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Workflows for IBM DB2

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IBM DB2

Workflow type	Workflow name
Compliance	DB2 - Compliance Audit
Configuring HADR	DB2 - Configuring HADR Database
	DB2 - Configure Tivoli SAMP On HADR Database
Provisioning DB2	DB2 - Provision Software v2
	DB2 - Provision Instance
	DB2 - Provision Database
Patching Patching	DB2 - Patch Fixpack
	DB2 - Rollback Fix Pack
Upgrading	DB2 - Upgrade Instance and Database

DB2 - Compliance Audit

The ["DB2 - Compliance Audit"](#) workflow enables you to audit a IBM DB2 LUW instance for compliance with the following security benchmark requirements:

- Center for Internet Security (CIS) security configuration benchmarks for DB2 Database Server 8, 9, 9.5 version 1.1.0, December 2009
- Payment Card Industry (PCI) data security standard version 2.0, October 2010
- Sarbanes-Oxley (SOX) requirements Sarbanes-Oxley Act of 2002 Section 302

The workflow performs CIS Level 1 and Level 2 auditing and identifies compliance related problems with a DB2 instance.

The workflow performs the checks included in the CIS benchmark and then maps those CIS checks to the benchmark type that you specify in the Compliance Type parameter. The audit summary email will match the Compliance Type that you specify.

Although this workflow runs at the database level, the compliance report is generated only at the DB2 instance level; hence, in such cases, if the same workflow runs for another database created on the same DB2 instance, then there will be redundant results in the instance level compliance check report.

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 step descriptions
"How to Run this Workflow"	Instructions for running this workflow in your environment
"Sample Scenarios"	Examples of typical parameter values for this workflow
Parameters	List of input parameters for this workflow

Prerequisites for this Workflow

Be sure that the following prerequisites are satisfied before you run the "DB2 - Compliance Audit" workflow:

- The latest HPE DMA solution packs require the latest HPE DMA platform. To use the latest solution packs, update the HPE DMA platform. HPE DMA10.20 solution packs are supported on HPE DMA10.20 (and later).
- You have installed the Database Compliance solution pack.

The workflow, which by default runs against a DB2 database, requires the following:

- The user (typically root) has unchallenged `sudo` access and can access all required files and directories.
- The DB2 instance and database must exist on the target machine, and the user running the workflow must have sufficient privileges to run the required DB2 commands and queries against the DB2 system table on the target machine.
- Login credentials must be stored in metadata.
- Certain DB2 feature compliance checks require a DB2 license (as recommended by IBM) to ensure that the workflow runs.
- DB2 Admin Server related checks are performed only if the Admin server is found on the target DB2 machine (it may have been attached to any DB2 Instance). There cannot be more than one DB2 Admin Server on the target machine.

How this Workflow Works

This workflow performs the following actions:

- Prepares to run the workflow by gathering information about the target DB2 instance and validating parameter values.
- Audits the various configuration settings specified in the pertinent CIS, SOX, or PCI benchmark.
- Composes and sends an email containing the results of the audit.

Note: The emails are sent through the mail server configured on the HPE DMA server. You can configure the mail server in the path below:

DMA setup > Configuration > Outgoing Mail > Server.

Validation Checks Performed show

This workflow validates the following conditions:

1. Any Excluded Checks specified by the user refer to actual CIS, SOX, or PCI benchmark checks.
 - a. Any email addresses specified are valid addresses.
2. The workflow can create the temporary file that will store the compliance check results.

Steps Executed show

The "DB2 - Compliance Audit" 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.

Click each box in the diagram to view additional information about that step.

Steps Used by Run DB2 Compliance Audit

Workflow Step	Description
Gather Parameters for DB2 Compliance	This step sets the default values for all the DB2 configurable parameters used in the compliance audit and in subsequent workflow steps.
Gather Advanced Parameters for DB2 Compliance	This step sets the default values all the DB2 advanced configurable parameters used in the compliance audit and in subsequent workflow steps.
Prepare DB2 Call Wrapper	This step constructs the commands that will be used to execute subsequent workflow steps as either the OS administrative user (root) or the owner of the DB2 instance.
Validate DB2 Compliance Parameters	This step accepts input and default parameters and validates them for the DB2 database.
Check if DB2 Admin Server	This step verifies that there is a DB2 Admin Server on the target machine. If the DAS name is found, then a string is returned with the name.

Steps Used by Run DB2 Compliance Audit, continued

Workflow Step	Description
Exists	
Discover DB2 Target Configuration	This step discovers any DB2 configurations that have been set up on the target server and uses that information to run the workflow.
Audit DB2 Installation and Patches	This step audits the recommendations in Section 1, Installation and Patches, of the Center for Internet Security (CIS) Configuration Benchmarks for DB2.
Audit DB2 Directory and File Permissions	This step audits the recommendations in Section 2.x , DB2 Directory and File Permissions, of the Center for Internet Security (CIS) Configuration Benchmarks for DB2.
Audit DB2 Configuration Parameters	This step audits the recommendations in Sec 3.x.x, DB2 Configurations, of the Center for Internet Security (CIS) Configuration Benchmarks for DB2.
Audit DB2 Label Based Access Controls	This step audits the recommendations in Section 4.x, Auditing and Logging, of the Center for Internet Security (CIS) Security Configuration Benchmarks for DB2.
Audit DB2 Database Maintenance	This step audits the recommendations in Section 5.x, Database Maintenance, of the Center for Internet Security (CIS) Configuration Benchmarks recommendations for DB2.
Audit DB2 Database Objects Security	This step audits the recommendations in Section 6.x, Securing Database Objects, of the Center for Internet Security (CIS) Security Configuration Benchmarks for DB2.
Audit DB2 Entitlements	This step audits the recommendations in Section 7.x, Entitlements, of the Center for Internet Security (CIS) Security Configuration Benchmarks for DB2.
Audit DB2 General Policy and Procedures	This step audits the recommendations in Section 8.x, General Policy and Procedures, of the Center for Internet Security (CIS) Security Configuration Benchmarks for DB2.
Audit DB2 Utilities and Tools	This step audits the recommendations in Section 9.x, DB2 Utilities and Tools, of the Center of Internet Security (CIS) Configuration Benchmarks for DB2.
Validate Post-Compliance Checks	This step reads the temporary file that contains the results of the compliance audit and prints the audit results to the HPE DMA Console. If email addresses were specified, then it also creates a report in HTML format that will be emailed to those addresses by a later step in the workflow.

Steps Used by Run DB2 Compliance Audit, continued

Workflow Step	Description
Send Compliance Email	This step sends the previously generated compliance audit report to the specified email addresses.
Delete File	This step deletes the specified file on the target server.

How to Run this Workflow

The following instructions show you how to customize and run the "DB2 - Compliance Audit" workflow in your environment.

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

The workflow provides default values for some parameters. These default values are usually sufficient for a "typical" installation. You can override the defaults by specifying parameter values in the deployment. 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 DB2 - Compliance Audit](#).

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

To use the Run DB2 Compliance Audit workflow:

1. Create a deployable copy of the workflow.
2. Determine the values that you will specify for the following parameters:

Parameters Defined in this Step: Gather Parameters for DB2 Compliance

Parameter Name	Default Value	Required	Description
Compliance Type	CIS	optional	Type of compliance report that will be generated by the workflow. Supported types are: CIS = Center for Internet Security (CIS) Security Configuration Benchmark PCI = Payment Card Industry (PCI) Data Security Standard SOX = Sarbanes-Oxley (SOX) sections 302.2, 302.4b, 302.4c, and 302.5 requirements
DB2 Latest Fixpack Number	no default	required	The latest DB2 UDB Fixpack Number for the specific DB2 version against which the DB2 Compliance workflow is running.
Excluded Compliance Checks	no default	optional	Comma-separated list of compliance checks to exclude from the audit. For example: 1.2, 2, 3.*, 5*, 6.1.2 Make sure that the checks specified here correspond with the compliance audit type (CIS, PCI, or SOX) that you are running.

Parameters Defined in this Step: Gather Advanced Parameters for DB2 Compliance

Parameter Name	Default Value	Required	Description
Email Addresses to Receive Report	no default	optional	The email address (or multiple email addresses separated by commas without spaces) to which the compliance test results are sent.

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

3. In the workflow editor, expose any additional parameters that you need. You will specify values for those parameters when you create the deployment.
4. Save the changes to the workflow (click **Save** in the lower right corner).
5. Create a new deployment.
6. On the Parameters tab, specify values for the required parameters listed in step 2 and any additional parameters that you have exposed. You do not need to specify values for those parameters whose default values are appropriate for your environment.
7. On the Targets tab, specify one or more targets for this deployment.
8. Save the deployment (click **Save** in the lower right corner).
9. Run the workflow using this deployment.

To verify the results:

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

Information about each compliance check is displayed in the step output on the Console (and the History page) for each of the audit steps.

A summary of the compliance audit is also displayed in the step output for the Validate Post Compliance Checks step.

To view the reports:

A compliance audit summary in HTML format is emailed to all parties on the Email Addresses to Receive Report list.

After you run this workflow, you can generate two types of compliance reports on the Reports page:

- Database Compliance Report
- Database Compliance Detail Report

To access the Database Compliance reports:

1. Go to the Reports page.
2. At the bottom of the page, specify the following settings:
For the Database Compliance Report:
 - a. Select the Database Compliance report.
 - b. Select the organization where your target resides.
 - c. Because this report lists the latest compliance audit reports for all targets in the specified organization, you do not specify a Server, Database, or Time span.For the Database Compliance Detail Report:
 - a. Select the Database Compliance Details report.
 - b. Select the organization where your target resides.
 - c. Specify the Server and Instance that you selected when you created your deployment.
3. Click **Run report**.

Sample Scenarios

This topic shows you how to use various parameters to achieve the following compliance audit scenarios in your environment using the "DB2 - Compliance Audit" workflow.

Scenario 1: Perform a Partial CIS Compliance Audit and Email the Results show

In the scenario, the following checks are excluded from the audit:

- Section 7: Entitlements
- Section 9: DB2 Utilities and Tools

A summary report is sent to the three parties listed in the Email Addresses to Receive Report parameter.

Parameter Name	Example Value	Description
Compliance Type	CIS	Type of compliance report that will be generated by the workflow. Supported types are: CIS = Center for Internet Security (CIS) Security Configuration Benchmark PCI = Payment Card Industry (PCI) Data Security Standard SOX = Sarbanes-Oxley (SOX) sections 302.2, 302.4b, 302.4c, and 302.5 requirements
DB2 Latest Fixpack Number	8	The latest DB2 UDB Fixpack Number for the specific DB2 version against which the DB2 Compliance workflow is running.
Excluded Compliance Checks	7.*,9.*	Comma-separated list of compliance checks to exclude from the audit. For example: 1.2, 2, 3.*, 5*, 6.1.2 Note: Make sure that the checks specified here correspond with the compliance audit type (CIS, PCI, or SOX) that you are running.
Email Addresses to Receive Report	DB2DBAdminTeam@mycompany.com, DB2DBAdminMgr@mycompany.com, CustomerSupportTeam@mycompany.com	Comma-separated list of email addresses for those individuals or groups who will receive a copy of the compliance audit report.

Note: Some of these parameters are not exposed by default in the deployment.

Be sure that the default values for all remaining input parameters are appropriate for your environment.

Scenario 2: Perform a Full PCI Compliance Audit and Email the Results show

A summary report is sent to the three parties listed in the Email Addresses to Receive Report parameter.

Parameter Name	Example Value	Description
Compliance Type	PCI	Type of compliance report that will be generated by the workflow. Supported types are: CIS = Center for Internet Security (CIS) Security Configuration Benchmark PCI = Payment Card Industry (PCI) Data Security Standard SOX = Sarbanes-Oxley (SOX) sections 302.2, 302.4b, 302.4c, and 302.5 requirements
DB2 Latest Fixpack Number	8	The latest DB2 UDB Fixpack Number for the specific DB2 version against which the DB2 Compliance workflow is running.
Email Addresses to Receive Report	DB2DBAdminTeam@mycompany.com, DB2DBAdminMgr@mycompany.com, CustomerSupportTeam@mycompany.com	Comma-separated list of email addresses for those individuals or groups who will receive a copy of the compliance audit report.

Note: Some of these parameters are not exposed by default in the deployment.

Be sure that the default values for all remaining input parameters are appropriate for your environment.

Scenario 3: Perform a Full SOX Compliance Audit and Email the Results show

A summary report is sent to the three parties listed in the Email Addresses to Receive Report parameter.

Parameter Name	Example Value	Description
Compliance Type	SOX	Type of compliance report that will be generated by the workflow. Supported types are: CIS = Center for Internet Security (CIS) Security Configuration Benchmark PCI = Payment Card Industry (PCI) Data Security Standard SOX = Sarbanes-Oxley (SOX) sections 302.2, 302.4b, 302.4c, and 302.5 requirements
DB2 Latest Fixpack Number	8	The latest DB2 UDB Fixpack Number for the specific DB2 version against which the DB2 Compliance workflow is running.
Email Addresses to Receive Report	DB2DBAdminTeam@mycompany.com, DB2DBAdminMgr@mycompany.com, CustomerSupportTeam@mycompany.com	Comma-separated list of email addresses for those individuals or groups who will receive a copy of the compliance audit report.

Note: Some of these parameters are not exposed by default in the deployment.

Be sure that the default values for all remaining input parameters are appropriate for your environment.

Scenario 4: Perform a Full CIS Compliance Audit and Display the Results on the HPE DMA Consoleshow

In the scenario, all scorable checks are performed, and the compliance audit report is displayed only on the HPE DMA Console. In this case, a summary report is not emailed. This scenario would be appropriate for initial testing.

It is not necessary to specify any input parameters in this scenario unless the DB2 inventory file is located in a non-standard directory.

Parameter Name	Example Value	Description
Compliance Type	CIS	Type of compliance report that will be generated by the workflow. Supported types are: CIS = Center for Internet Security (CIS) Security Configuration Benchmark PCI = Payment Card Industry (PCI) Data Security Standard SOX = Sarbanes-Oxley (SOX) sections 302.2, 302.4b, 302.4c, and 302.5 requirements

Note: Some of these parameters are not exposed by default in the deployment.

Be sure that the default values for all remaining input parameters are appropriate for your environment.

Parameters for DB2 - Compliance Audit

The following tables describe the required and optional input parameters for this workflow. Some of these parameters are not initially visible in a deployment. For most parameters, if you do not specify a value for a parameter, a default value is assigned

For information about which steps use which parameters, see ["How this Workflow Works"](#).

Parameters Defined in this Step: Gather Parameters for DB2 Compliance

Parameter Name	Default Value	Required	Description
Compliance Type	CIS	optional	Type of compliance report that will be generated by the workflow. Supported types are: CIS = Center for Internet Security (CIS) Security Configuration Benchmark PCI = Payment Card Industry (PCI) Data Security Standard SOX = Sarbanes-Oxley (SOX) sections 302.2, 302.4b, 302.4c, and 302.5 requirements
DB2 Latest Fixpack Number	no default	required	The latest DB2 UDB Fixpack Number for the specific DB2 version against which the DB2 Compliance workflow is running.
Excluded Checks	no default	optional	Comma-separated list of compliance checks to exclude from the audit. For example: 1.2, 2, 3.*, 5*, 6.1.2 Note: Make sure that the checks specified here correspond with the compliance audit type (CIS, PCI, or SOX) that you are running.

Parameters Defined in this Step: Gather Advanced Parameters for DB2 Compliance

Parameter Name	Default Value	Required	Description
Email Addresses to Receive Report	no default	optional	The email address (or multiple email addresses separated by commas without spaces) to which the compliance test results are sent.

Parameters Defined in this Step: Gather Advanced Parameters for DB2 Compliance, continued

Parameter Name	Default Value	Required	Description
Latest Patch	no default	optional	The latest DB2 UDB Fixpack Number for the specific DB2 version against which the DB2 Compliance workflow is running.

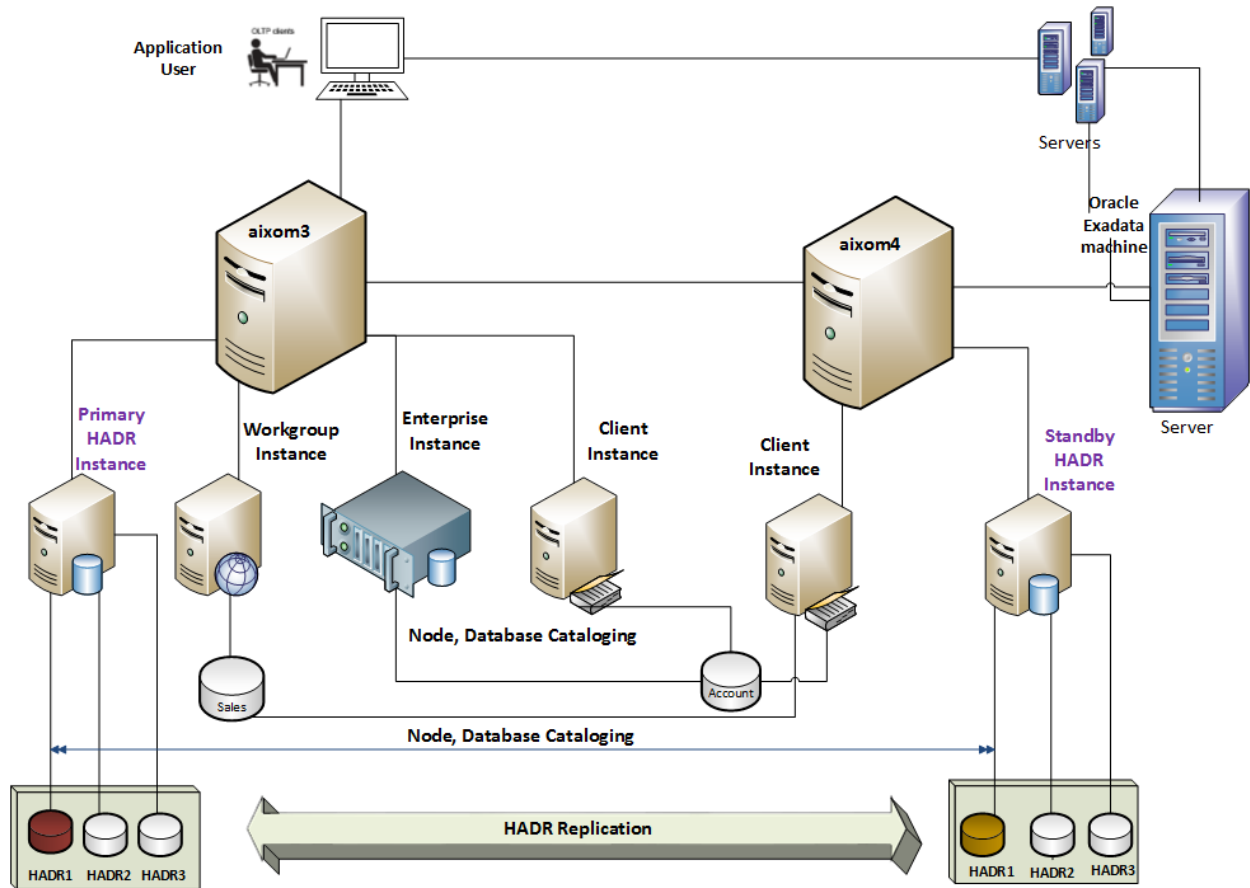
DB2 - Configuring HADR Database

This section describes how to use Database and Middleware Automation (HPE DMA) to create, automate and standardize configuring an IBM DB2 high availability disaster recovery (HADR) environment on an existing DB2 software, instance, and database using default or custom "golden user templates" and configuring IBM DB2 HADR with Tivoli System Automation for Multiplatforms (TSAMP).

Goal

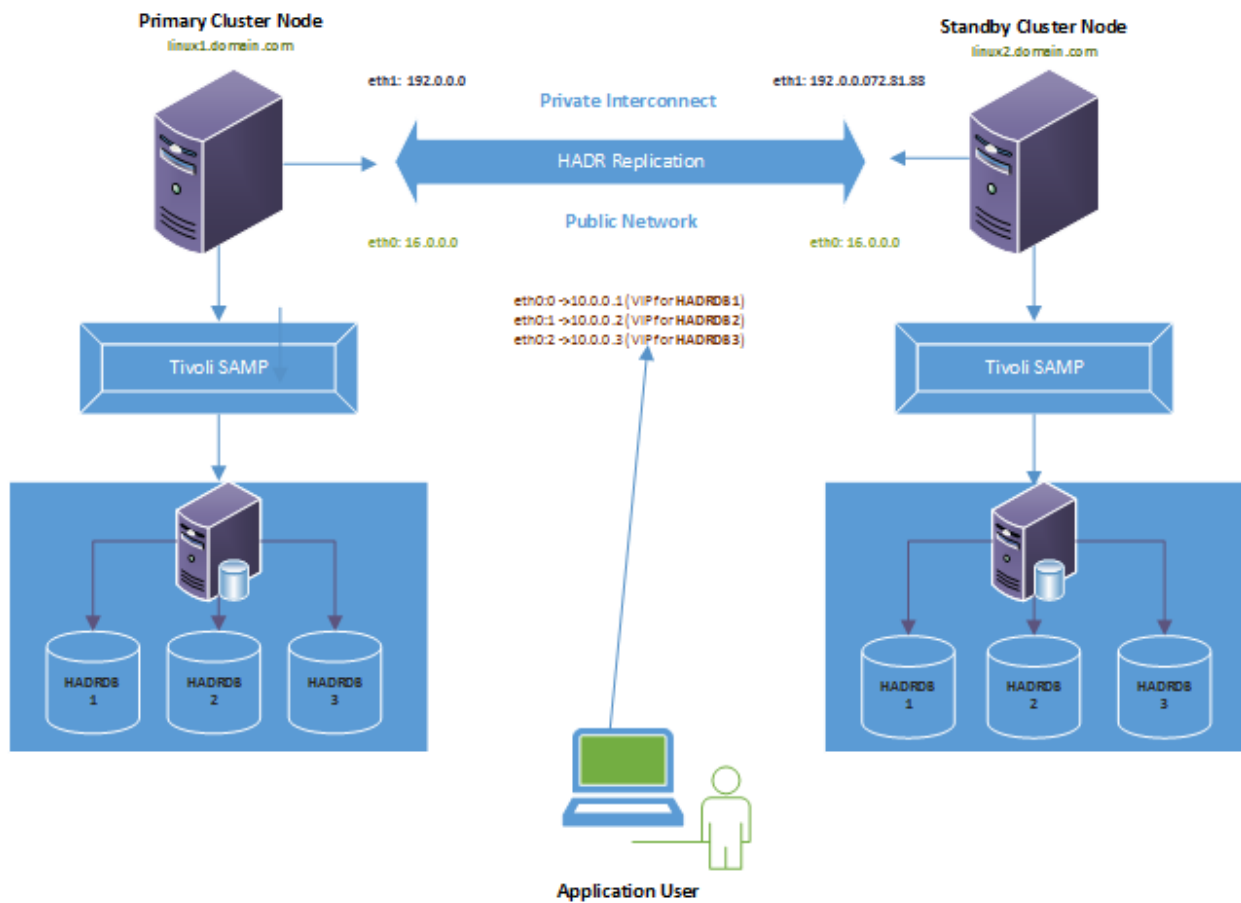
The DB2 - Configure HADR Database configures DB2 database(s) for IBM DB2 for Linux and AIX operating systems on the target source and destination servers. This workflow currently supports DB2 versions 10.1 and 10.5 on RedHat Linux and AIX servers. This is an instance level workflow. This workflow configures the database with the HADR feature.

High Availability Data Replication Using HADR Port



The DB2 - Configure Tivoli SAMP On HADR Database workflow configures DB2 database(s) for IBM DB2 for Linux and AIX operating systems on the target source and destination servers with Tivoli System Automation for Multiplatforms (samp) where this workflow is deployed.

High Availability with Tivoli System Automation for Multiplatforms



Prerequisites

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

Prerequisites for the DB2 - Configure HADR Database workflow

- SSH service must be turned on for both primary and standby host computers.
- The source and destination host computer is configured with SSH password-less login across the nodes (primary to standby and vice versa).
- A TCP/IP interface must be available between the HADR host computers, and a high-speed, high-capacity network is recommended.
- Use identical host computers for the HADR primary and standby databases. That is, they should be from the same vendor and have the same architecture.
- Both the primary and standby host computers must run one of the following operating systems (that is supported by IBM DB2 10.1 or 10.5 and HPE DMA):

- Linux
- AIX

See the HPE DMA *Support Matrix* for specific operating system versions, available at: <https://softwaresupport.hp.com/>

- The operating system on the primary and standby host computer must be the same version, including patches.
- DB2 software must be provisioned on both the primary and standby host computer.

Tip: You can use DB2 - Provision Software workflow to accomplish this.

- The DB2 instance must be provisioned on both primary and standby host computer.

Tip: You can use DB2 - Provision Instance workflow to accomplish this.

- The DB2 database must be created on the instance at the primary host computer on which the workflow will be deployed.

Tip: You can use DB2 - Provision Database workflow to accomplish this.

- DB2 instance on primary host computer must be up and running on both the primary and standby host computer.

- 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.

- 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 DB2 database user.
- The operating system kernel parameters and shared memory is properly configured.
- License for HPE 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 - Configure HADR Database	The sudo package is installed on the target servers. The target servers have the gunzip and tar utilities in the environment path.

Prerequisites for the DB2 - Configure Tivoli SAMP On HADR Database workflow

- SSH service must be turned on for both primary and standby host computers.
- The source and destination host computer is configured with SSH password-less login across the nodes (primary to standby and vice versa).
- DB2 software must be provisioned on both the primary and standby host computer.

Tip: You can use DB2 - Provision Software workflow to accomplish this.

- The DB2 instance must be provisioned on both primary and standby host computer.

Tip: You can use DB2 - Provision Instance workflow to accomplish this.

- The DB2 database must be available on primary and standby instance cluster node with primary and standby HADR configuration state.
- DB2 instance on primary host computer must be up and running on both the primary and standby host computer.
- Tivoli System Automation for Multiplatforms (TSAMP) must be installed and on both primary and standby cluster nodes.
- Valid license to activate the TSAMP on primary and standby cluster nodes.
- Guidelines from IBM to provide the correct input parameter values for the steps Gather Parameters For Configure Tivoli SAMP on HADR Database and Gather Advanced Parameters For Configure Tivoli SAMP on HADR Database in order to prepare correct XML file for TSAMP.
- The following workflow requirements:

Workflow	Requirements
DB2 - Configure Tivoli SAMP On HADR Database	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.

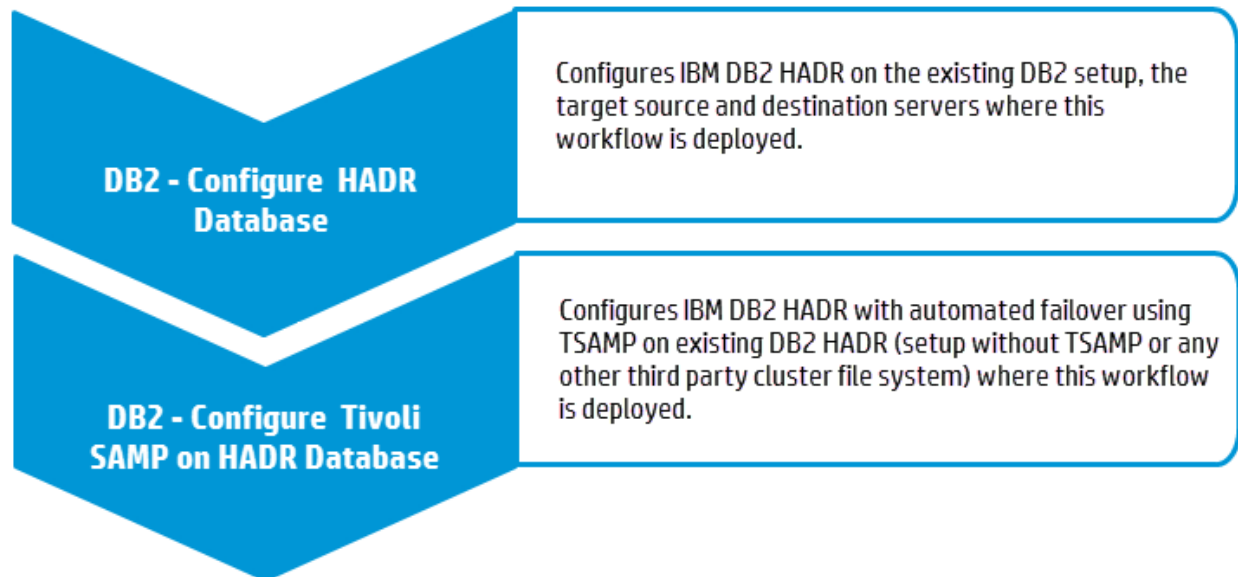
Refer to the [IBM Documentation](#) for the following:

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

Process Overview

Configuration of DB2 HADR is done in two steps. In the first step, DB2 - Configure HADR Database workflow configures the HADR with manual failover. In the second step, the DB2 - Configure Tivoli SAMP On HADR Database workflow configures HADR using Tivoli SAMP which allows to have automatic failover and failback. These workflows validate prerequisites, configures, and verifies HADR configuration.

Use the following HPE DMA workflows to standardize the process of configuring DB2 HADR:



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 configuring DB2 10.5 HADR on an AIX server with an 'Enterprise' edition instance.

Before running the DB2 - Configure HADR Database workflow, the DB2 license must be activated for the instances that you create.

The following sections provides detailed information required to run the workflow.

Workflow 1: DB2 - Configure HADR Database

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

Solution pack

This workflow requires the HPE DMA Database Provisioning Solution Pack.

Parameters to expose

None

Input parameters

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

The parameters in the "Gather Advanced Parameters for Configure DB2 HADR" step provide options to customize the workflow deployment.

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

Step: Gather DB2 Source and Destination Instances

Parameter	Description	Example Value
DB2 Destination HADR Instance	Required: The standby node instance name of the remote server. Administration tools, such as the DB2 Control Center, use this parameter to contact the remote server. In the bridge execution workflow, this instance will be used at the run time to run the specific steps configured to run on the standby instance node. The value will be set at the run time.	hadr105 [aixom02.mycompany.com]
DB2 Source HADR Instance	Required: The primary node instance name of the local server. Administration tools, such as the DB2 Control Center, use this parameter to contact the local server. In the bridge execution workflow, this instance will be used at the run time to run the specific steps configured to run on the primary instance node. The value will be set at the run time.	hadr105 [aixom01.mycompany.com]

Step: Gather Parameters for Configure DB2 HADR

Parameter	Description	Example Value
DB2 HADR Database Name	Required: The database name for which the High Availability Disaster Recovery will be configured. The database name must be available on the primary instance node.	DB2_HADR
DB2 HADR Local Service Name	Required: This parameter specifies the TCP service name for which the local high availability disaster recovery (HADR) process accepts connections. Example: DB2_HADR_SVC.	DB2_HADR_SERVICE_P1
DB2 HADR Port Number	Required: This parameter specifies the TCP service port number for which the high availability disaster recovery (HADR) process accepts connections. The same port will be used in the primary and standby node for HADR communication.	58234
DB2 HADR Remote Instance Name	Required: This parameter specifies the instance name of the remote server. Administration tools, such as the DB2 Control Center, use this parameter to contact the remote server. High availability disaster recovery (HADR) also checks whether a remote database requesting a connection	hadr105

Step: Gather Parameters for Configure DB2 HADR, continued

Parameter	Description	Example Value
	belongs to the declared remote instance.	
DB2 HADR Remote Service Name	Required: This parameter specifies the TCP service name for which the remote high availability disaster recovery (HADR) process accepts connections. Example: DB2_HADR_SVC.	DB2_HADR_SERVICE_P1
DB2 HADR Standby Host Name	Required: This parameter specifies the TCP/IP host name or IP address of the remote high availability disaster recovery (HADR) database server.	aixom2.mycompany.com

Workflow 2: DB2 - Configure Tivoli SAMP On HADR Database

This section provides detailed information required to run the DB2 - Configure Tivoli SAMP On HADR Database workflow.

Solution pack

This workflow requires the HPE DMA Database Provisioning Solution Pack.

Parameters to expose

None

Input parameters

When you deploy the DB2 - Configure Tivoli SAMP On HADR Database workflow, specify input parameter values for the following steps.

The parameters in the Gather Advanced Parameters For Configure Tivoli SAMP on HADR Database step provide options to customize the workflow deployment.

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

Step: Gather DB2 Source and Destination Instances

Parameter	Description	Example Value
DB2 Destination HADR Instance	Required: The standby node instance name of the remote server. Administration tools, such as the DB2 Control Center, use this parameter to contact the remote server. In	hadr105 [aixom02.mycompany.com]

Step: Gather DB2 Source and Destination Instances, continued

Parameter	Description	Example Value
	the bridge execution workflow, this instance will be used at the run time to run the specific steps configured to run on the standby instance node. The value will be set at the run time.	
DB2 Source HADR Instance	The primary node instance name of the local server. Administration tools, such as the DB2 Control Center, use this parameter to contact the local server. In the bridge execution workflow, this instance will be used at the run time to run the specific steps configured to run on the primay instance node. The value will be set at the run time.	hadr105 [aixom01.mycompany.com]

Step: Gather Parameters For Configure Tivoli SAMP on HADR Database

Parameter	Description	Example Value
Database Name	Required: The database name for which the High Availability Disaster Recovery will be configured. The database must be available on the primary and standby instance cluster nodes.	DB2HADR
IP Of Primary Cluster Node	Required: Internet Protocol Address (IP address) for primary cluster node machine where the HADR Instance and database is configured.	16..0.0.1
IP Of Standby Cluster Node	Required: Internet Protocol Address (IP address) for primary cluster node machine where the HADR Instance and database is configured.	16.0.0.2
Local Instance Name	Required: This parameter specifies the instance name of the local cluster node. Administration tools, such as the DB2 Control Center, use this parameter to contact the local server. High availability disaster recovery (HADR) also checks whether a local database requesting a connection belongs to the declared local instance. Default, it is configured to use the instance name on which this workflow is deployed.)	DB2_105HADR_SVC1
Local Instance Port Number	Required: DB2 connection port number for the local instance on primary cluster node where HADR database is mounted.	51000

Step: Gather Parameters For Configure Tivoli SAMP on HADR Database, continued

Parameter	Description	Example Value
Primary Cluster Node Name	Required: This parameter specifies the local host (primary cluster node name) name for high availability disaster recovery (HADR) TCP communication.	aixom01.mycompany.com
Quorum Device Name	Required: A network quorum is an IP address that can be pinged from both the primary and the standby nodes. In the event of a site failure, the quorum decides which node serves as the active node and which node goes offline. When you are choosing the network quorum, ensure that the IP remains active all the time. The DNS server IP is always a good choice for the network quorum.	16.0.1.1
Remote Instance Name	Required: This parameter specifies the instance name of the remote cluster node (server). Administration tools, such as the DB2 Control Center, use this parameter to contact the remote server. High availability disaster recovery (HADR) also checks whether a remote database requesting a connection belongs to the declared remote instance.	hadr105
Remote Instance Port Number	Required: DB2 connection port number for the remote instance on standby cluster node where HADR database is mounted.	51000
Standby Cluster Node Name	Required: This parameter specifies the remote host(standby cluster node name) name for high availability disaster recovery (HADR) TCP communication.	aixom02.mycompany.com
Subnetmask Of Primary Cluster	Required: Subnet Mask Address(IP address) for primary cluster node machine where the HADR Instance and database is configured.	255.255.240.0
Subnetmask Of Standby Cluster	Required: Subnet Mask Address(IP address) for standby cluster node machine where the HADR Instance and database is configured.	255.255.240.0

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, and then specify the filename in the DB2 Software Binaries parameter for the DB2 - Provision Software workflow.

Can I use HPE DMA to provision DB2 universal databases?

No. HPE DMA can only provision DB2 server installations.

What types of DB2 instances can HPE DMA create?

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

Workflow: DB2 - Provision Instance

Step: Gather Advanced Parameters V2 for DB2 Provision Instance

Parameter: DB2 Instance Type

¹These parameters are hidden by default and must be exposed when you make a copy of the workflow.

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

Yes. HPE DMA can create and use catalog, temporary, or user tablespaces managed by the system by specifying values for the following parameters:¹

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

Can I use HPE 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 HPE DMA* white section, available at: [HPE Software Support web site](#)

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

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

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

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

¹These parameters are hidden by default and must be exposed when you make a copy of the workflow.

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

HPE DMA does not automatically provision the IBM DB2 license.

Provisioning DB2

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

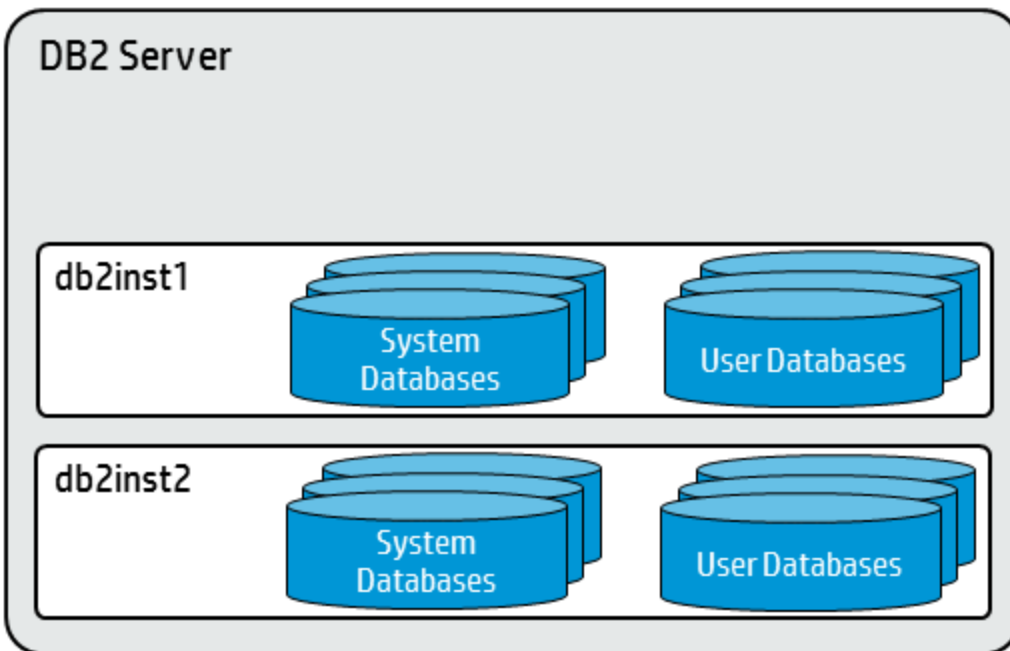
Overview

The HPE DMA workflows described in this section 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

Goal

This section describes how to create the following DB2 configuration:



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

Prerequisites

Before performing the procedures in this section, 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 HPEDMA):
 - Linux
 - AIX

See the *HPE 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.
- 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 HPE 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 v2:	The sudo 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	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.
DB2 - Provision Database	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 HPE 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.

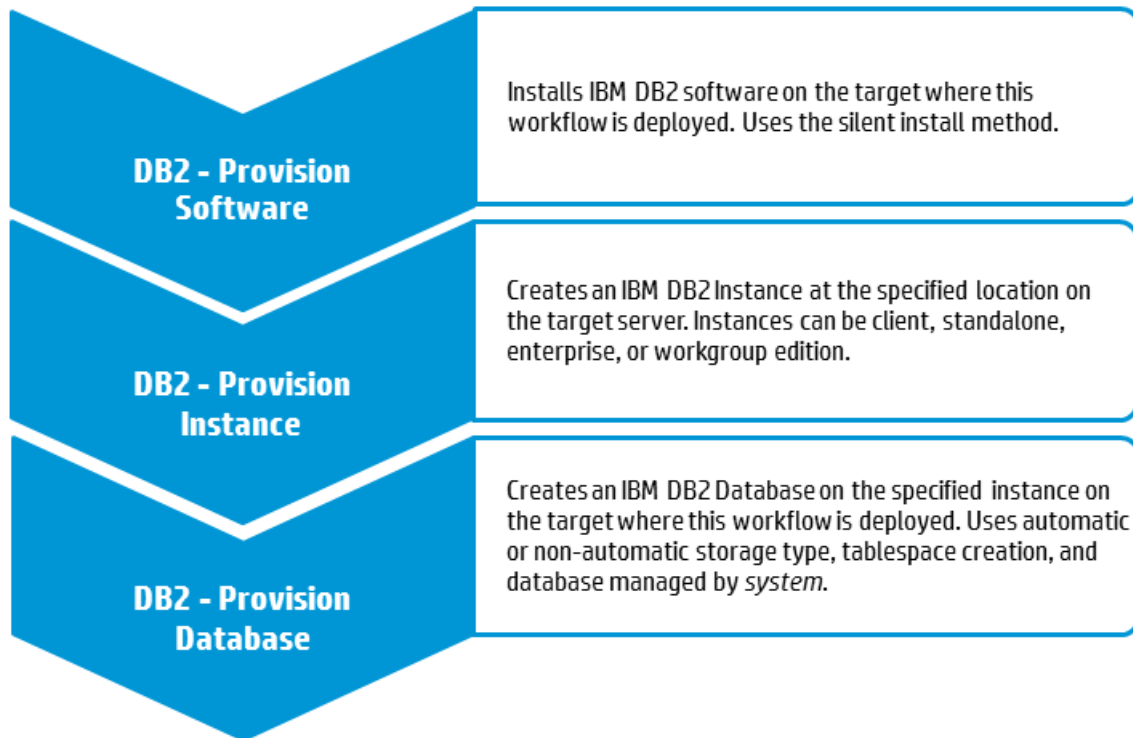
Acceptable types and range of values when using HPE DMA advanced parameters to configure IBM DB2 settings.

Process Overview

Patching DB2 Grid Infrastructure with HPE DMA is a simple, one-step process. All required checks and steps to patch an DB2 Grid infrastructure—including the Grid Home, all Database Homes, and the databases—have been implemented in a single HPE DMA workflow.

Use the following HPE DMA workflow to standardize the process of applying an DB2 Patch Set Update (PSU):

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

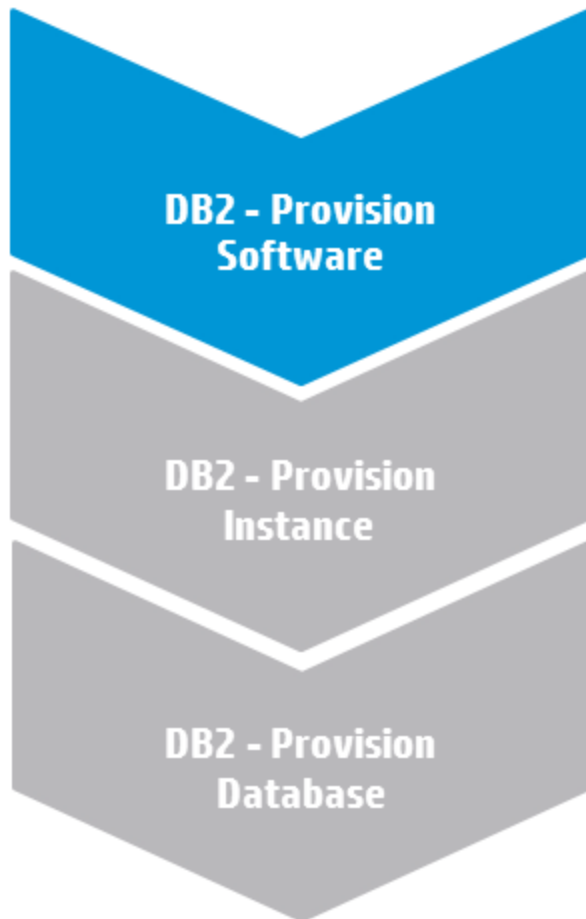


Note: These workflows support DB2 version 9.5, 9.7, 10.1, or 10.5 on a Red Hat Linux or AIX server. The examples given are appropriate for provisioning DB2 10.5 on an AIX server with an 'Enterprise' edition instance.

Before running the DB2 - Provision Database workflow, the DB2 license must be activated for the instances that you create.

Note: Note: For additional information, see How to run an HPE DMA workflow.

Workflow 1: DB2 - Provision Software v2



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

Solution pack

This workflow requires the Database Provisioning Solution Pack.

Parameters to expose

None

Input parameters

The DB2 - Provision Software v2 workflow provides default values for some parameters. These default values are usually sufficient for a "typical" installation. You can override the defaults by specifying parameter values in the deployment.

Step: Gather Parameters V2 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.	v10.5_aix64_server_t.tar.gz

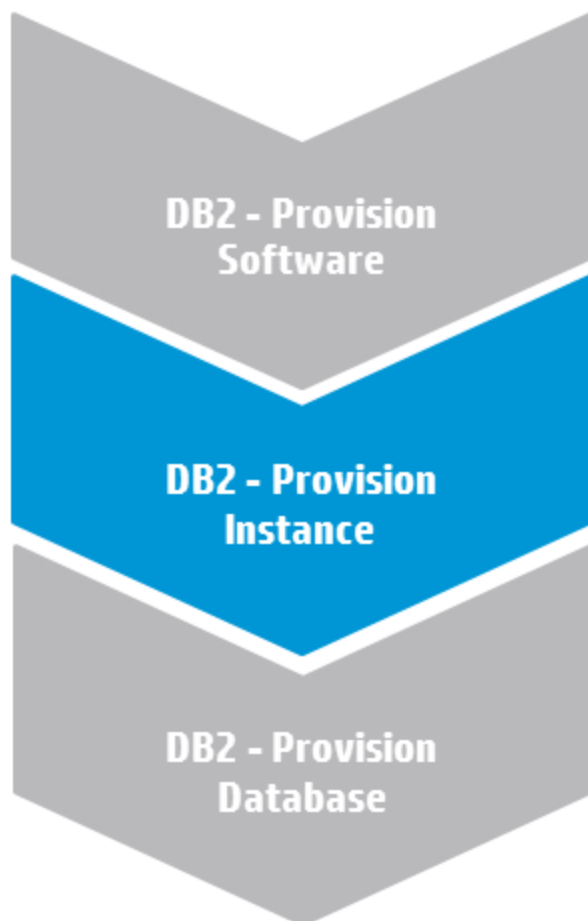
Step: Gather Advanced Parameters v3 for Provision DB2 Software

Parameter	Description	Example Value
Clean on Failure	Optional: Specifies whether to clean up on workflow failure. If set to 'Yes', the workflow will clean up the downloaded files, installation location and the staging location. Valid values are 'Yes' and 'No'. The default value is 'Yes'	Yes
Clean on Success	Optional: Specifies whether to clean up on workflow success. If set to 'Yes', the workflow will clean up the downloaded files. The default value is 'Yes'.	Yes
DB2 Installation Type	Optional: The type of DB2 installation supported by IBM. It can be either COMPACT, TYPICAL, or CUSTOM. The default value is 'TYPICAL'. If CUSTOM is set, provide the DB2 installation response file with the custom parameter values.	TYPICAL
DB2 Product Edition	Optional: The edition of the product that you want to install. For example: DB2 Workgroup Edition, DB2 Enterprise Edition, etc. The default value is set to 'DB2_SERVER_EDITION' for DB2 version 10.5. Use 'ENTERPRISE_SERVER_EDITION' for DB2 versions 9.7 and	DB2_SERVER_EDITION

Step: Gather Advanced Parameters v3 for Provision DB2 Software, continued

Parameter	Description	Example Value
	10.1.	
DB2 Product Installation Language	Optional: The language(s) for installing your product. If no language optio is specified, English language (EN) will be installed by default.	EN
DB2 Product License	Optional: Indicate acceptance of license agreement as specified in the file in "db2/license" directory on the installation media. Default value is 'ACCEPT'.	ACCEPT
DB2 Software User Resource File	Optional: User specified resource file to be used during DB2 software installation.	Defaulttv97.rsp Defaulttv101.rsp
Install Tivoli System Automation Multiplatforms	Optional: Installs IBM Tivoli System Automation for Multiplatforms (SAMP) with required components, if value is set to Yes. This parameter is supported only for DB2 versions 9.5 and 9.7. Default value is NO.	NO
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

Workflow 2: DB2 - Provision Instance



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

Solution pack

This workflow requires the Database Provisioning Solution Pack.

Parameters to expose

In the Gather Advanced Parameters V2 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 V2 for DB2 Provision Instance step.

¹This parameter is hidden by default and must be exposed when you make a copy of the workflow.

Input parameters

When you deploy the DB2 - Provision Instance 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 V2 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 HPE DMA user.	●●●
Trust SSL Certificates	Deprecated: HPE 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 HPE DMA web server. HPE DMA now uses the <code>com.hp.dma.conn.trustAllCertificates</code> parameter in the <code>dma.xml</code> file.	

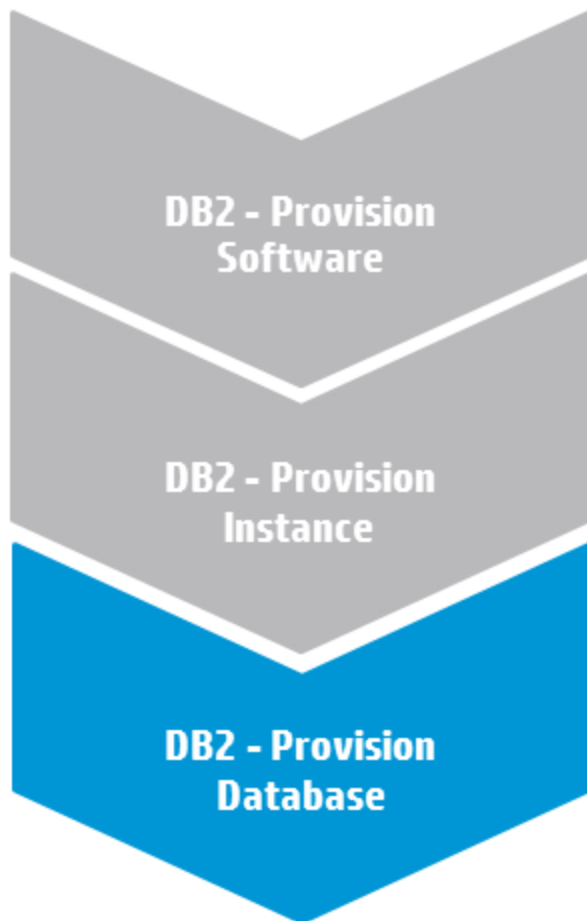
Step: Gather Advanced Parameters V2 for DB2 Provision Instance

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. ²	<code>v105user</code>

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

²This parameter is hidden by default and must be exposed when you make a copy of the workflow.

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.

Solution pack

This workflow requires the 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

¹This parameter is hidden by default and must be exposed when you make a copy of the workflow.

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 HPE DMA user.	●●●
Trust SSL Certificates	Deprecated: HPE 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 HPE DMA web server. HPE 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)	8 K

¹This parameter is hidden by default and must be exposed when you make a copy of the workflow.

Step: Gather Advanced Parameters For DB2 Provision Database, continued

Parameter	Description	Example Value
	<p>when the database is created. Also the default page size for all future CREATE BUFFERPOOL and CREATE TABLESPACE statements. 1</p> <p>The format is <n> or <n> K, where <n> is an integer. Valid values are: 4096, 8192, 16384, 32768, 4 K, 8 K, 16 K, or 32 K. If you use the <n> K format, there must be at least one space between the integer and K.</p> <p>The default is 4096 bytes (or 4 K).</p>	
Territory	<p>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: US1</p>	US

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, and then specify the filename in the DB2 Software Binaries parameter for the DB2 - Provision Software workflow.

Can I use HPE DMA to provision DB2 universal databases?

No. HPE DMA can only provision DB2 server installations.

What types of DB2 instances can HPE DMA create?

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

Workflow: DB2 - Provision Instance

Step: Gather Advanced Parameters V2 for DB2 Provision Instance

Parameter: DB2 Instance Type

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

Yes. HPE 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

Can I use HPE 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 HPE DMA* white section, available at: [HPE Software Support web site](#)

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

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

¹These parameters are hidden by default and must be exposed when you make a copy of the workflow.

²These parameters are hidden by default and must be exposed when you make a copy of the workflow.

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

No. HPE 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. HPE 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

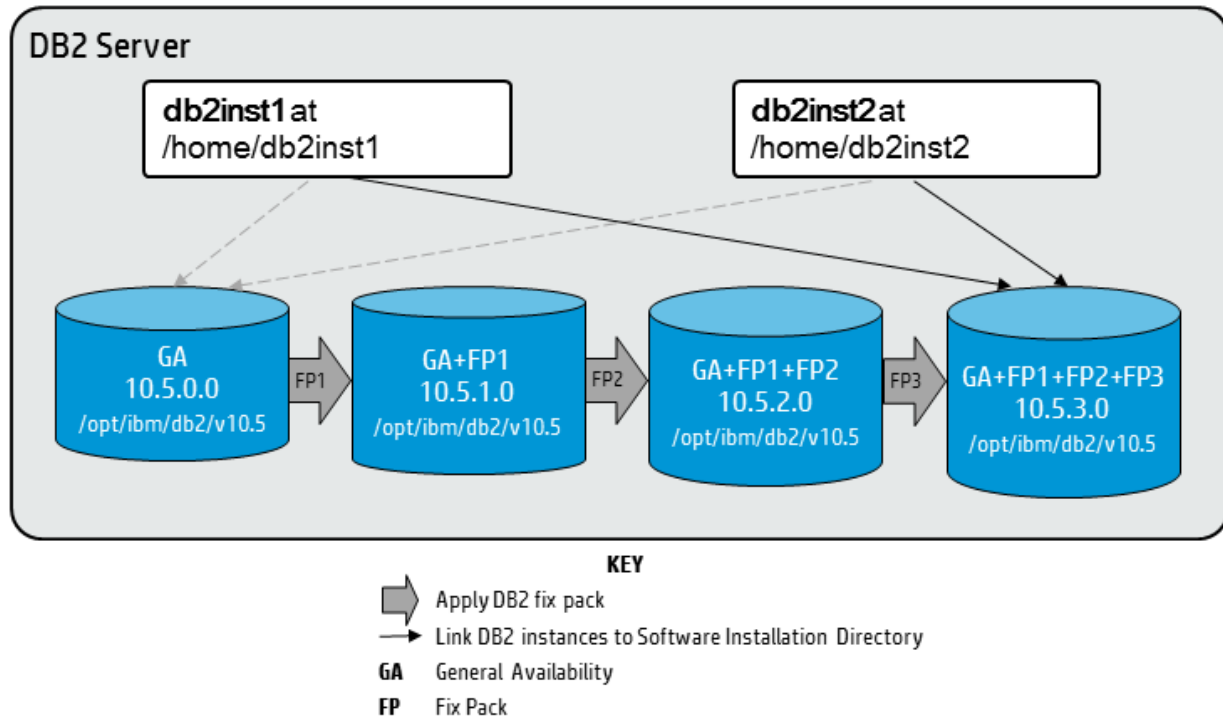
HPE DMA does not automatically provision the IBM DB2 license.

DB2 - Patch Fixpack

This section describes how to use Database and Middleware Automation (HPE DMA) to create a repeatable, standardized method to quickly and accurately apply IBM DB2 server fix packs on DB2 installations across an enterprise to keep fix packs current.

Goal

This section describes how to apply the supplied fix pack to the DB2 installation—the DB2 Software Installation Directory and all associated Instances:



The diagram shows a DB2 server with two instances. The DB2 instances point to the DB2 Software Installation Directory that is updated over time with subsequent DB2 server fix packs.

Prerequisites

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

- A server running AIX 6.1 or 7.1 or Red Hat Enterprise Linux 5 or 6. The operating system platform must be certified for the pertinent DB2 fix pack version.
- DB2 server software—version 9.5, 9.7, 10.1, or 10.5—is installed on the target and is ready to be patched.
- The infrastructure required for applying the fix pack is in place.
- All DB2 Instances are on the same initial fix pack version.
- Patch media:

The DB2 server fix pack file from IBM.

Patch installation files must be available locally or available for download from the software repository.

Note: HPE DMA only applies DB2 server fix packs, not universal fix packs.

- Storage: A staging directory with 7-8 gigabytes available to unpack the binary file and to apply the fix pack and archive—requires about double the size of the current DB2 installation on the disk.

- The operating system kernel parameters and virtual and shared memory are properly configured to avoid any failure while applying the DB2 fix pack.
- License for HPE DMA.
- License for DB2 Database version 9.5, 9.7, 10.1, or 10.5.

Additional requirements

For additional requirements, see the following IBM documentation:

DB2 version	IBM documentation
9.5	DB2 Version 9.5 Fix Pack
9.7	DB2 Version 9.7 Fix Pack
10.1	DB2 Version 10.1 Fix Pack
10.5	DB2 Version 10.5 Fix Pack

Process Overview

Applying a DB2 Fix Pack to a DB2 installation with HPE DMA is a simple, one-step process. All required checks and steps have been implemented in a single HPE DMA workflow.

Use the following HPE DMA workflow to standardize the process of applying a DB2 fix pack:

Use the following HPE DMA workflows to standardize the process of provisioning DB2 Grid standalone server, software, and database:

DB2 - Apply Fixpack On DB2 Home

Applies an IBM DB2 server fix pack to the DB2 Software Installation Directory on the target server where the workflow is deployed. Updates all instances created against the DB2 Software Installation Directory with the fix pack.

Note: This workflow applies the DB2 server fix pack to the DB2 Software Installation Directory and ALL Instances associated with the DB2 Software Installation Directory. (You cannot use this workflow to apply a fix pack to a subset of the instances associated with a DB2 Software Installation Directory.)

This workflow does not update the DB2 databases with the newly applied DB2 fix pack. You will need to do that manually after you run the workflow. "[How can I patch the DB2 databases?](#)"

The examples given are appropriate for applying a DB2 10.5 fix pack on an AIX server.

The following section provides detailed information required to run the workflow.

Workflow: DB2 - Apply Fixpack on DB2 Home



This section provides detailed information required to run the DB2 - Apply Fixpack on DB2 Home workflow.

Solution pack

This workflow requires the HPE DMA Database Patching Solution Pack.

Parameters to expose

None

Input parameters

When you deploy the DB2 - Apply Fixpack on DB2 Home 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 Apply Fixpack

Parameter	Description	Example Value
DB2 Fixpack Software Binaries	Required: Name of the DB2 fix pack binary file that you want to apply. Obtained from IBM. If the file is not found in download location (the default is /tmp), it will be downloaded from the software repository.	v10.5fp3_aix64_server.tar.gz
DB2 Installation Location DB2 Home	Required: Fully-qualified path where DB2 is installed on the target machine.	/opt/ibm/db2/V10.5
Trust SSL Certificates	Deprecated: HPE DMA no longer uses	

Step: Gather Parameters for DB2 Apply Fixpack, continued

Parameter	Description	Example Value
	this workflow parameter to determine whether the workflow will trust any Secure Sockets Layer (SSL) certificate used to connect to the HPE DMA web server. HPE DMA now uses the <code>com.hp.dma.conn.trustAllCertificates</code> parameter in the <code>dma.xml</code> file.	
Web Service Password	Required: Password for the HPE DMA Discovery web service API.	●●●
Web Service User	Required: User who is capable of modifying the managed environment by using the HPE DMA Discovery web service API.	dmawebuser

Step: Gather Advanced Parameters for DB2 Install Fixpack

Parameter	Description	Example Value
Download Location	Optional: The directory where input files already exist or to which files will be downloaded from the software repository.	/tmp
Staging Directory	Optional: Fully-qualified path of the directory where the DB2 installer will be extracted from the archive. Will be cleaned up at end of workflow execution. Default: If no input is provided <code>/tmp/db2_fixpack</code> will be created.	

FAQs

What can cause the workflow to fail?

The workflow will fail if the DB2 server fix pack is not available on the target or in the software repository.

To solve this problem, obtain the DB2 server fix pack from IBM, store the file either on the target or in the software repository, and then specify the filename in the DB2 Fixpack Software Binaries parameter before running the workflow.

How can I patch the DB2 databases?

The DB2 - Apply Fixpack on DB2 Home workflow only patches the DB2 Software Installation Directory and the associated instances. To update the DB2 databases with the newly applied DB2 fix pack, perform the following after running the workflow:

```
db2 CONNECT TO <dbname>
```

Here, <dbname> is the name of the DB2 database.

```
db2 BIND INSTHOME\sqllib\bnd\db2schema.bnd BLOCKING ALL GRANT PUBLIC SQLERROR CONTINUE
db2 BIND INSTHOME\sqllib\bnd\@db2ubind.lst BLOCKING ALL GRANT PUBLIC ACTION ADD
db2 BIND INSTHOME\sqllib\bnd\@db2cli.lst BLOCKING ALL GRANT PUBLIC ACTION ADD
```

Can I use HPE DMA to apply DB2 universal fix packs?

No. HPE DMA can only apply DB2 LUW server fix packs to DB2 LUW server installations.

Can I use HPE DMA to patch DB2 universal databases?

No. HPE DMA can only apply DB2 LUW server fix packs to DB2 LUW server installations.

Can I use HPE DMA to apply a DB2 fix pack if the instances have different initial fix pack versions?

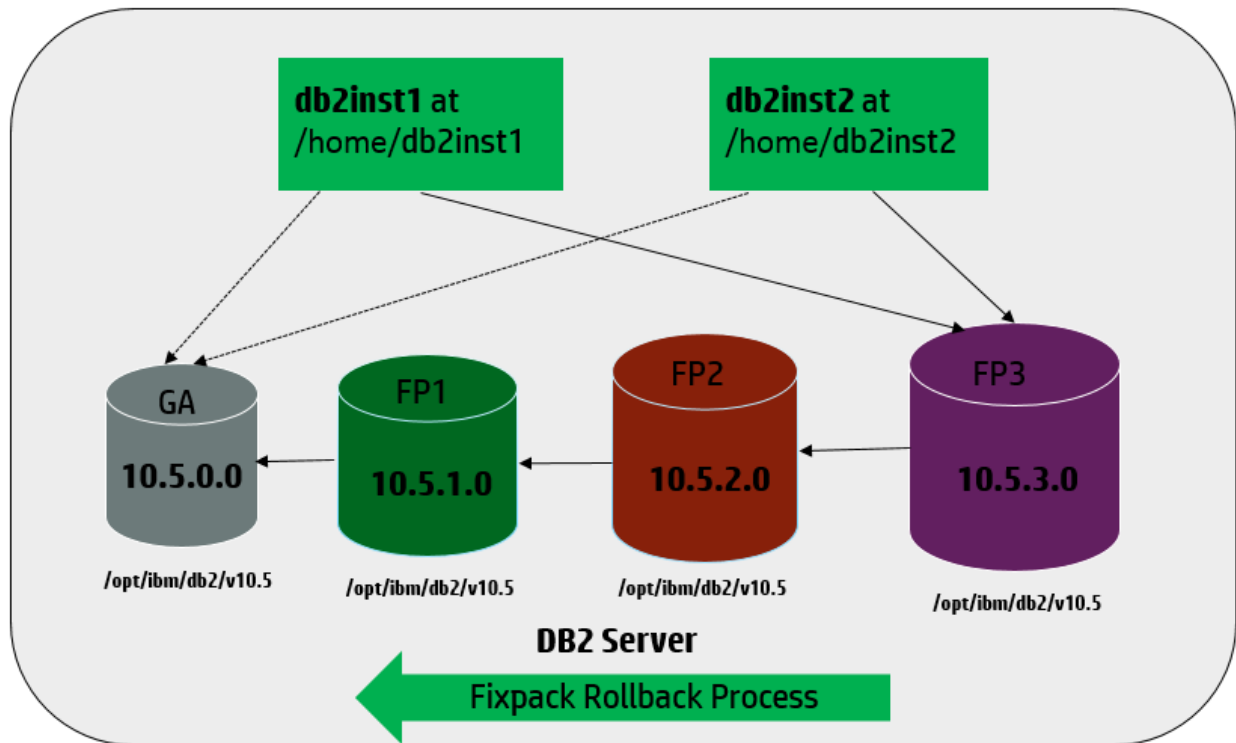
No. All DB2 instances must have the same initial fix pack version in order to use the DB2 - Apply Fixpack on DB2 Home workflow.

DB2 - Rollback Fix Pack

This section describes how to use HP Database and Middleware Automation (HPE DMA) to roll back server or universal fixpack for IBM DB2 home, instances and databases on the target server where it is deployed.

Goal

This section describes process for fixpack rollback process:



The diagram shows a DB2 server with two instances. The DB2 instances point to the DB2 software installation directory that is updated over time with subsequent DB2 server fix packs.

Prerequisites

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

- A server running AIX 6.1 or 7.1 or Red Hat Enterprise Linux 5 or 6. The operating system platform must be certified for the pertinent DB2 fix pack version.
- DB2 server software—version 9.5, 9.7, 10.1, or 10.5—is installed on the target and fixpack applied.
- The workflow must have the unchallenged ability to become the OS administrator user (typically root on UNIX systems).
- For all the instances on the target machine, the license has to be activated to use; otherwise the workflow will not be able to restart the instances after the fixpack is rolled back and database connection may not be possible again.
- The user who runs the workflow with the server wrapper must have the access to create or modify the directory structure for instances and databases.
- As stated in the IBM DB2 release bulletin, the following prerequisites must be satisfied before this workflow is run:

- DB2 software must be already installed on the target machine.
- The infrastructure required for rollback fixpack must be in place. Make sure the target server has adequate available disk space to rollback and restore DB2 installation. By default, it is expected to have about double the size of current DB2 Installation on the disk.
- The operating system platform is certified for the pertinent DB2 specific fixpack version.
- The operating system kernel parameters and virtual and shared memory is properly configured to avoid any failure while applying the DB2 fixpack.
- All DMA database metadata must be up-to-date on the target server where the workflow is deployed.

Process Overview

Rollback of a DB2 Fix Pack for DB2 installations is a simple, one-step process. All required checks and steps have been implemented in a single HPE DMA workflow.

Use the following HPE DMA workflow to standardize the process of rollback a DB2 fix pack:

- DB2 - Rollback Fixpack

This workflow can rollback server or universal fixpack for IBM DB2 (LUW) instances on the target server where this workflow is deployed. It currently supports the DB2 Versions 9.5, 9.7, 10.1, 10.5 on RedHat Linux and AIX servers. This is a server level workflow. It will rollback fixpack to the DB2 Home (also known as the DB2 installation directory, e.g., /opt/ibm/db2/V10.5) installed on the target machine where this workflow is deployed. It updates all the instance(s) by restoring the backup provided by the user.

This workflow shuts down all the DB2 instances, DB2 admin server, and licensing daemons that are running for all the instances that are provisioned against a specific DB2 home (DB2 Installation Location). It kills all the application user connections with DB2 instances that are to be rolled back. It validates the eligibility for the fixpack to rollback by comparing the current fixpack level on the installed DB2 against the fixpack level that user is trying restore from the backup.

The workflow also rebinds the OS packages with databases for each instance, if exists.

Workflow: DB2 - Rollback Fixpack

This section provides detailed information required to run the DB2 - Rollback Fixpack workflow.

Solution pack

This workflow requires the HPE DMA Database Patching Solution Pack.

Parameters to expose

None

Input parameters

When you deploy the DB2 - Rollback Fixpack 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 Rollback Fixpack

Parameter	Description	Example Value
Backup Location For Installation	Required: Absolute directory path for DB2 Installation location where you want to create the backup copy of the current DB2 installation.	/opt/apps/db2/bkp/v10.5_bkp
Backup Location to Restore	Required: Absolute directory path for DB2 Installation location that you would like to restore for the rollback of the fixpack. Default value is False.	/opt/apps/db2/bkp/v10.5_bkp_to_restore
DB2 Installation Location	Required: Absolute directory path for DB2 Installation location on the target machine.	/opt/ibm/db2/v10.5

Step: Gather Advanced Parameters for Rollback Fixpack

Parameter	Description	Example Value
Bind Packages To Database	Optional: Enables or disables binding capability of workflow step for various packages to database (s) for each instance(s) created against current DB2 installation. The default value is set to "False" which will not bind any packages. Valid values are "Yes", "Y", "True", "False", "N", "No".	False
Web Service Password	Optional: Password for the discovery web service API. If password is not provided, the DMA token is used as the password.	
Web Service URL	Optional: URL for the HPE DMA Discovery web service API to discover and update metadata in DMA. Default value is DMA.URL.	dma.url
Web Service User	Optional: User capable of modifying the managed environment through the discovery web service API.	dma.user

FAQs

What can cause the workflow to fail?

The workflow will fail if the DB2 server fix pack is not available on the target or in the software repository.

To solve this problem, obtain the DB2 server fix pack from IBM, store the file either on the target or in the software repository, and then specify the filename in the DB2 Fixpack Software Binaries parameter before running the workflow.

How can I patch the DB2 databases?

The DB2 - Apply Fixpack on DB2 Home workflow only patches the DB2 Software Installation Directory and the associated instances. To update the DB2 databases with the newly applied DB2 fix pack, perform the following after running the workflow:

```
db2 CONNECT TO <dbname>
```

Here, <dbname> is the name of the DB2 database.

```
db2 BIND INSTHOME\sqllib\bnd\db2schema.bnd BLOCKING ALL GRANT PUBLIC SQLERROR CONTINUE
db2 BIND INSTHOME\sqllib\bnd\@db2ubind.lst BLOCKING ALL GRANT PUBLIC ACTION ADD
db2 BIND INSTHOME\sqllib\bnd\@db2cli.lst BLOCKING ALL GRANT PUBLIC ACTION ADD
```

Can I use HPE DMA to rollback DB2 universal fix packs?

Yes. HPE DMA can only rollback DB2 LUW universal fix packs to DB2 LUW server installations.

Can I use HPE DMA to rollback a DB2 fix pack if the instances have different initial fix pack versions?

No. All DB2 instances must have the same initial fix pack version in order to use the DB2 - Rollback Fixpack workflow.

DB2 - Upgrade Instance and Database

This section describes how to use Database and Middleware Automation (HPE DMA) to create a repeatable, standardized “gold image” for upgrading an IBM DB2 instance and database.

Goal

This workflow upgrades IBM DB2 instance(s) and database(s) on the target server where this workflow is deployed. It currently supports the DB2 versions 9.5, 9.7, 10.1, 10.5 on RedHat Linux and AIX servers. This is a server level workflow. It will install the software and upgrade the existing DB2 Home (also known as the DB2 Installation Directory, for example: /opt/ibm/db2/V10.5) installed on the target machine where this workflow is deployed. It upgrades all instance(s) and database(s) that exist for each of the respective DB2 setup.

The following options are available to upgrade DB2 instance(s) and database(s):

- DB2 9.5 to 9.7
- DB2 9.5 to 10.1
- DB2 9.7 to 10.1
- DB2 9.7 to 10.5
- DB2 10.1 to 10.5

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

Prerequisites

Before performing the procedures in this section, 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 HPE DMA):
 - Linux
 - AIX

See the *HPE DMA Support Matrix* for specific operating system versions, available at: <http://hpln.hp.com/group/database-and-middleware-automation>.

- 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.
- DB2 software must already be installed on the target server.
- Target server has available disk space to unpack the binary file and apply fixpack.
- Unchallenged ability to become the OS administrator user (typically root on UNIX systems).
- The following workflow requirements:

Workflow	Requirements
DB2 - Upgrade Instance and Database	The user who runs the workflow with the server wrapper must have access to create or modify the directory structure for instances and databases. After creating the instances, the license must be activated before the database

Workflow	Requirements
	<p>can use the instance.</p> <p>The HPE DMA database metadata is up-to-date for the DB2 Instance where the workflow is deployed.</p>

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

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

Process Overview

Upgrading IBM DB2 instance(s) and database(s) on the target server is a simple process. All required checks and steps to upgrade DB2 instance(s) and database(s) have been implemented in a single HPE DMA workflow.

Use the following HPE DMA workflow to standardize the process of upgrading IBM DB2 instance(s) and database(s) on the target server:

Note: This workflow support DB2 version 10.1 or 10.5 on a Red Hat Linux or AIX server.

Before running the DB2 - Upgrade Instance and Database workflow, the DB2 license must be activated for the instances that you create.

Important Notes: The DB2 - Upgrade Instance and Database workflow does not support the following:

- The DB2 - Upgrade Instance and Database workflow currently installs only the GA or fixpack and upgrades all the instance(s) and database(s) against the specific DB2 Installation. It does not currently upgrade a specific instance or database.
- The DB2 - Upgrade Instance and Database workflow currently does not upgrade the instance(s) and databases(s) that are provisioned on DB2 High Availability Disaster Recovery (HARD), DB2 Purescale, or Database Partition Feature (DPF).
- This workflow currently does not support cleaning up the partially upgraded instance(s) or database(s). Partially upgraded database(s) or instance(s) cannot be restored or downgraded to its original state. In such cases, install the fresh DB2 binary (with the necessary versions on DB2), provision the instance (s) desired, and restore the database(s) from backup.
- This workflow does not upgrade DB2 Admin Server. DB2 Admin Server has to be manually upgraded.

Workflow: DB2 - Upgrade Instance and Database

This section provides detailed information required to run the DB2 - Upgrade Instance and Database workflow.

Solution pack

This workflow requires the HPE DMA Database Provisioning Solution Pack.

Parameters to expose

If user desire to use non-default values set in the workflow step, the following parameters are exposed for user input:

- Clean on Failure
- Clean on Success
- DB2 Archive Location
- DB2 Configuration Backup Location
- DB2 Installation Type
- DB2 Product Edition
- DB2 Product Installation Language
- DB2 Product License
- DB2 Staging Location
- DB2 Upgrade Check Logfile Location
- Install Tivoli System Automation Multiplatforms
- Trust SSL Certificates
- User Defined Responsefile
- Web Service Password
- Web Service URL
- Web Service User

Input parameters

When you deploy the DB2 - Upgrade Instance and 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 Upgrade Instance and Database

Parameter	Description	Example Value
DB2 Existing Installation Location	The fully-qualified absolute directory path where the current version of DB2 software is already installed and set up with instances and databases.	/opt/ibm/db2/v10.1
DB2 Installation Location	The fully-qualified absolute directory path where the upgrade version of DB2 software will be installed to upgrade the instances and databases.	/opt/ibm/db2/v10.1_to_v10.5
DB2 Software Binaries	Required: Name of the DB2 installer archive file. Obtained from IBM. If the file is not found in DB2 Archive Location(/tmp/dma/archive), It will be	v10.5_aix64_server_t.tar.gz

Step: Gather Parameters for DB2 Upgrade Instance and Database, continued

Parameter	Description	Example Value
	downloaded from the SA repository.	

Step: Gather Advanced Parameters for DB2 Upgrade Instance and Database

Parameter	Description	Example Value
Clean on Failure	Optional: Flag that determines whether to clean up on workflow failure. If set to 'yes', the workflow will clean up the downloaded files, installation location and the staging location. Valid values are 'Yes' and 'No'. The default value is 'Yes'.	Yes
Clean on Success	Optional: Flag that determines whether to clean up on workflow success. If set to 'yes', the workflow will clean up the downloaded files. The default value is 'Yes'.	Yes
DB2 Archive Location	Optional: Location on the target machine where the DB2 binaries will be stored prior to the installation. The default value is /tmp/dma/archive.	/tmp/dma/archive
DB2 Configuration Backup Location	Optional: Directory location where the DB2 Server, instance and database level configuration will be backed up in different files. The default value is set '/tmp/dma/config_bkp'.	/tmp/dma/config_bkp
DB2 Installation Type	Optional: The type of DB2 installation supported by IBM. It can be either COMPACT, TYPICAL or CUSTOM. The default value is 'TYPICAL'. If set the CUSTOM, you should provide the DB2 installation responsefile with the custom parameter values.	TYPICAL
DB2 Product Edition	Optional: The product that you want to install, for example, DB2 Workgroup Edition, DB2 Enterprise Edition only, or other editions. The default value is set to 'DB2_SERVER_EDITION' for DB2 10.5 in this step. If upgrading to DB2 version 9.7 or 10.1 then you should use 'ENTERPRISE_SERVER_EDITION'.	DB2_SERVER_EDITION
DB2 Product Installation Language	Optional: The language(s) you want installed. If you do not enable any language keywords, then the English language (EN) will be installed by default. Please refer IBM install	EN

Step: Gather Advanced Parameters for DB2 Upgrade Instance and Database, continued

Parameter	Description	Example Value
	guide for the more details.	
DB2 Product License	Optional: Modify the value of the following LIC_AGREEMENT keyword to indicate that you have read and agreed to the license agreement file in the db2/license directory on the installation media. Default value is set to 'ACCEPT'	ACCEPT
DB2 Staging Location	Optional: Location on the target machine where the DB2 software installation binaries will be extracted. The default value is /tmp/dma/staging.	/tmp/software/staging
DB2 Upgrade Check Logfile Location	Optional: Directory location on target machine where the pre-upgrade check logfile will be created if it runs. The default location value is '/tmp'. The only valid values are /tmp or /var/tmp.	/tmp
Install Tivoli System Automation Multiplatforms	Optional: If set to "YES", IBM Tivoli System Automation for Multiplatforms (SA MP) is installed with required components. Do not specify any value if installing DB2 10.1 (or higher version) since this option is deprecated.	NO
Trust SSL Certificates	Optional: If 'True', this step will trust any SSL used to connect to the DMA Web Service.	True
User Defined Responsefile	Optional: The user response file that will be used to provision DB2 Software. If the user response file is not specified, the workflow will use the deployment parameters and create a default response file using the default configuration set. If responsefile is provided, workflow will use the user specified responsefile parameter values.	
Web Service Password	Optional: Password for the HPE DMA Discovery web service API to discover and update the metadata in DMA.	--
Web Service URL	Optional: URL for the HPE DMA Discovery web service API to discover and update metadata in DMA.	--
Web Service User	Optional: User for the HPE DMA Discovery web service API to discover and update metadata in DMA.	--

FAQs

Can I use HPE DMA to provision DB2 universal databases?

No. HPE DMA can only provision DB2 server installations.

Can I use DB2 - Upgrade Instance and Database workflow to upgrade fixpack?

Yes. The workflow supports upgrading lower version of DB2 fixpack to a higher version of DB2 fixpack level (for example, from 10.1 FP4 to 10.5 FP6).

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

HPE DMA does not automatically provision the IBM DB2 license.

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Feedback on Workflows for IBM DB2 (Database and Middleware Automation 10.40)

Just add your feedback to the email and click send.

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We appreciate your feedback!