



Standardize IBM DB2 Standalone Provisioning Using HP DMA

HP Database and Middleware Automation version 10.30

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Purpose

This paper describes how to use HP Database and Middleware Automation (HP DMA) to create a repeatable, standardized “gold image” for provisioning an IBM DB2 standalone environment, including the DB2 software, instance, and database.

Benefits of HP DMA

HP DMA automates many of the daily administrative tasks required to manage the lifecycle of relational databases and J2EE application servers. These tasks are complex, often manual, typically time-consuming, and frequently error-prone. HP DMA improves the efficiency of these administrative tasks, enabling administrators to deliver change faster with higher quality, better consistency, and improved reliability.

HP DMA equips you to do the following:

- Define and enforce standards for software installation
- Define an installation process once and reuse it repeatedly
- Leverage knowledge enterprise-wide
- Avoid human error

What HP DMA provisions for DB2

The HP DMA workflows described in this paper provision the following IBM DB2 features:

- DB2 Database software, installed
- DB2 Instances of types client, standalone, workgroup edition, or enterprise
- DB2 databases that use automatic storage or non-automatic storage type
- DB2 databases with catalog tablespace, user tablespace, and database tablespace
- DB2 databases managed by system

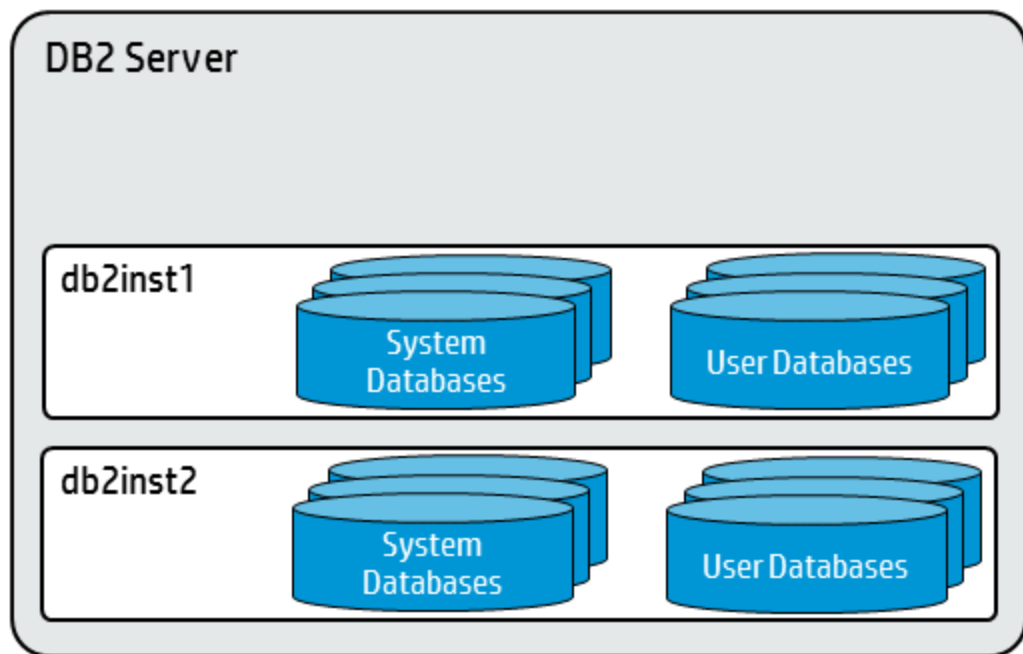
IBM Documentation

For more information about IBM DB2, refer to the following IBM documentation:

DB2 version	IBM documentation
10.1	IBM DB2 10.1
10.5	IBM DB2 10.5

Goal

This paper describes how to create the following DB2 configuration:



Note: You can create more complex DB2 environments by running multiple deployments of the HP DMA workflows.

Prerequisites

Before performing the procedures in this paper, your environment must meet the following minimum requirements:

- A server running one of the following operating systems (any version that is supported by IBM DB2 and HP DMA):
 - Linux
 - AIX

See the *HP DMA Support Matrix* for specific operating system versions, available at: softwaresupport.hp.com

- Installation media:
 - The DB2 server installation software binary file from IBM.
 - Installation software binary file must be available locally or available for download from the software repository.¹
- Storage:
 - 4-6 GB to provision the DB2 software.
 - 1 GB for each DB2 instance.
 - 1 GB for each DB2 database (more may be required for your configuration).
 - At least 1 GB for Catalog tablespace.
 - If automatic storage is on, 1 GB on the default directory where the default tablespace will be created.
- Unchallenged ability to become the OS administrator user (typically root on UNIX systems).
- The operating system kernel parameters and shared memory is properly configured.
- License for HP DMA.
- License for DB2 Database version 9.5, 9.7, 10.1, or 10.5.

Note: You have 90 days before you are required to purchase a DB2 license.

- The following workflow requirements:

Workflow	Requirements
DB2 - Provision Software	<ul style="list-style-type: none"> - The <code>sudo</code> package is installed on the target servers. - The target servers have the <code>gunzip</code> and <code>tar</code> utilities in the environment path.
DB2 - Provision Instance	<ul style="list-style-type: none"> - The user who runs the workflow with the server wrapper must have access to update the <code>/etc/service</code> file to configure the TCP/IP services for the DB2 network port.

¹For additional information, see [Alternative methods for specifying input files](#).

Workflow	Requirements
DB2 - Provision Database	<ul style="list-style-type: none"> - After creating the instances with the DB2 - Provision Instance workflow, the license must be activated before the database can use the instance. - The user who runs the workflow with the server wrapper must have access to create the install directory structure for databases and tablespaces. - The HP DMA database metadata is up-to-date for the DB2 Instance where the workflow is deployed.

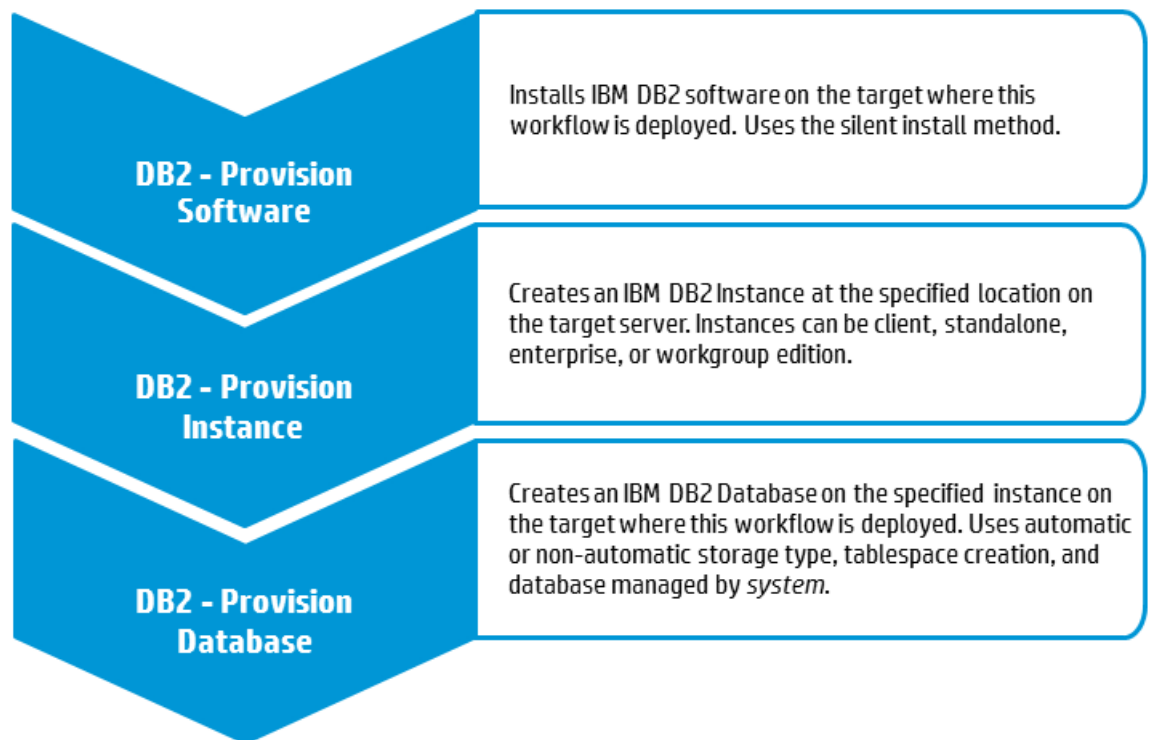
Refer to the [IBM Documentation](#) for the following:

- Complete installation and infrastructure requirements for IBM DB2.
- Acceptable types and range of values when using HP DMA advanced parameters to configure IBM DB2 settings.

Tip: For examples of how to meet these general requirements for DB2 10.5 on either a Red Hat Enterprise Linux server or an AIX server, see [How to meet prerequisites](#). You can adapt these instructions for other DB2 versions.

Process Overview

Use the following HP DMA workflows to standardize the process of provisioning DB2 software, instance, and database:



Note: These workflows support DB2 version 9.5, 9.7, 10.1, or 10.5 on a Red Hat Linux or AIX server.

The examples given are appropriate for provisioning DB2 10.5 on an AIX server with an 'Enterprise' edition instance.

Before running the DB2 - Provision Database workflow, the DB2 license must be activated for the instances that you create. For more information, see [Where can I learn more about IBM DB2 licenses?](#)

The following sections provide detailed information required to run each workflow.

Note: For additional information, see [How to run an HP DMA workflow](#).

Workflow 1: DB2 - Provision Software

This section provides detailed information required to run the DB2 - Provision Software workflow.

Solution pack

This workflow requires the HP DMA Database Provisioning Solution Pack.

Parameters to expose

None

Input parameters

When you deploy the DB2 - Provision Software workflow, specify input parameter values for the following steps.¹

Note: Bold text in the following tables indicates that you must specify a value for the parameter.

Step: Gather Parameters for Provision DB2 Software

Parameter	Description	Example Value
DB2 Installation Location	Required: Fully-qualified path where DB2 will be installed.	/opt/ibm/db2/V10.5
DB2 Software Binaries	Required: Name of the DB2 installer archive file. Obtained from IBM. If the file is not found in Staging Directory (the default is /tmp/db2_stage), it will be downloaded from the software repository. ²	v10.5_aix64_server_t.tar.gz

Step: Gather Advanced Parameters for Provision DB2 Software

Parameter	Description	Example Value
Staging Directory	Optional: Fully-qualified path of the directory where the DB2 installer will be extracted from archive. Will be cleaned up at end of workflow execution. Default: If no input is provided /tmp/db2_stage will be created.	/tmp/db2_stage

¹ HP DMA uses the latest (highest version number) of steps.

² For additional information, see [Alternative methods for specifying input files](#).

Workflow 2: DB2 - Provision Instance

This section provides detailed information required to run the DB2 - Provision Instance workflow.

Solution pack

This workflow requires the HP DMA Database Provisioning Solution Pack.

Parameters to expose

In the Gather Advanced Parameters for DB2 Provision Instance step, expose the DB2 Instance Owner parameter.¹

Tip: You do not need to expose any parameters for basic provisioning. Many optional parameters to customize the configuration are available in the Gather Advanced Parameters for DB2 Provision Instance step.

Input parameters

When you deploy the DB2 - Provision Instance workflow, specify input parameter values for the following steps.²

Note: Bold text in the following tables indicates that you must specify a value for the parameter.

Step: Gather Parameters for DB2 Provision Instance

Parameter	Description	Example Value
DB2 Installation Location	Required: Fully-qualified path of the DB2 installation where the new instance will be created.	<code>/opt/ibm/db2/V10.5</code> <i>Use the same value specified for the DB2 Installation Location parameter for the DB2 - Provision Software deployment.</i>
DMA Password	Required: Password for the HP DMA user.	●●●
Trust SSL Certificates	Deprecated: HP DMA no longer uses this workflow parameter to determine whether the workflow will trust any Secure Sockets Layer (SSL) certificate used to connect to the HP DMA web server. HP DMA now uses the <code>com.hp.dma.conn.trustAllCertificates</code> parameter in the <code>dma.xml</code> file.	

¹This parameter is hidden by default and must be exposed when you make a copy of the workflow. For additional information, see [How to expose hidden parameters](#).

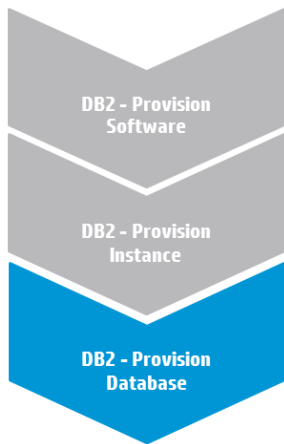
²HP DMA uses the latest (highest version number) of steps.

Step: Gather Advanced Parameters for DB2 Provision Instance

Parameter	Description	Example Value
DB2 Instance Owner	Optional: The OS user id of the DB2 instance owner. It will be the name of the instance. It is also used to construct some default values. ¹	v105user

¹This parameter is hidden by default and must be exposed when you make a copy of the workflow. For additional information, see [How to expose hidden parameters](#).

Workflow 3: DB2 - Provision Database



This section provides detailed information required to run the DB2 - Provision Database workflow.

Note: After creating the instances with the DB2 - Provision Instance workflow and before running the DB2 - Provision Database workflow, the DB2 license must be activated for the instances that you created. If the license is not activated, the Server will shut down. For more information, see [Where can I learn more about IBM DB2 licenses?](#)

Solution pack

This workflow requires the HP DMA Database Provisioning Solution Pack.

Parameters to expose

In the Gather Advanced Parameters For DB2 Provision Database step, expose the following parameters:¹

- Code Set
- Page Size
- Territory

Tip: You do not need to expose any parameters for basic provisioning. Many optional parameters to customize the configuration are available in the Gather Advanced Parameters For DB2 Provision Database step.

Input parameters

When you deploy the DB2 - Provision Database workflow, specify input parameter values for the following steps.

Note: Bold text in the following tables indicates that you must specify a value for the parameter.

Step: Gather Parameters for DB2 Provision Database

Parameter	Description	Example Value
Database Name	Required: Name of the DB2 database that you want to create. The name has a maximum of 8 characters without any special characters. There is no default. This parameter is used if the database is created using user provided CLP scripts.	cloud_db
DMA Password	Required: Password for the HP DMA user.	●●●
DMA User	Required: The HP DMA user name.	dmauser

¹ These parameters are hidden by default and must be exposed when you make a copy of the workflow. For additional information, see [How to expose hidden parameters.](#)

Step: Gather Parameters for DB2 Provision Database, continued

Parameter	Description	Example Value
Trust SSL Certificates	Deprecated: HP DMA no longer uses this workflow parameter to determine whether the workflow will trust any Secure Sockets Layer (SSL) certificate used to connect to the HP DMA web server. HP DMA now uses the <code>com.hp.dma.conn.trustAllCertificates</code> parameter in the <code>dma.xml</code> file.	

Step: Gather Advanced Parameters For DB2 Provision Database

Parameter	Description	Example Value
Code Set	Optional: The code set to be used for data entered into this database. After you create the database, you cannot change the specified code set. ¹	utf8
Page Size	Optional: The page size of the default buffer pool and the initial table spaces (SYSCATSPACE, TEMPSPACE1, USERSPACE1) when the database is created. Also the default page size for all future CREATE BUFFERPOOL and CREATE TABLESPACE statements. ¹ The format is <code><n></code> or <code><n>K</code> , where <code><n></code> is an integer. Valid values are: 4096, 8192, 16384, 32768, 4 K, 8 K, 16 K, or 32 K. If you use the <code><n>K</code> format, there must be at least one space between the integer and K. The default is 4096 bytes (or 4 K).	8 K
Territory	Optional: The territory or locale identifier to be used for data entered into this database. After you create the database, you cannot change the specified territory. The combination of the code set and territory must be valid. For example: US ¹	US

¹ This parameter is hidden by default and must be exposed when you make a copy of the workflow. For additional information, see [How to expose hidden parameters](#).

FAQs

What can cause the DB2 - Provision Software workflow to fail?

The workflow will fail if the DB2 server installation binary file is not available on the target or in the software repository.

To solve this problem, obtain the DB2 server installation binary file from IBM, store the file either on the target or in the software repository (for additional information see [Alternative methods for specifying input files](#)), and then specify the filename in the DB2 Software Binaries parameter for the DB2 - Provision Software workflow.

Can I use HP DMA to provision DB2 universal databases?

No. HP DMA can only provision DB2 server installations.

What types of DB2 instances can HP DMA create?

By default, HP DMA creates 'Enterprise' edition instances. To create DB2 use, client, or standalone instances, specify the appropriate value for the following parameter:¹

Workflow: DB2 - Provision Instance

Step: Gather Advanced Parameters for DB2 Provision Instance

Parameter: DB2 Instance Type

Can HP DMA create and use catalog, temporary, or user tablespaces managed by the system?

Yes. HP DMA can create and use catalog, temporary, or user tablespaces managed by the system by specifying values for the following parameters:²

Workflow: DB2 - Provision Database

Step: Gather Advanced Parameters For DB2 Provision Database

Parameters: Catalog Tablespace Path
Is Catalog Tablespace
Is Temporary Tablespace
Overhead
Prefetch Size
Temporary Tablespace Path
Transfer Rate

¹ This parameter is hidden by default and must be exposed when you make a copy of the workflow. For additional information, see [How to expose hidden parameters](#).

² These parameters are hidden by default and must be exposed when you make a copy of the workflow. For additional information, see [How to expose hidden parameters](#).

Can I use HP DMA to install a DB2 fix pack on the new DB2 database?

Yes. After you provision the DB2 database, use the DB2 - Apply Fixpack on DB2 Home workflow to apply the fix pack. For more information, see the *Achieve Patch Currency for IBM DB2 Environments Using HP DMA* white paper, available at:

softwaresupport.hp.com

Can I use HP DMA to support tablespaces managed by Database?

No. HP DMA does not support tablespaces (for creating catalog, user, or database) managed by Database.

Can I use HP DMA to specify the number of pages to be allocated for tablespace sizes?

No. HP DMA does not support specifying the number of pages to be allocated for tablespace sizes.

Can I use raw devices for provisioning a database and tablespaces?

No. HP DMA does not support any raw device for provisioning a database and tablespaces.

Where can I learn more about IBM DB2 licenses?

For more information about IBM DB2 licenses, refer to the following IBM documentation:

DB2 version	IBM license information
9.5	IBM DB2 9.5 license files
9.7	IBM DB2 9.7 license files
10.1	IBM DB2 10.1 license files
10.5	IBM DB2 10.5 license files

HP DMA does not automatically provision the IBM DB2 license.

Appendix A: How to meet prerequisites

This appendix provides instructions that you can use to fulfill the general requirements to provision IBM DB2 10.5 on either a Red Hat Enterprise Linux server or an AIX server.

Note: Adapt these instructions as appropriate for other IBM DB2 versions.

DB2 10.5 on Red Hat Enterprise Linux Server

1. Install (or update) the OS packages:

```
yum libpam.so.0
yum libaio.so.1
yum libstdc++.so.6.0.8
yum install pdksh
```

2. Set the kernel parameters as recommended by IBM:

- a. Edit the file `/etc/sysctl.conf`
- b. Set the parameter values as shown:

```
vm.swappiness=0
vm.overcommit_memory=0
```

3. Set and automate the kernel settings:

```
/sbin/sysctl -p
```

DB2 10.5 on AIX Server

Install the I/O Completion Ports (IOCP):

1. Run the command:

```
#smitty iocp
```

2. Select the Change/Show characteristics of the I/O Completion Ports.
3. Change the status of IOCP from **defined** to **available**.
4. Reboot the AIX server.
5. Verify the IOCP status.

Appendix B: Alternative methods for specifying input files

HP DMA provides alternative methods for specifying input files, either downloaded from the software repository or stored directly on the target server(s).

Method 1: The input files are in the software repository

1. Obtain the pertinent input files.
For example, download the DB2 installer archive file from IBM.
2. Import the files into the software repository. For additional information, see [How to import a file into the software repository](#).
3. When you create the workflow deployment, specify the filenames and/or directory names for the pertinent input parameters—the files should not exist on the target server(s).
4. When the deployment is executed, HP DMA determines that the input files do not exist on the target server(s) in the specified (or default) download location and then downloads them from the software repository. If the input files need to be processed (for example, unzipped), the new files are placed in the specified (or default) extract location.
5. All downloaded, extracted, and staged files are removed upon successful completion of the workflow.

Method 2: The input files are stored on each target server

1. Obtain the pertinent input files.
For example, download the DB2 installer archive file from IBM.
2. Copy the files to each target server into the specified (or default) download location.
3. When you create the workflow deployment, specify the filenames and/or directory names for the pertinent input parameters.
4. When the deployment is executed, HP DMA determines that the input files exist on the target server(s) in the specified (or default) download location. If the input file needs to be processed (for example, unzipped), the new files are placed in the specified (or default) extract location.
5. All extracted and staged files (and any downloaded files) are removed upon successful completion of the workflow.

Appendix C: 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(s) where the workflow is running. The following procedure shows 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 (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 SA Software Library:

1. Launch the SA Client from the Windows Start Menu.
By default, the SA Client is located in Start → All Programs → HP Software → HP Server Automation Client.
If the SA Client is not installed locally, follow the instructions under “Download and Install the HP SA Client Launcher” in the *HP Server Automation Single-Host Installation Guide* available at: softwaresupport.hp.com
2. In the navigation pane in the SA Client, select Library → By Folder. Select (or create) the folder where you want to store the file. Click **Import Software**.
3. In the Import Software dialog, browse to the file (or files) to import, select the character encoding, and then click **Open**. For the Type, select **Unknown**. Select (or browse to) the folder where you want to store the files. For the Platform, select all the operating systems. Click **Import**.
4. Click **Close** after the import completes.

Appendix D: How to run an HP DMA workflow


The following steps outline the general instructions to run an HP DMA workflow:

1. Import the specified HP DMA solution pack (if it is not already available).
2. Create a deployable copy of the workflow: Specify a name, add roles, optionally expose parameters (for additional information, see [How to expose hidden parameters](#)), and then **Save**.
3. Create a deployment: Specify a name, schedule, targets, and input parameters, and then **Save**.
4. Execute the deployment to run the workflow.
5. View the results to verify that the workflow ran correctly (refer to the online workflow documentation).

Note: For more information about running HP DMA workflows, see the *HP DMA Quick Start Tutorial* available at: softwaresupport.hp.com

Appendix E: How to expose hidden parameters

If you need to expose any hidden parameters, perform the following additional steps when you create a deployable copy of the workflow:

1. Click the Workflow tab.
2. Click the blue arrow  next to the pertinent step to expand the list of input parameters.
3. For the parameter that you want to expose, select **- User selected -** from the drop-down list. For example:



4. Repeat steps 2 and 3 for all the parameters that you would like to expose.
5. Save the copy of the workflow.

To learn more about HP Database and Middleware Automation visit

hp.com/go/dma

