sure that the default values for all remaining parameters are appropriate for your environment (see [Parameters for Backup and Restore MS SQL Database](#) on page 48).

Scenario 2: Backup and Restore—Overwrite Existing Database and Preserve Existing Users

This scenario requires you to specify the two restore parameters that instruct the workflow to overwrite the existing database and then re-create existing users and roles. In this example, the backup file is stored on a network share.

Note that the BACKUP - Windows Share User and BACKUP - Windows Share Password are specified. This is not required, but it facilitates the disk space check on the network path. If you do not specify this parameter, this check is skipped.

| Step Name | Parameter Name | Example Value |
|---|---------------------------------------|---|
| Gather Parameters for MS SQL Database Backup and Restore | Source Database | Selected at run time. |
| | Target Instance | Selected at run time. |
| | Working Path | \\WIN-DOMAIN-CTRL\Backups |
| Gather Advanced Parameters for MS SQL Database Backup and Restore | BACKUP - Windows Share User | WIN\Administrator |
| | BACKUP - Windows Share Password | WinSharePwd <div style="border: 1px solid gray; background-color: #f0f0f0; padding: 5px;"> <p>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 60).</p> </div> |
| | RESTORE - Overwrite Existing Database | YES |
| | RESTORE - Preserve Users and Roles | YES |

Be sure that the default values for all remaining parameters are appropriate for your environment (see [Parameters for Backup and Restore MS SQL Database](#) on page 48).

Scenario 3: Perform a Backup, Simulate a Restore, and Configure Windows Domain User Using Runtime Parameters

This scenario overwrites an existing database and restores any existing users after the restore is performed. In this example, the backup file is stored on a network share.

Note: You may want to run this workflow against a MS SQL instance that can only be accessed by a Windows user with a temporary password. By using a runtime parameter for the password, you can ensure that the password used is always the latest.

To specify the Windows domain user at the time you execute a deployment with runtime parameters, perform the following additional steps:

1. When you make a copy of the workflow, expand the appropriate step, and then set the following Windows domain user parameters to - **User selected** -:
 BACKUP - Instance Account
 BACKUP - Instance Password
 RESTORE - Instance Account
 RESTORE - Instance password
2. When you create a deployment from the copy of the workflow, set the parameter types to **Runtime Value**.
3. When you execute the deployment, specify the Windows domain user account and password.

| Step Name | Parameter Name | Example Value |
|---|---------------------------------|--|
| Gather Parameters for MS SQL Database Backup and Restore | Source Database | Selected at run time. |
| | Target Instance | Selected at run time. |
| | Working Path | \\WIN-DOMAIN-CTRL\Backups |
| Gather Advanced Parameters for MS SQL Database Backup and Restore | BACKUP - Windows Share User | WIN\Administrator |
| | BACKUP - Windows Share Password | WinSharePwd 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 60). |

| Step Name | Parameter Name | Example Value |
|---|-----------------------------|---|
| Gather Advanced Parameters for MS SQL Database Backup and Restore (continued) | ALL - Run Simulation Only | YES |
| | BACKUP - Instance Account | Domain\DomainUserAcct Note: Enter at runtime. |
| | BACKUP - Instance Password | DomainUserPswd Note: Enter at runtime. |
| | RESTORE - Instance Account | Domain\DomainUserAcct Note: Enter at runtime. |
| | RESTORE - Instance Password | DomainUserPswd Note: Enter at runtime. |

Be sure that the default values for all remaining parameters are appropriate for your environment (see [Parameters for Backup and Restore MS SQL Database](#) on the next page).

Parameters for Backup and Restore MS SQL Database

The following tables describe the required and optional input parameters for this workflow. Most of these parameters are not initially visible in a deployment (see [How to Expose Additional Workflow Parameters](#) on page 59). 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 Backup and Restore MS SQL Database

| Parameter Name | Default Value | Required | Description |
|-----------------|---------------|----------|---|
| Source Database | no default | required | The database from which the backup file will be created. You specify this parameter at run time. |
| Target Instance | no default | required | The instance where the database will be restored from the backup file. You specify this parameter at run time. <div style="background-color: #f0f0f0; padding: 5px;"> <p>Note: Bridged execution workflows work on one target level (server, instance, or database). This workflow runs on the database level at all times. When choosing a target instance at run time, you will actually see a list of databases that reside on each instance. You can select any database in the target instance where you want to perform the restore.</p> <p>If you specify the RESTORE - Database Name parameter, the workflow will use that database. If you do not specify the RESTORE - Database Name parameter, the workflow will use the original database name from the backup.</p> </div> |
| Working Path | no default | required | The directory where the database backup file will be stored. This can be a directory or a full file path. This path must be accessible to both the source and target servers. Be sure to specify this parameter in network share notation (for example: \\<network share>\). A network path can be located on a target server, but it should always be referenced using network share notation instead of local folder notation (for example: C:\<folder>). You specify this parameter in the deployment. |

Additional Parameters Defined in this Step: Gather Advanced Parameters for Backup and Restore MS SQL Database

| Parameter Name | Default Value | Required | Description |
|----------------------------------|---------------|----------|--|
| ALL - Encryption Password | no default | optional | Password used to encrypt and decrypt the backup file. To decrypt a backup file that was encrypted with a password, specify the password in this parameter. |
| ALL - Run Simulation Only | No | optional | If set to YES, the workflow will only run the Pre-Restore Validation step. It will not attempt to restore the database. Use this mode to discover the original data and log files used for the database backup. Valid values: YES or NO. |
| BACKUP - Backup Description | no default | optional | Text that describes this backup (up to 255 characters). |
| BACKUP - Backup Name | no default | optional | The name of this backup (up to 128 characters). |
| BACKUP - Compress Backup File | NO | optional | If you specify YES, the backup file will be compressed. Valid values: YES or NO. Compression is supported on SQL Server 2008 Enterprise and later. |
| BACKUP - Expiration Date | no default | optional | Date and time when the backup file expires and the backup data is no longer considered relevant. After this date and time, SQL Server is not prevented from overwriting this backup file. The Expiration Date must be specified in a format compatible with the configured system datetime format. If both the Retention Days and the Expiration Date parameters are specified, the Retention Days parameter takes precedence. |
| BACKUP - Instance Account | no default | optional | The Windows account that will perform the backup operation. |
| BACKUP - Instance Password | no default | optional | The password for the Windows account that will perform the backup operation. |
| BACKUP - Perform Integrity Check | NO | optional | If you specify YES, the workflow will perform an integrity check on the database backup file. Valid values: YES or NO. |

Additional Parameters Defined in this Step: Gather Advanced Parameters for Backup and Restore MS SQL Database, continued

| Parameter Name | Default Value | Required | Description |
|---------------------------------------|---------------|----------|---|
| BACKUP - Retention Days | no default | optional | Number of days that must elapse before this backup file can be overwritten by SQL Server. If both the Retention Days and the Expiration Date parameters are specified, the Retention Days parameter takes precedence. |
| BACKUP - Windows Share Password | no default | optional | Password for the user specified in Windows Share User. |
| BACKUP - Windows Share User | no default | optional | Windows user who can access the specified Windows network share and who will own (and write) the backup file. |
| RESTORE - Data File Locations | no default | optional | Comma-delimited list of directories or full file paths for each data file in the backup file. Use Run Simulation Only to discover the number of data files in backup file. If this parameter is not specified, the original data file name will be used. |
| RESTORE - Database Name | no default | optional | To restore the database from the backup file using a different database name, specify that name here. If this parameter is not specified, the original database name will be used. |
| RESTORE - Download Target Destination | no default | optional | The directory where the database backup file will be stored. |
| RESTORE - Instance Account | no default | optional | The Windows account that will perform the restore operation. |
| RESTORE - Instance Password | no default | optional | The password for the Windows account that will perform the restore operation. |
| RESTORE - Log File Locations | no default | optional | Comma-delimited list of directories or full file paths for each log file in the backup file. Use Run Simulation Only mode to discover the number of log files in backup file. If this parameter is not specified, the original log file name will be used. |
| RESTORE - Overwrite Existing Database | NO | optional | If set to YES, and the database already exists, the workflow will overwrite the database. Valid values: YES or NO. |

Additional Parameters Defined in this Step: Gather Advanced Parameters for Backup and Restore MS SQL Database, continued

| Parameter Name | Default Value | Required | Description |
|-------------------------------------|---------------|----------|--|
| RESTORE - Preserve Users and Roles | NO | optional | If set to YES, and the database already exists, the workflow will overwrite the database. Valid values: YES or NO. |
| RESTORE - Reindex Restored Database | NO | optional | <p>If set to YES, the workflow will re-index the database after the restore operation is successfully completed. Valid values: YES or NO.</p> <p>Re-indexing improves database performance. More specifically , it recreates all the table look-ups and performance tunes them according to the new environment. This is important when you are restoring a database in a new environment that it has never seen before.</p> |

Chapter 3: Reference Information

This page shows you where to find additional information about the SQL Server products discussed in this guide and about HP DMA.

SQL Server Product Documentation

For information about SQL Server, including prerequisites, see the Microsoft SQL Server documentation available at the following web site:

<http://msdn.microsoft.com/en-us/library>

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 this Solution is Organized](#) on the next page
- [How to Expose Additional Workflow Parameters](#) on page 59
- [How to Use a Policy to Specify Parameter Values](#) on page 60
- [How to Import a File into the Software Repository](#) on page 63

How this Solution is Organized

In HP DMA, a workflow executes a process—such as installing a software product or creating a database.

A solution pack contains one or more related workflow templates. This solution contains the following workflow templates:

Backup MS SQL Database

Use this solution to backup a specific database into a backup file. [more info](#)

You can specify various options for the backup operation, including whether the backup file is compressed or encrypted with a password.

The workflow performs extensive validation checks prior to and immediately after the backup operation to ensure that the backup file is valid. The workflow will perform an additional integrity check on the backup file if you set the Perform Integrity Check parameter to YES.

The workflow will perform a basic database backup where most parameters have default values. You can override these default values by specifying additional parameter values in the deployment. The input parameter values that you specify are validated before the backup begins.

Restore MS SQL Database

Use this solution to restore a new or existing database from a backup file that you provide. [more info](#)

This workflow enables you to restore a SQL Server database from a previously created database backup file that is stored locally, on a network share, or in the software repository.

If the database does not exist in the target instance, the workflow will create it. If the database already exists, you can specify whether you want the workflow to overwrite its contents. You can also specify whether existing database users should be re-created after the restore operation—in which case, any users included in the backup file are ignored.

The workflow will perform a basic database restore where most parameters have default values. You can override these default values by specifying additional parameter values in the deployment. The input parameter values that you specify are validated before the restore begins.

Backup and Restore MS SQL Database

Use this solution to backup the contents of a SQL Server database (the source database) into a file and restore a database in another instance (the target instance) using the contents of that backup file. [more info](#)

You can specify various options, including whether the backup file is compressed or encrypted with a password.

If the database specified in the Database Name parameter does not exist in the target instance, the workflow will create it. If the database already exists, you can specify whether you want the workflow to overwrite its contents. You can also specify whether existing database users should be re-created after the restore operation—in which case, any users included in the backup file are ignored .

What's Inside

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

The screenshot displays the HP Database & Middleware Automation web interface. At the top, there is a navigation bar with the HP logo and the title 'Database & Middleware Automation'. Below this, a menu bar contains links for 'Home', 'Automation', 'Reports', 'Environment', 'Solutions', and 'Setup'. A secondary menu bar includes 'Workflows', 'Steps', 'Functions', 'Policies', 'Deployments', 'Run', 'Console', and 'History'. The main content area is titled 'Backup MS SQL Database' and features four tabs: 'Documentation' (selected), 'Workflow', 'Deployments', and 'Roles'. Under the 'Documentation' tab, the following information is presented:

- Name:** Backup MS SQL Database
- Tags:**
- Type:** SQL Server
- Target level:** Database

The 'Documentation' section is divided into four sub-sections:

- Description:** This workflow will backup an existing database to a local or network share file. The default deployment will only show required parameters.
- Parameters:** By default, only the required parameters are shown on the deployment screen. All advanced parameters are hidden in the deployment screen by default. In order to activate an advanced parameter, go into the Workflow, and change the parameter mapping on the step "Gather Advanced Parameters for MS SQL Database Backup" from "Blank" to "User Input".
- Dependencies:** A SQL Server 2005/2008/2008 R2 instance should already be provisioned. Database backup path should be accessible locally, or on Windows network share.
- Results Verification:** In the last step, the workflow verifies that the backup file exists and is accessible.

At the bottom right of the documentation area, there are links for [HELP](#) and [PDF](#). The footer of the interface includes a 'Copy' button, an 'EXPORT' button, an 'EXTRACT POLICY' button, and a lock icon next to the text 'HP DMA DATABASE REFRESH SOLUTION PACK'.

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

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 also displayed in the following locations in the HP DMA web interface:

- On the Workflow tab for each workflow.

- On the Parameters tab for each step in the workflow

The screenshot shows the HP Database & Middleware Automation web interface. The top navigation bar includes 'Home', 'Automation', 'Reports', 'Environment', 'Solutions', and 'Setup'. Below this, a secondary navigation bar shows 'Workflows', 'Steps', 'Functions', 'Policies', 'Deployments', 'Run', 'Console', and 'History'. The main heading is 'Gather Advanced Parameters for MS SQL Database Backup'. Below the heading are tabs for 'General', 'Action', 'Parameters', 'History', 'Workflows', 'Solutions', and 'Roles'. The 'Parameters' tab is active, displaying a list of parameters under 'INPUT PARAMETERS' and 'OUTPUT PARAMETERS'. The 'INPUT PARAMETERS' list includes: Backup Description, Backup Encryption Password, Backup Name, Compress Backup File, Expiration Date, Instance Account, Instance Password, Perform Integrity Check, Retention Days, Windows Share Password, and Windows Share User. The 'OUTPUT PARAMETERS' list includes: Backup Description and Backup Encryption Password.

- On the Parameters tab in the deployment (organized by step)

The screenshot shows the HP Database & Middleware Automation web interface. The top navigation bar includes 'Home', 'Automation', 'Reports', 'Environment', 'Solutions', and 'Setup'. Below this, a secondary navigation bar shows 'Workflows', 'Steps', 'Functions', 'Policies', 'Deployments', 'Run', 'Console', and 'History'. The main heading is 'Example Deployment'. Below the heading are tabs for 'Targets', 'Parameters', and 'Roles'. The 'Parameters' tab is active, displaying a form for 'Gather Parameters for MS SQL Database Backup'. The form includes a text input field for 'Target Backup Path:' and a dropdown menu set to 'Text'. Below the input field is a note: '*Required. The path to the database backup file in the Software Repository. If file already exists on local system, ensure that the filename is entered into this field, and the file's directory is entered into the "Download Target Destination" parameter.' At the bottom of the form are buttons for 'DELETE', 'RUN', 'Restore defaults', 'Copy', 'Save', and 'CANCEL'.

All parameters used by the workflows in this solution pack are also described in the [Workflow Details](#) for this solution pack.


Note: The workflow templates included in this solution pack are read-only and cannot be deployed. To use a workflow template, you must first create a copy of the template and then customize that copy for your environment (see "Create a Deployable Workflow" in *HP DMA Quick Start Tutorial*).

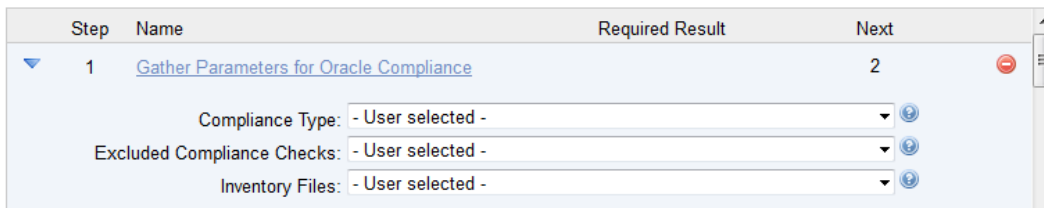
How to Expose Additional Workflow Parameters

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:



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 a 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

Data Pump

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

deployment

Deployments associate a workflow with a target environment in which a workflow runs. You can customize a deployment by

specifying values for any workflow parameters that are designated - User Selected - in the workflow. You must save a deployment before you can run the workflow. You can re-use a saved deployment as many times as you like.

destination

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

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.

Recovery Manager (RMAN)

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

role

Each HP DMA user has one or more roles. Roles are used to grant users permission to log in to and to access specific automation items and organizations. Roles are defined in 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.

source

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

source database

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

steps

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

T

target instance

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

W

workflow

A workflow automates the process followed for an operational procedure. Workflows contain steps, which are linked together to form business logic for a common task.

Workflows connect existing tasks in order to perform a new business process by building on existing best practices and processes.

workflow editor

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

workflow templates

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