

**WebSphere Business Integration Server
Foundation
Process Choreographer**

**Migrating Process Choreographer to
Version 5.1**

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1. Introduction

This document describes the support that is provided by WebSphere process choreographer to migrate configuration data and business process applications from earlier WebSphere versions to WebSphere V5.1.

Only perform the instructions in this document if you have configured process choreographer in WebSphere V5.0.x and want to upgrade the existing configuration to WebSphere V5.1. If you have not configured process choreographer in V5.0.x, or if you want to create a new process choreographer configuration in V5.1, then you do not need to read this document.

Migration support for process choreographer extends the WebSphere migration support by migrating the business process container configuration and applications that contain business processes.

The migration support for process choreographer includes the following features:

- API backward-compatibility.
- Seamless handling of running process instances.
- Seamless handling of database schema changes and extensions.
- Continuity of the audit log.
- Updating the process container preserves the existing configuration.
- Updating the Web client preserves the existing configuration.

Note: Migrating V5.0.x-style business processes (FDML) to V5.1-style business processes (BPEL) is outside the scope of this document; it is described in the WSAD IE V5.1 documentation.

2. Preparing the environment for migration

This document only covers items that are specific to process choreographer. For general information about preparing for WebSphere migration, Information Center at <http://publib.boulder.ibm.com/infocenter/ws51help/index.jsp> (click WebSphere Application Server > Migrating > Getting Started > Migrating and coexisting).

The following conditions must be met before you can start migrating from WebSphere Enterprise V5.0.x to WBI SF V5.1:

- One of the following WebSphere Enterprise versions must be installed with process choreographer configured:
 - V5.0.0 with mandatory e-fixes PQ70655 and PQ71037 and WebSphere MQ as the JMS provider.
 - V5.0.1 with WebSphere MQ as the JMS provider.
 - V5.0.2 with WebSphere MQ or with embedded messaging as the JMS provider.
- When using WebSphere MQ as the JMS provider for process choreographer, upgrade to WebSphere MQ 5.3 CSD 04 or a later release because earlier versions of WebSphere MQ are no longer supported.

- When using embedded messaging as the JMS provider for process choreographer, note that V5.0.0 and V5.0.1 use a level of embedded messaging that is incompatible with the level supported by V5.0.2 or V5.1. To solve this problem, upgrade V5.0.0 or V5.0.1 to V5.0.2 by applying Fix Pack 2.
- WBI SF V5.1 must be installed on the application server node(s). When migrating an ND environment, WBI SF V5.1 must also be installed on the deployment manager node and the V5.1 nodes must not have been added to the V5.1 deployment manager. This will be done during migration.
- You must not already have configured process choreographer in WBI SF V5.1. This implies that you cannot select ‘Configure a Sample Business Process Container’ during WBI SF V5.1 installation.
Caution: This condition will not be detected by migration but is likely to result in an unusable process choreographer configuration.
- Upgrade your database software to a supported level:
 - **For Cloudscape:**
A new version of embedded Cloudscape is shipped with WBISF V5.1. Cloudscape is not supported by process choreographer in an ND environment. If it is used for an unmanaged node the Cloudscape database must be moved manually from the V5.0.x installation directory (usually, `<install_root>/ProcessChoreographer/BPEDB`) to the WBI SF V5.1 installation directory. You must do this before you start the V5.1 application server for the first time after migrating. At this point, the Cloudscape database will be updated to the new version because the process choreographer migration process adds the `upgrade=true` flag to the data source definition.
 - **For DB2:**
Depending on the existing DB2 version, you might have to upgrade the database system. You must complete any necessary upgrade before starting to migrate WebSphere. On Windows, UNIX, and Linux systems, DB2 UDB V7 is no longer supported. On z/OS, DB2 UDB V6 is no longer supported.
 - **For Oracle:**
Oracle version 8 clients are no longer supported. If you cannot upgrade your database server to Oracle version 9, you must at least install the version 9 client to be able to access the database in WBI SF V5.1. The JDBC driver used with WebSphere V5.0.x, (the `classes12.zip` file that ships with Oracle) cannot be used with WBI SF V5.1. You must download the new JDK 1.4 compliant version of the JDBC driver (`ojdbc14.jar`) from Oracle and copy it to the same location as the `classes12.zip` file. During migration, the JDBC provider will be modified to use the `ojdbc14.jar` file.
 - **For Sybase:**
For Sybase 12.5, patch 12.5.0.3 is required
 - **For Microsoft SQL Server:**
Migration specific tasks are not necessary.
 - **For Informix:**
Informix was not supported by process choreographer before WBI SF V5.1, therefore no upgrade is needed.

- If you want to update the process choreographer database schema manually, you must do it before starting the V5.1 application server for the first time. The database schema will be automatically updated during application server startup if it was not done before. For details, see the following section.

3. Updating the database schema

To continue working with an existing database that is used with Version 5.0.x of process choreographer, you must update the database schema. This must be completed before the first business process is run with V5.1 of the product.

Create a backup of your process choreographer database before you update the schema.

If you have process choreographer running on multiple application servers in a cluster, you only need to update the database once per cluster.

Choosing automatic or manual update

If process choreographer V5.1 detects an older schema, it will automatically update the database schema – this is referred to as “automatic schema update” and requires appropriate user rights to allow schema changes to the process choreographer database.

The automatic schema update operation use the existing data source setting to access the process choreographer database. The user ID which is specified as an authentication data alias must have permissions (database rights) to perform operations such as:

- CREATE TABLE
- ALTER TABLE
- CREATE INDEX
- CREATE VIEW
- DROP VIEW

While this is normally not a problem in a test environment (such as the WSAD IE Unit Test Environment), a database administrator might be reluctant to grant these rights to a user for a production system.

If the user ID used to connect to the database does not have appropriate permissions and if it cannot be assigned the permissions temporarily (for the duration of the update process), then you must update the schema manually.

Process choreographer V5.1 must have been installed to perform the following tasks.

Steps required for an automatic schema update

The database system must acquire exclusive locks to alter database objects in the existing schema. If it fails to lock a database object, the automatic update algorithm will repeatedly retry until all changes have been applied successfully.

1. Make sure the user ID you choose to access the process choreographer database has the rights to create, drop, and alter tables and views. For details on how to grant these rights, refer to the documentation for your database system.

2. Start the V5.1 application server.
3. Use the process choreographer Web client or any other business process application that will trigger database operations in process choreographer.
4. Check that the migration “started” and “completed successfully” messages are reported (shown here for an update of a V5.0.2 database):


```
BPEP0612I: Database Migration started 502 to 510
BPEP0613I: Database Migration completed successfully 502 to 510
```
5. If there are any errors or exceptions, messages such as


```
BPEP0614E: Database migration step failure ...
```

 will be reported. In this case, stop the application server, work on the reported errors and start again from step 2.

Steps required to update the schema manually

The updated database schema for V5.1 is compatible with version 5.0.x of process choreographer. If you chose to perform a "manual update", you must complete these steps before the V5.1 process choreographer accesses the database system.

1. Process choreographer V5.1 ships scripts to upgrade from a V5.0 or a V5.0.1 database are in the directory:


```
<install_root>/AppServer/ProcessChoreographer/upgradeSchema_50
```

 and scripts to upgrade from a V5.0.2 database are in the directory:


```
<install_root>/AppServer/ProcessChoreographer/upgradeSchema_502.
```

 In the appropriate directory, identify the script that applies to your installed database system. For example, to upgrade a DB2 UDB V8 database that is used with Process choreographer V5.0.2, use the script named “upgradeSchema502Db2.ddl”.
2. Check the script, and make any necessary changes to it. For example, you must substitute some values for placeholders before running the script for DB2 on z/OS.
3. Make sure that the user ID that you will use to run the script has the rights to create, drop, and alter schema objects in the database. For details on how to grant these rights, refer to the documentation for your database system.
4. The scripts do not use schema qualifiers and process choreographer does not access tables using schema qualifiers.
 Therefore, if the user ID that will run the script does not match the one you configured in the application server to access the database, you must either add additional qualifiers or create appropriate aliases.
5. Check the script for instructions about how to run it.
6. Run the script on your database.
 Note: For DB2 on z/OS there are two upgrade scripts, first run the “upgrade tablespace” script named “upgradeTablespaces502Db2V7zOs.ddl”, then run the “upgrade schema” script named “upgradeSchema502Db2V7zOs.ddl”.
7. If any errors or exceptions are reported during the processing of the script, use the tools that come with the database system to run the script step by step.
8. If you intend to remove tables and tablespaces for a DB2 z/OS V7 system after updating the schema, note that the naming of tablespaces has been changed for process choreographer V5.1. If you run the dropTablespaceDb27zOs.ddl script that ships with V5.1, it will not delete the tablespaces that existed with version

5.0. Either delete them manually or run the V5.0.2 script to remove them from your database system.

4. Migrating an unmanaged node

1. During the migration of an unmanaged node with one or more process choreographer configurations there are no considerations specific to process choreographer.
2. If you are using a Cloudscape database for process choreographer you must move it manually to the new WBI SF V5.1 installation before trying to start the migrated server.

5. Migrating a managed (federated) node

1. To reduce the overall internal complexity during migration it is recommended to have no more pending compensation tasks. Especially when complex processes are distributed across certain cluster nodes a pending compensation can result in the situation that a process can not completed until all cluster nodes are migrated. To get information on pending compensation tasks:
 - a. Connect to the database (for example, for DB2, enter the command:
`db2 connect to BPEDB`)
 - b. Query for any pending compensation (for example, for DB2, enter the command:
`db2 select namefld,coordinatorstate,uuidfld from coordinator`).
 - c. If no rows are returned then no compensation tasks are pending.
2. Migrate the deployment manager node before migrating any other nodes in the cell.
 - a. During migration of the deployment manager there are no considerations specific to process choreographer.
 - b. Do not use the administrative console or administration scripting during migration. In particular, deploying new processes will result in unpredictable results.
3. If the node has servers that are members of a cluster which spans multiple nodes (in other words, not all servers in the cluster are on the same node) and the cluster has process choreographer configured, then you must perform additional steps to ensure that no V5.1 servers in the cluster are started while there are still V5.0 .x servers running (see “Limitations”):
 - a. Stop the servers of the V5.0.x node that you are migrating.
 - b. Migrate the node to V5.1 as described in step 4 below. In the `<install_root>/logs/WASPostUpgrade*.log` file you will see a warning message:

```
BPEM0202W: You must manually update the Process Choreographer cluster
'<clusterName>' when half of the nodes have been migrated.
BPEM0201I: Make sure the deployment manager is running and then run:
BPEM0201I:      wsadmin.bat -f ProcessChoreographer\bpeupgrade.jacl
            -cluster <clusterName> -migrationFrom <version>
```

- c. When half of the nodes that have cluster members have been migrated, stop all remaining V5.0.x servers and only then start the V5.1 servers. This will cause a short service-outage, which cannot be avoided. On the deployment manager, you must run the following command:

On Windows systems, enter the commands:

```
cd %WAS_HOME%\ProcessChoreographer
..\bin\wsadmin.bat -f bpeupgrade.jacl -cluster <clusterName> -migrationFrom <version>
```

On Unix systems, enter the commands:

```
cd $WAS_HOME/ProcessChoreographer
../bin/wsadmin.sh -f bpeupgrade.jacl -cluster <clusterName> -migrationFrom <version>
```

Where *<version>* is the WebSphere Enterprise version you are migrating from, for example, “5.0.2”. The actual value to use will be displayed as part of the message issued by the WASPostUpgrade tool. This step is required because the process choreographer V5.0 code (bpecontainer.ear) cannot run on a node that has been migrated to V5.1.

- d. Migrate the remaining V5.0 nodes one by one.
4. There are two cases to consider when migrating a managed node:
- a. If the deployment manger is running during the migration of a managed node with one or more process choreographer configurations, there are no considerations specific to process choreographer.
 - b. If the deployment manger is not running during the migration of a managed node with one or more process choreographer configurations, you will see the following messages:

```
Connection status: ERROR
BPEM0202W: Running Process Choreographer migration on a managed node; the admin
client cannot connect to the deployment manager.
BPEM0201I: Make sure the deployment manager is running and then run:
BPEM0201I:      wsadmin.bat -f ProcessChoreographer\bpeupgrade.jacl -
migrationFrom <version>
BPEM0201I: You can run this command either locally or on the deployment
manager.
BPEM0201I: If you run it on the deployment manager, add the '-node <nodeName>'
command line option.
BPEM0201I: If global security is enabled, add the '-user <uid> -password <pwd>'
command line options.
```

- i. Start the deployment manager.
- ii. Synchronize the node by running the syncNode command or by using the administrative console.
- iii. On Windows systems, enter the following command:

```
cd %WAS_HOME%\ProcessChoreographer
..\bin\wsadmin.bat -f bpeupgrade.jacl -migrationFrom <version>
```

- iv. On Unix systems, enter the following command:

```
cd $WAS_HOME/ProcessChoreographer
../bin/wsadmin.sh -f bpeupgrade.jacl -migrationFrom <version>
```

6. Limitations

- After migration, you must not use any of the WebSphere V5.0.x servers that have process choreographer configured. If the process choreographer database is accessed by V5.0.x servers and V5.1 servers, the database might become corrupted.
- Never create V5.0.x cluster members in clusters that have process choreographer configured and have already been migrated to V5.1. This would cause the process choreographer V5.1 code to be synchronized to the V5.0.x servers, but the process choreographer V5.1 code cannot run on V5.0.x application servers, so they will fail to start.
- Never configure process choreographer on a server of a managed WebSphere V5.0.x node if the deployment manager has already been migrated to V5.1. The reason is the same as for the previous limitation.
- When migrating a cluster that spans multiple nodes, you must manually run `bpeupgrade.jacl` to update the process choreographer V5.0 code to V5.1 because the process choreographer V5.0 code cannot run on nodes that have been migrated to V5.1 (for details refer to 5.3 above).

Appendix A: Cluster migration example

The steps required to migrate a cluster with process choreographer must be performed in a particular sequence.

In this example, one deployment manager (ND) and two managed nodes (AS1 and AS2) each reside on a dedicated machine. The application servers are both members of a cluster named “TestCluster”. WebSphere V5.0 is installed on all hosts and process choreographer is configured in the cluster and operational. In addition it is assumed that the WebSphere V5.0 server cluster and the deployment manager are running.

1. If required, upgrade the database system (for example. upgrade from DB2 UDB V7 to DB2 UDB V8) before you start the WebSphere migration.
2. If not already installed, upgrade WebSphere MQ to CSD 04.
3. Verify that your V5.0 setup is working properly after the database system and the WebSphere MQ upgrade.
4. Install WebSphere 5.1 on ND, AS1, and AS2. Do not select the migration check box during installation. You must not configure process choreographer on the newly installed systems.
5. For the following commands, you must use the correct environment. To get the correct environment, run the utility:
`$WAS_HOME/bin/setupCmdLine.sh`
6. From the WBI SF V5.1 installation, run the WASPreUpgrade tool for ND, AS1, and AS2 on the corresponding machines.
7. From the WBI SF V5.1 installation, run the WASPostUpgrade tool for ND.
8. Start the WBI SF V5.1 deployment manager.
9. On AS1, stop the application server **and** the node agent (using the Administration Console).

10. From the WBI SF V5.1 installation, run the WASPostUpgrade tool for AS1
11. Now that half of the nodes have been migrated, perform the manual step from the WBI SF V5.1 deployment manager by entering the command:

```
bpeupgrade.jacl -cluster TestCluster
```

§ If WebSphere global security is enabled, you must also add the command line options `-user <UserID> -password <Password>`
12. On AS2 stop the application server **and** the node agent. (using the Administration Console).
13. On AS1, start the 5.1 node agent and the application server.
14. From the WBI SF 5.1 installation run the WASPostUpgrade tool on AS2
15. On the AS2 start the node agent.
16. After the node agent from AS2 has connected to the deployment manager start the application server on AS2.

Appendix B: Reference

- In case of problems, check the migration message log which can be found in `<install_root>/logs/WASPostUpgrade*.log`. This file includes information about process choreographer migration. If you ran the `bpeupgrade.jacl` script manually, the log file can be found at `<install_root>/logs/bpeupgrade.log`.
- Like the other WebSphere samples, the process choreographer samples, `TravelBooking.ear` and `TravelBookingSAMP.ear`, are not migrated on unmanaged nodes. However, they are migrated on managed nodes. It is recommended that you work with the WBI SF V5.1 versions of the process choreographer samples instead. Therefore, on a managed node uninstall these samples and install the new versions after the migration is completed.

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