IBM InfoSphere Data Replication
Version 10.1.3

Migrating to Replication and Event Publishing Version 10.1.3

IBM

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IBM

> **Note**
>
> Before using this information and the product that it supports, read the information in "Notices and trademarks" on page 69.

Contents

Chapter 1. Migrating to Q Replication and Event Publishing Version 10.1.3 (Linux, UNIX, Windows)

Migrating to Q Replication and Event Publishing Version 10.1.3 on Linux, UNIX, and Windows involves running SQL scripts that add new control tables, change some existing control tables, and update the architecture level and compatibility information in the control tables.

On Linux, UNIX, and Windows, first you upgrade your DB2® instance to Version 10.1, and then you activate InfoSphere® Data Replication Version 10.1.3. Finally, you run SQL scripts to migrate the control tables to Version 10.1.3.

Migrating is a multistep process: You run a series of scripts, each of which migrates the control tables to the next version:

- From Version 9.7 Fix Pack 3 to Version 10.1.3
- From Version 9.7 to Version 9.7 Fix Pack 3
- From Version 9.5 to Version 9.7
- From Version 9.1 to Version 9.5

You must migrate the control tables after the Q Capture and Q Apply servers are upgraded to Version 10.1.3. You can migrate the Version 10.1.3 Q Capture and Q Apply servers independently. Coexistence support in Version 10.1 (Linux, UNIX, Windows) describes the ability of the Version 10.1.3, Version 9.7, and Version 9.5 Q Replication and Event Publishing programs to work together so that you can upgrade your environment in stages.

Note: For multidirectional replication, the paired sets of Q Capture and Q Apply control tables must be migrated at the same time

Migrating the Q Capture program to Version 10.1.3 (Linux, UNIX, Windows)

You migrate the Q Capture control tables to the Version 10.1.3 level after you upgrade the Q Capture server to DB2 Version 10.1 for Linux, UNIX, and Windows.

Before you begin

The Q Capture control tables must be at the Version 9.7 Fix Pack 3 or 3a level. See Chapter 3, "Migrating to replication and publishing Version 9.7 Fix Pack 3 or 3a (Linux, UNIX, Windows)," on page 9 for details. If the ARCH_LEVEL column in the IBMQREP_CAPPARMS table is lower than 0907, you must run multiple migration scripts to bring the control tables to the Version 9.7 Fix Pack 3 or 3a level (ARCH_LEVEL 0973).

1. Stop the Q Capture program.
2. Upgrade the DB2 instance to Version 10.1. See Upgrade essentials for DB2 servers for more information.

   From this point, do not use the replication administration tools to modify your replication configuration (for example to add a Q subscription) until your Q Capture control tables are migrated.

3. Activate InfoSphere Data Replication 10.1.3 by installing the InfoSphere Data Replication Activation Kit.
4. Migrate the Q Capture control tables to the Version 10.1.3 level:
   a. Find the migration script for your DB2 or Oracle source database in the `sqllib/samples/repl/mig10/q/` directory.

Platform	Migration script file
DB2	`asnqcapluwv10.sql`
Oracle	`asnoqcapluwv10.sql`

   b. Change the variable for the Q Capture schema to your schema.
   c. Change all occurrences of *!CAPTABLESPACE!* to the name of the table space where your Q Capture control tables are created.
   d. Run the migration script.
5. Optional: Migrate any Q Apply programs that the Q Capture program replicates to, and then ensure that the value of the COMPATIBILITY column in the IBMQREP_CAPPARMS table is correct. Refer to the table in "Coexistence support in Version 10.1.3 (Linux, UNIX, Windows)" on page 3 for the appropriate compatibility values. You can use the following SQL statement to update the value:

```
UPDATE schema.IBMQREP_CAPPARMS
SET COMPATIBILITY = '1001';
```

6. Start the Q Capture program with **startmode**=warmsi and **migrate**=y.

Recommendation: Start the Q Capture program as soon as possible after the migration, before you start other applications if possible. DB2 provides replication with the first valid log sequence number (LSN) within the current set of active log files as determined by the LOGPRIMARY database parameter. You should start Q Capture soon enough to ensure that all of the transactions that need to be captured can be found in the active log files.

Migrating the Q Apply program to Version 10.1.3 (Linux, UNIX, Windows)

You migrate the Q Apply control tables to the Version 10.1.3 level after you upgrade the Q Apply server to DB2 Version 10.1 for Linux, UNIX, and Windows.

Before you begin

The Q Apply control tables must be at the Version 9.7 Fix Pack 3 or 3a level. See Chapter 3, "Migrating to replication and publishing Version 9.7 Fix Pack 3 or 3a (Linux, UNIX, Windows)," on page 9 for details. If the ARCH_LEVEL column in the IBMQREP_APPLYPARMS table is lower than 0907, you must run multiple migration scripts to bring the control tables to the Version 9.7 Fix Pack 3 or 3a level (ARCH_LEVEL 0973).

1. Stop the Q Apply program.

   Note: If your Q Capture program is processing a high volume of data, the receive queue could fill while Q Apply is stopped, prompting the source transmission queue to fill and Q Capture to stop. If this happens, you can start Q Capture after Q Apply migration is complete and Q Apply then starts processing messages on the receive queue.

2. Upgrade the DB2 instance to Version 10.1. See Upgrade essentials for DB2 servers for more information.

   From this point, do not use the replication administration tools to modify your replication configuration (for example to add a Q subscription) until your Q Apply control tables are migrated.

3. Activate InfoSphere Data Replication 10.1.3 by installing the InfoSphere Data Replication Activation Kit.

4. Migrate the Q Apply control tables to the Version 10.1.3 level:

   a. Find the migration script for your DB2 or non-IBM target database in the `sqllib/samples/repl/mig10/q/` directory.

Platform	Migration script file
DB2	`asnqappluwv10.sql`
Oracle	`asnqapporav10.sql`
Informix®	`asnqappinfx10.sql`
Sybase	`asnqappsyb10.sql`
Microsoft SQL Server	`asnqappmssql10.sql`
Teradata	`asnqapptera10.sql`

   b. Change the variable for the Q Apply schema to your schema.

   c. Change all occurrences of *!APPTABLESPACE!* to the name of the table space where your Q Apply control tables are created.

   d. Run the migration script.

5. Optional: If the Q Capture program that replicates data to this Q Apply program was upgraded to Version 10.1.3, make sure that the COMPATIBILITY value in the IBMQREP_CAPPARMS table on the Q Capture server is changed to 1001. You can use the following SQL statement to update the value:

```
UPDATE schema.IBMQREP_CAPPARMS
SET COMPATIBILITY = '1001';
```

   If the Q Capture version is prior to V10.1.3, refer to the table in "Coexistence support in Version 10.1.3 (Linux, UNIX, Windows)" for the appropriate compatibility values.

6. Start the Q Apply program.

Coexistence support in Version 10.1.3 (Linux, UNIX, Windows)

The Q Capture and Q Apply programs support full interoperability between Version 10.1.3 on Linux, UNIX, and Windows, Versions 10.1 and 9.1 on z/OS®, and Versions 9.7, 9.5, and 9.1 on Linux, UNIX, and Windows.

After you install DB2 Version 10.1 for Linux, UNIX, and Windows on the system where Q Capture runs, you migrate the Q Capture control tables to Version 10.1.3. You might need to change the value of the COMPATIBILITY column in the IBMQREP_CAPPARMS table depending on the version of your Q Apply program or programs. Q Capture checks this column to determine the level of messages to send.

Important: The compatibility level of the Q Capture server must be at the same level as or lower than the architecture level of the consuming Q Apply program's control tables.

Table 1 shows relationships between Version 9 and Version 10 replication programs and the effect of the COMPATIBILITY setting.

Table 1. Required settings for COMPATIBILITY column in IBMQREP_CAPPARMS table to enable coexistence between different versions

Q Apply version

		9.1	9.5	9.7	9.7 FP2	9.7 FP3	9.8 FP3 or above	10.1 (z/OS)	10.1.3
Q Capture version (includes Oracle sources)	**9.1**	0901	0901	0901	0901	0901	0901	0901	0901
	9.5	0901	0905	0905	0905	0905	0905	0905	0905
	9.7	0901	0905	0907	0907	0907	0907	0907	0907
	9.7 FP3 (Linux, UNIX, Windows)	0901	0905	0907	0907	0973	0907	0907	0907
	9.8 FP2 or above (Linux, UNIX, Windows)	Not supported	Not supported	Not supported	0908	0908	0908	0908	0908
	10.1 (z/OS)								
	10.1.3 (Linux, UNIX, Windows)	0901	0905	0907	0907	0973	0908	1001	1001

ASNCLP and Replication Center

Although in most cases the ASNCLP command-line program and Replication Center support the creation of control tables that are at a newer version than the DB2 server on which they are created, for Version 10.1.3 this is not the case.

The Version 10.1.3 control tables are designed to accommodate longer, 16-byte log sequence numbers that are used starting with DB2 10.1 for Linux, UNIX, and Windows, and so Version 10.1.3 control tables can only be created on a DB2 10.1 for Linux, UNIX, and Windows database.

Table 2 shows the level of control tables that are created by the ASNCLP program and Replication Center on different server levels as indicated by the value of the ARCH_LEVEL column in the IBMQREP_CAPPARMS table.

Table 2. Version of control tables created by different levels of replication administration tools on different server levels

Server level

Table 2. Version of control tables created by different levels of replication administration tools on different server levels (continued)

		z/OS V10.1 or below	Linux, UNIX, Windows V10.1.3	Linux, UNIX, Windows V9.7 FP3-FP5	Linux, UNIX, Windows V9.8 FP2-FP3	Linux, UNIX, Windows V9.7-V9.7 FP2	Linux, UNIX, Windows V9.5	Linux, UNIX, Windows V9.1	Oracle source
Admin client	V10.1	1001	1001						1001
	V9.7 FP5	100Z	Not supported	0973	0908	0907^2	0905^2	0901^2	0973
	V9.7 FP4								
	V9.8 FP3		0973						
	V9.7 FP3								
	V9.8 FP2	0907	0907	0907	0908^1				0907
	V9.7 FP2				0907	0907			
	V9.5	0905						0901	Not supported
	V9.1	0901							

1. Only the ASNCLP command-line program is supported.
2. Administration clients that are at Version 9.7 FP2 and newer allow you to create control tables at a version that is higher than the DB2 server, as long as the ARCH_LEVEL value of the control tables is lower than 1001.

Chapter 2. Optional: Migrating to replication and publishing Version 9.7 Fix Pack 5 (Linux, UNIX, Windows)

The optional migration to Version 9.7 Fix Pack 5 on Linux, UNIX, and Windows adds new indexes on two control tables to help improve performance.

The migration scripts add the following indexes:

IBMQREP_SUBS table
> On the SUB_ID column to avoid a table scan while generating a unique value for the SUB_ID column.

IBMQREP_TARGETS table
> On the SPILLQ and STATE columns to improve the performance of Q Apply while processing a Q subscription from a spill queue.

IBMQREP_EXCEPTIONS table
> On the EXCEPTION_TIME column to improve the processing time of queries that are performed by the Q Replication Dashboard.

Migrating the Q Apply control tables

Follow these steps to migrate the Q Apply control tables.

1. Stop the Q Apply program.

   Note: If your Q Capture program is processing a high volume of data, the receive queue could fill while Q Apply is stopped, prompting the source transmission queue to fill and Q Capture to stop. If this happens, you can start Q Capture after Q Apply migration is complete and Q Apply then starts processing messages on the receive queue.

2. Migrate the DB2 instance to Version 9.7 Fix Pack 5 by running the fix pack installer, which also upgrades the Q Apply server to Version 9.7 Fix Pack 5.

   From this point, do not use the replication administration tools to modify your configuration (for example, add a Q subscription) until the Q Apply control tables are migrated.

3. Migrate the control tables:
   a. Find the Q Apply migration script for your DB2 or federated target in the `sqllib/samples/repl/mig97/q/` directory:

Platform	Migration script file
DB2	`asnqappluwv97fp.sql`
Informix	`asnqappinfxv97fp.sql`
Oracle	`asnqapporav97fp.sql`
Microsoft SQL Server	`asnqappmssqlv97fp.sql`
Sybase	`asnqappsybv97fp.sql`
Teradata	`asnqappteradatav97fp.sql`

   b. Delete or comment out statements that apply to fix packs other than Version 9.7 Fix Pack 5.
   c. In the remainder of the script, replace the schema and table space names as required and run the script.

4. You can now start the Version 9.7 Fix Pack 5 Q Apply program to work with your Q Capture program.

Migrating the Q Capture control tables

Follow these steps to migrate the Q Capture control tables.

1. If you are migrating from Version 9.5 or earlier, quiesce all applications on the Q Capture server and let Q Capture read to the end of the DB2 log. This action ensures that no pre-Version 9.7 log records are generated that cannot be read by the V9.7 DB2 or Q Capture.

2. Stop the Q Capture program.

3. Migrate the DB2 instance to Version 9.7 Fix Pack 5 by running the fix pack installer, which also upgrades the Q Capture server to Version 9.7 Fix Pack 5.

   From this point, do not use replication administration to modify your replication configuration (for example to add a Q subscription) until your Q Capture control tables are migrated.

4. Find the migration script for your DB2 or Oracle source database in the `sqllib/samples/repl/mig97/q/` directory.

Platform	Migration script file
DB2	`asnqcapluwv97fp.sql`
Oracle	`asnoqcapluwv97fp.sql`

5. Delete or comment out statements that apply to fix packs other than Version 9.7 Fix Pack 5.

6. Change the variable for the Q Capture schema to your schema.

7. Run the script.

8. If all of the Q Apply programs that this Q Capture program replicates to are migrated to Version 9.7 Fix Pack 5, ensure that the value of the COMPATIBILITY column in the IBMQREP_CAPPARMS table is 0907. You can use the following SQL statement to update the value:

   ```
   UPDATE schema.IBMQREP_CAPPARMS
   SET COMPATIBILITY = '0907';
   ```

9. Start the Version 9.7 Fix Pack 5 Q Capture program. If you are migrating from Version 9.1 or 9.5 to Version 9.7 Fix Pack 5, use the initialization parameters **migrate**=y and **startmode**=warmns. If you are migrating from a previous Version 9.7 release or fix pack, these parameters are not required.

   Recommendation: Start the Q Capture program as soon as possible after the migration, before you start other applications if possible. DB2 provides replication with the first valid log sequence number (LSN) within the current set of active log files as determined by the LOGPRIMARY database parameter. You should start Q Capture soon enough to ensure that all of the transactions that need to be captured can be found in the active log files.

Chapter 3. Migrating to replication and publishing Version 9.7 Fix Pack 3 or 3a (Linux, UNIX, Windows)

Migrating your control tables to Version 9.7 Fix Pack 3 or 3a is required on Linux, UNIX, and Windows after you upgrade your DB2 instance to Version 9.7 Fix Pack 3 or 3a.

The following sections describe the migration process in more detail:
- "Migrating the Q Apply server first"
- "Migrating the Q Capture server before migrating multiple Q Apply servers" on page 10

Migrating the Q Apply server first

Follow these steps to migrate the Q Apply server first. You can use this procedure with a single Q Capture program that replicates to a single Q Apply program or to multiple Q Apply programs.

1. *Optional:* Stop the Replication Alert Monitor to prevent the monitor from issuing alerts while the replication programs are stopped for migration.
2. Stop the Q Apply program.

   Note: If your Q Capture program is processing a high volume of data, the receive queue could fill while Q Apply is stopped, prompting the source transmission queue to fill and Q Capture to stop. If this happens, you can start Q Capture after Q Apply migration is complete and Q Apply then starts processing messages on the receive queue.
3. Migrate the DB2 instance to Version 9.7 Fix Pack 3 or 3a by running the fix pack installer, which also upgrades the Q Apply server to Version 9.7 Fix Pack 3 or 3a.

   From this point, do not use the replication administration tools to modify your configuration (for example, add a Q subscription) until the Q Apply control tables are migrated.
4. Migrate the control tables:
   a. Find the Q Apply migration script for your DB2 or federated target in the `sqllib/samples/repl/mig97/q/` directory:

Platform	Migration script file
DB2	`asnqappluwv97fp.sql`
Informix	`asnqappinfxv97fp.sql`
Oracle	`asnqapporav97fp.sql`
Microsoft SQL Server	`asnqappmssqlv97fp.sql`

   b. Delete or comment out statements that apply to fix packs other than Version 9.7 Fix Pack 3 or 3a.
   c. In the remainder of the script, replace the schema and table space names as required and run the script.
5. You can now start the Version 9.7 Fix Pack 3 or 3a Q Apply program to work with your Q Capture program.

If you are ready to migrate the Q Capture server next, follow these steps:

1. If you are migrating from Version 9.5 or earlier, quiesce all applications on the Q Capture server and let Q Capture read to the end of the DB2 log. This action ensures that no pre-Version 9.7 log records are generated that cannot be read by the V9.7 DB2 or Q Capture.

2. Stop the Q Capture program.

3. Migrate the DB2 instance to Version 9.7 Fix Pack 3 or 3a by running the fix pack installer, which also upgrades the Q Capture server to Version 9.7 Fix Pack 3 or 3a.

   From this point, do not use replication administration to modify your replication configuration (for example to add a Q subscription) until your Q Capture control tables are migrated.

4. Find the `asnqcapluwv97fp.sql` migration script in the `sqllib/samples/repl/mig97/q/` directory.

5. Delete or comment out statements that apply to fix packs other than Version 9.7 Fix Pack 3 or 3a.

6. Change all occurrences of !capschema! to your Q Capture schema.

7. Change all occurrences of !qcsubbp! and !qcsubts! to the name of the buffer pool and table space where you want the IBMQREP_SUBS table to be created. You must create the IBMQREP_SUBS table in a table space with 8K page size.

8. Run the script.

9. If all of the Q Apply programs that this Q Capture program replicates to are migrated to Version 9.7 Fix Pack 3 or 3a, change the value of the COMPATIBILITY column in the IBMQREP_CAPPARMS table to 0907. Use the following SQL statement:

   ```
   UPDATE schema.IBMQREP_CAPPARMS
   SET COMPATIBILITY = '0907';
   ```

10. Reorganize the following control tables whose column data types or lengths were changed by the migration:
    - IBMQREP_CAPMON
    - IBMQREP_CAPQMON
    - IBMQREP_APPLYMON
    - IBMQREP_IGNTRANTRC
    - IBMQREP_SIGNAL

11. Start the Version 9.7 Fix Pack 3 or 3a Q Capture program with the parameters **migrate**=y and **startmode**=warmns.

    Recommendation: Start the Q Capture program as soon as possible after the migration, before you start other applications if possible. DB2 provides replication with the first valid log sequence number (LSN) within the current set of active log files as determined by the LOGPRIMARY database parameter. You should start Q Capture soon enough to ensure that all of the transactions that need to be captured can be found in the active log files.

12. Start the Replication Alert Monitor if you stopped it.

Migrating the Q Capture server before migrating multiple Q Apply servers

This procedure is a slight modification of the above procedures for use with multiple Q Capture or Q Apply servers.

1. Follow the steps above for migrating a Q Capture server.

2. Start the Version 9.7 Fix Pack 3 or 3a Q Capture program.
3. If you have more than one Q Capture program, migrate each one. Q Capture programs do not have to be migrated all at once.
4. Follow the steps above to migrate a Q Apply program.
5. You can now start the Version 9.7 Fix Pack 3 or 3a Q Apply program to work with your Version 9.7 Fix Pack 3 or 3a Q Capture program.
6. Repeat the migration steps for each Q Apply program that you want to migrate.

Chapter 4. Migrating to replication and publishing Version 9.7 Fix Pack 2 (Linux, UNIX, Windows)

Migrating to replication and publishing Version 9.7 Fix Pack 2 involves running SQL scripts that add a new control table, add new columns to existing control tables, and change nickname column options for some federated targets.

This migration is for Q Capture and Q Apply servers on Linux, UNIX, and Windows operating systems only. The following sections describe the migration process in more detail:

- "Control table changes"
- "Migrating the Q Apply server first"
- "Migrating the Q Capture server before migrating multiple Q Apply servers" on page 15

Control table changes

One new control table is added in V9.7 Fix Pack 2 to assist in replication from range-partitioned tables. New columns are added to two control tables to assist the replication administration tools, and new options are added to some nickname columns if you are replicating to federated targets. Table 3 describes the changes.

Table 3. Control table changes for Version 9.7 Fix Pack 2

Change	Description
New control table, IBMQREP_PART_HIST	Maintains a history of changes to range-partitioned source tables on Linux, UNIX, or Windows systems. This table is used by Q replication and SQL replication.
New column for IBMQREP_CAPPARMS table	CAPTURE_ALIAS column added to store the alias name for the database or subsystem that is used as the Q Capture server.
New column for IBMQREP_APPLYPARMS table	APPLY_ALIAS column added to store the alias name for the database or subsystem that is used as the Q Apply server.
Options added to nickname columns to improve Q Apply pruning performance	VARCHAR_NO_TRAILING_BLANKS 'Y' option added to IBMQREP_DONEMSG.RECVQ, IBMQREP_SPILLEDROW.SPILLQ, and IBMQREP_SPILLQS.SPILLQ for Oracle targets; BINARY_REP 'Y' added to IBMQREP_DONEMSG.MQMSGID for Microsoft SQL Server targets.

Migrating the Q Apply server first

You can migrate either the Q Capture or Q Apply server first because Version 9.7 Fix Pack 2 does not change the ARCH_LEVEL or COMPATIBILITY value in the control tables.

Follow these steps to migrate the Q Apply server first. You can use this procedure with a single Q Capture program that replicates to a single Q Apply program or to multiple Q Apply programs.

1. *Optional:* Stop the Replication Alert Monitor to prevent the monitor from issuing alerts while the replication programs are stopped for migration.
2. Stop the Version 9.7 Q Apply program.

   Note: If your Q Capture program is processing a high volume of data, the receive queue could fill while Q Apply is stopped, prompting the source transmission queue to fill and Q Capture to stop. If this happens, you can start Q Capture after Q Apply migration is complete and Q Apply then starts processing messages on the receive queue.
3. Upgrade your DB2 instance by installing Fix Pack 2 on top of DB2 Version 9.7.

   From this point, do not use the replication administration tools to modify your configuration (for example, add a Q subscription) until the Q Apply control tables are migrated.
4. Migrate the control tables:
   a. Find the sample migration script for your DB2 or federated target in the `sqllib/samples/repl/mig97/q/` directory:

Platform	Migration script file
DB2	`asnqappluwv97fp.sql`
Oracle	`asnqapporav97fp.sql`
Microsoft SQL Server	`asnqappmssqlv97fp.sql`

   b. Edit the script to replace the schema name as required and run the script.
5. You can now start the Version 9.7 Fix Pack 2 Q Apply program to work with your Version 9.7 Q Capture program.

If you are ready to migrate the Q Capture server next, follow these steps:

1. Stop the Version 9.7 Q Capture program.
2. Upgrade your DB2 instance by installing Fix Pack 2 on top of DB2 Version 9.7.

   From this point, do not use replication administration to modify your replication configuration (for example to add a Q subscription) until your Q Capture control tables are migrated.
3. Migrate the control tables:
   a. Find the sample migration script, `sqllib/samples/repl/mig97/q/ asnqcapluwv97fp.sql`.
   b. Edit the script to replace the schema name as required and run the script.
4. Start the Version 9.7 Fix Pack 2 Q Capture program with the parameters **migrate**=y and **startmode**=warmns.

   Recommendation: Start the Q Capture program as soon as possible after the migration, before you start other applications if possible. DB2 provides replication with the first valid log sequence number (LSN) within the current set of active log files as determined by the LOGPRIMARY database parameter. You should start Q Capture soon enough to ensure that all of the transactions that need to be captured can be found in the active log files.
5. Start the Replication Alert Monitor if you stopped it.

Migrating the Q Capture server before migrating multiple Q Apply servers

This procedure is a slight modification of the above procedures for use with multiple Q Capture or Q Apply servers.

1. Follow the steps above for migrating a Q Capture server.
2. Start the Version 9.7 Fix Pack 2 Q Capture program with the **migrate**=y and **startmode**=WARMNS parameters.
3. If you have more than one Q Capture program, migrate each one. Q Capture programs do not have to be migrated all at once.
4. Follow the steps above to migrate a Q Apply program.
5. You can now start the Version 9.7 Fix Pack 2 Q Apply program to work with your Version 9.7 Fix Pack 2 Q Capture program.
6. Repeat the migration steps for each Q Apply program that you want to migrate.

Chapter 5. Migrating to replication and publishing Version 9.7

Migrating to replication and publishing Version 9.7 from Version 9.5, Version 9.1, or Version 8.2 involves running SQL scripts that add new columns to existing control tables, change other control tables, and update the architecture level and compatibility information in the control tables.

Migrating your control tables to Version 9.7 differs depending on your operating system:

z/OS

To migrate to the Version 9.7 level on z/OS, you first apply the PTF for APAR PK85947 to WebSphere® Replication Server for z/OS Version 9.1. This PTF adds the functionality of Version 9.7 even though there is no Version 9.7 replication or Event Publishing product on z/OS. After applying the PTF, you run SQL scripts in the ASNQMZ97 sample data set to migrate the control tables to the V9.7 level.

Linux UNIX Windows

On Linux, UNIX, and Windows, first you upgrade your DB2 instance to Version 9.7, and then you install InfoSphere Replication Server Version 9.7 or InfoSphere Data Event Publisher Version 9.7. Finally, you run SQL scripts to migrate the control tables to Version 9.7.

Migrating from Version 9.1 or Version 8.2 is a multi-step process: You run a series of scripts, each of which migrates the control tables to the next version. When the control tables are at Version 9.5, you run a script to migrate them to Version 9.7.

You can migrate the Version 9.5 Q Capture and Q Apply servers independently. "Coexistence support in Version 9.7 Q Replication and Event Publishing" on page 18 describes the ability of the Version 9.7, Version 9.5, Version 9.1, and Version 8.2 replication and Event Publishing programs to work together so that you can upgrade your environment in stages.

Changes to initialization protocol for multidirectional replication

The initialization protocol for peer-to-peer and bidirectional replication changed with Version 9.7. Because of this change, if any of the Q Capture or Q Apply programs in the configuration are migrated to Version 9.7, all of the Q Capture and Q Apply programs in the configuration must be at Version 9.7. If a Q Capture program participates in both unidirectional and bidirectional or peer-to-peer configurations and any of the servers are migrated to V9.7, all components that are involved in both unidirectional and multidirectional configurations must be migrated to V9.7.

Using the replication administration tools with different versions

You can use the Version 9.7 replication tools with any combination of V9.7, V9.5, V9.1, and V8.2 Q Capture and Q Apply servers. The product function that is available with the tools is based on the lowest level of Q Capture or Q Apply program that exists in a scenario. For example, if you use a V9.7 ASNCLP command-line program to create a Q subscription between a Version 9.7 Q Capture and Version 9.5 Q Apply, the Q subscription is at the V9.5 level and does not have the full function of V9.7.

Starting with V9.7, you can specify a different release level for the Q Capture or Q Apply control tables when you use the Replication Center or ASNCLP command-line program to create the control tables.

If your tools are at a higher version than your Q Capture or Q Apply control tables, the tools can work with the lower-level control tables but you cannot use new function that is introduced in the higher version.

Migrating the Replication Alert Monitor to Version 9.7

Version 9.7 does not introduce any changes for the Replication Alert Monitor or its control tables. If you are using a Monitor program from Version 8, you must migrate to a Version 9.5 Monitor to work with Version 9.5 and higher replication and publishing programs. A Monitor program at Version 9.7, Version 9.5, or Version 9.1 can work with Version 9.7, Version 9.5, Version 9.1, or Version 8.2 replication and Event Publishing programs. You do not need to migrate the Monitor control tables when you migrate the replication and publishing programs.

Coexistence support in Version 9.7 Q Replication and Event Publishing

For unidirectional Q subscriptions, the Q Capture and Q Apply programs support full interoperability between Version 9.7, Version 9.5, Version 9.1, and Version 8.2.

The initialization protocol for peer-to-peer and bidirectional replication changed with Version 9.7, so that replication does not pause while all Q subscriptions are being activated. Because of this change, if any of the Q Capture or Q Apply programs in the configuration are migrated to Version 9.7 and you need to add a new Q subscription or activate a disabled Q subscription, all of the Q Capture and Q Apply programs in the configuration must be at Version 9.7. Active Q subscriptions are not affected.

After you install a Version 9.7 Q Replication or Event Publishing program on the system where Q Capture runs, you migrate the Q Capture control tables to Version 9.7. You might need to change the value of the `compatibility` parameter depending on the version of your Q Apply program or programs.

Important: The compatibility level of the Q Capture server must be lower than or at the same level as the architecture level of the consuming Q Apply program's control tables.

New functions that are introduced in Version 9.7 are not enabled until both the Q Capture and Q Apply control tables are migrated to Version 9.7.

Figure 1 on page 19 shows relationships between Version 8 and Version 9 replication programs and the effect of the `compatibility` parameter.

Version 9.7 Q Capture ARCH_LEVEL '0907' COMPATIBILITY '0907'	— Sends Version 9.7 messages →	Version 9.7 Q Apply
Version 9.7 Q Capture ARCH_LEVEL '0907' COMPATIBILITY '0905'	— Sends Version 9.5 messages →	Version 9.5 Q Apply
Version 9.5 Q Capture ARCH_LEVEL '0905' COMPATIBILITY '0905'	— Sends Version 9.5 messages →	Version 9.7 Q Apply
Version 9.7 Q Capture ARCH_LEVEL '0907' COMPATIBILITY '0901'	— Sends Version 9.1 messages →	Version 9.1 Q Apply
Version 9.1 Q Capture ARCH_LEVEL '0901' COMPATIBILITY '0901'	— Sends Version 9.1 messages →	Version 9.7 Q Apply
Version 9.7 Q Capture ARCH_LEVEL '0907' COMPATIBILITY '0802'	— Sends Version 8.2 messages →	Version 8.2 Q Apply
Version 8.2 Q Capture ARCH_LEVEL '0802'	— Sends Version 8.2 messages →	Version 9.7 Q Apply

Figure 1. Effect of compatibility parameter on level of messages sent from Q Capture to Q Apply

Other coexistence features for Version 9.7

The following list details other coexistence features of Version 9.7 Q Replication and Event Publishing:

ASNCLP and Replication Center
> You can use replication administration tools at the Version 9.7 level to manage Version 9.7, Version 9.5, Version 9.1, and Version 8.2 Q Replication and Event Publishing environments. If your tools are at Version 8, you can use them only to manage Version 8 environments.

Replication Alert Monitor
> If you are using a Monitor program from Version 8, you must migrate to a

Version 9.5 Monitor to work with Version 9.5 or newer replication and Event Publishing programs. A Monitor program at Version 9.7, Version 9.5, or Version 9.1 can work with Version 9.7, Version 9.5, Version 9.1, or Version 8.2 replication and Event Publishing programs.

Queue formatting program
The Version 9.7 asnqmfmt program can format and display Version 9.7, Version 9.5, Version 9.1, and Version 8.2 messages.

Q Analyzer program
The Version 9.7 asnqanalyze program works with Version 9.7, Version 9.5, Version 9.1, and Version 8.2 Q Replication and Event Publishing control tables.

Table differencing and repair programs
The Version 9.7 asntdiff and asntrep programs work with source and target tables in Version 9.7, Version 9.5, Version 9.1, and Version 8.2 DB2 servers.

Note: None of the utilities supports forward compatibility. For example, a V8.2 Monitor program or V8.2 asnqanalyze program cannot handle V9.7 replication servers.

Migrating different Q Replication and Event Publishing environments to Version 9.7

The steps that are required to migrate to Version 9.7 differ for unidirectional replication, bidirectional or peer-to-peer replication, and Event Publishing.

Migrating a unidirectional Q Replication environment to Version 9.7

For unidirectional Q Replication, you migrate the Q Apply program at the target server first and then migrate the Q Capture program at the source server.

About this task

When you migrate the Q Apply program first, Q Apply can continue to process Version 9.5 messages from the Q Capture program until you migrate the Q Capture program. After you migrate Q Capture, you can change the value of the COMPATIBILITY column in the IBMQREP_CAPPARMS table from 0905 to 0907 so that Q Capture begins to send Version 9.7 messages.

These instructions can be used with any of the following replication scenarios:
- One Q Capture program that replicates to one Q Apply program
- One Q Capture program that replicates to multiple Q Apply programs
- Multiple Q Capture programs that replicate to one Q Apply program

Procedure

To migrate a unidirectional Q Replication environment to Version 9.7:
1. Optional: Stop the Replication Alert Monitor program to prevent the monitor from issuing alerts while the replication programs are stopped for migration.

   If the Monitor is at Version 8.2, you must migrate the Monitor to at least Version 9.5. You can wait to migrate the monitor until after your Q Capture and Q Apply programs are migrated.

2. Migrate the Q Apply program. See "Migrating a Q Apply program to Version 9.7 (Linux, UNIX, Windows)" on page 25 for details.

   You do not need to migrate all of your Q Apply programs at once. However, all of the Q Apply programs that work with a Version 9.7 Q Capture program must be migrated before you update the COMPATIBILITY column in the IBMQREP_CAPPARMS table to 0907.

3. Migrate the Q Capture program. See "Migrating a Q Capture program to Version 9.7 (Linux, UNIX, Windows)" on page 24 for details. You do not need to migrate all of your Q Capture programs at once.

4. If necessary, migrate the Replication Alert Monitor program, and then start it.

Migrating a bidirectional or peer-to-peer Q Replication environment to Version 9.7

You migrate a bidirectional or peer-to-peer environment one server at a time. After you migrate the Q Capture and Q Apply control tables at each server, you instruct the Q Capture programs to begin sending Version 9.7 messages.

About this task

All Q Capture and Q Apply programs that are involved in bidirectional or peer-to-peer replication should be migrated to Version 9.7 at the same time. The initialization protocol for multidirectional replication changed with Version 9.7 so that replication does not pause while all Q subscriptions are being activated. Because of this change, if any of the Q Capture or Q Apply programs in the configuration are migrated to Version 9.7 and you need to add a new Q subscription or activate a disabled Q subscription, all of the Q Capture and Q Apply programs in the configuration must be at Version 9.7. Active Q subscriptions are not affected. If a Q Capture program participates in both unidirectional and bidirectional or peer-to-peer configurations and any of the servers are migrated to V9.7, all components that are involved in both unidirectional and multidirectional configurations must be migrated to V9.7.

Procedure

To migrate a bidirectional or peer-to-peer Q Replication environment to Version 9.7:

1. Optional: Stop the Replication Alert Monitor program to prevent the monitor from issuing alerts while the replication programs are stopped for migration.

2. At one of the peer servers, migrate the Q Capture and Q Apply programs. Follow these steps:

   a. Apply the PTF for APAR PK85947 to WebSphere Replication Server for z/OS Version 9.1 or install IBM® InfoSphere Replication Server V9.7 on Linux, UNIX, and Windows.

   b. Stop the Q Capture and Q Apply programs.

      The other peer servers can continue to replicate while you migrate the first server.

   c. Optional: Back up the database that contains the Q Capture and Q Apply control tables to allow for fallback and recovery.

      From this point, do not use the replication administration tools to change your configuration (for example, do not add a Q subscription) until you migrate the Q Capture and Q Apply control tables.

d. Migrate the Q Capture and Q Apply control tables at the server. Take the following steps depending on the operating system of the server:

z/OS

1) Optional: If you are migrating directly from Version 9.1 or Version 8.2 to Version 9.7, run the following migration scripts for previous versions:

   V8.2 to V9.1
   >   ASNQMZV9 sample job

   V9.1 to V9.5
   >   ASNQMZ95 sample job

   The samples contain SQL statements for migrating Q Capture, Q Apply, and Monitor control tables. Follow instructions in the scripts to replace the schema name and table space names as required.

2) Migrate the control tables to the Version 9.7 level by running the ASNQMZ97 sample job in the SASNSAMP partitioned data set. The sample contains SQL statements for migrating Q Capture, Q Apply, and Monitor control tables. Follow instructions in the script to replace the schema name and table space names as required.

3) Start the Q Capture program and Q Apply program at the migrated server. Ensure that you start the Q Capture and Q Apply programs with the PTF for APAR PK85947 instead of the Q Capture and Q Apply programs that you stopped before you migrated the control tables.

Linux UNIX Windows

1) Migrate the DB2 instance that your Q Capture and Q Apply programs run under to Version 9.7. See Upgrade essentials for DB2 servers in the DB2 Information Center for details.

2) Optional: If you are migrating directly from Version 9.1 or Version 8.2 to Version 9.7, you need to run the migration scripts for previous versions (either V9.5, or V9.1 and V9.5). Follow instructions in the script to replace the schema name and table space names as required.

3) Migrate the control tables to the Version 9.7 level by running the migration script for your DB2 platform. Follow instructions in the script to replace the schema name and table space names as required.

4) Start the Q Capture program with the **migrate**=y parameter and **startmode**=warmns.

5) Start the Q Apply program at the migrated server.

3. Repeat Step 2 for each remaining peer server (you can migrate the servers at different times).

4. After you migrate all of the peer servers to Version 9.7, follow these steps at each server to inform the Q Capture programs that all of the Q Apply programs are migrated:

a. Stop the Q Capture program.

b. Change the value of the COMPATIBILITY column in the
   IBMQREP_CAPPARMS table to 0907. You can run the `asnqupdcompv97.sql`
   script in the `sqllib/samples/repl/mig97/q/` directory, or use one of the
   following methods:

Method	Description

SQL	Run the following statement:
	
	`UPDATE schema.IBMQREP_CAPPARMS`
	`SET COMPATIBILITY = '0907';`

Replication Center	Use the Change Parameters - Saved window for Q Capture. To open the window, right-click the Q Capture server that contains the newly migrated control tables and select **Change Parameters** > **Saved**.

   c. Start the Q Capture program. Do not use **migrate**=y unless this is the first
      time you are starting Q Capture after the migration.
5. If necessary, migrate the Replication Alert Monitor program, and then start it.

Migrating an Event Publishing environment to Version 9.7

When you migrate an Event Publishing environment, you migrate the Q Capture
program and then set the COMPATIBILITY column in the IBMQREP_CAPPARMS
table to 0907 to prompt Q Capture to begin sending Version 9.7 messages to
subscribing applications.

Procedure

To migrate an Event Publishing environment to Version 9.7:
1. Optional: Stop the Replication Alert Monitor program to prevent the monitor
   from issuing alerts while the replication programs are stopped for migration.
2. Migrate the Q Capture program. See "Migrating a Q Capture program to
   Version 9.7 (Linux, UNIX, Windows)" on page 24 for details.
3. If necessary, migrate the Replication Alert Monitor program, and then start it.

Migrating Q Replication and Event Publishing programs to Version 9.7 (Linux, UNIX, and Windows)

After you install a Version 9.7 Q Replication or Event Publishing product, the
migration process involves running SQL scripts to update the Q Capture, Q Apply,
or Replication Alert Monitor control tables to the Version 9.7 level.

On Linux, UNIX, and Windows, you must migrate your DB2 instance to Version
9.7 before you run the scripts to migrate the control tables. After you migrate your
DB2 instance to Version 9.7, all Q Capture and Q Apply programs within the
instance must be migrated to Version 9.7 to operate.

For the Q Capture program, you also set the **compatibility** parameter when all of
the Q Apply programs or subscribing applications that the Q Capture program
works with are migrated to Version 9.7.

Migrating a Q Capture program to Version 9.7 (Linux, UNIX, Windows)

To migrate a Q Capture program to Version 9.7, you install IBM InfoSphere Replication Server Version 9.7 and then run an SQL script that updates the Q Capture control tables at the source server. You might also need to change the value of the COMPATIBILITY column in the IBMQREP_CAPPARMS table.

Before you begin

Before you migrate a Q Capture program to V9.7, migrate all of the Q Apply programs that it works with.

About this task

After you migrate your DB2 instance to Version 9.7, you must migrate all of the Q Capture control tables that are defined in the instance to Version 9.7. If you have more than one Q Capture program, migrate each Q Capture program with this procedure.

The order in which you migrate the Q Capture and Q Apply programs might differ depending upon your Q Replication or Event Publishing configuration. For details, see "Migrating different Q Replication and Event Publishing environments to Version 9.7" on page 20.

Procedure

To migrate a Q Capture program to Version 9.7:

1. Stop your applications and let the Q Capture program process any remaining transaction in the DB2 recovery log.
2. Stop the Q Capture program. Any Q Apply programs or subscribing applications can be running or stopped.
3. Install one of the following products on the system where the Q Capture program runs:
   - InfoSphere Replication Server V9.7
   - InfoSphere Data Event Publisher V9.7

   From this point, do not use the replication administration tools to change your configuration (for example, do not add a Q subscription) until you migrate the Q Capture control tables.
4. Migrate the DB2 instance that your Q Capture program runs under. See Upgrade essentials for DB2 servers in the DB2 Information Center for details.
5. Optional: If you are migrating directly from Version 9.1 or Version 8.2 to Version 9.7, run the migration scripts for previous versions (either V9.5, or V9.1 and V9.5). Follow these steps:
   a. Locate the script in the installation directory.

      V9.5   `sqllib/samples/repl/mig95/q/asnqcapluwv95.sql`

      V9.1   `sqllib/samples/repl/mig9/q/asnqcapluw.sql`

   b. Edit the script to replace the schema name and table space names as required. Complete instructions are in the scripts.
   c. Run the script.
6. Migrate the Q Capture control tables to the Version 9.7 level by running the migration script. Follow these steps:

a. Locate the `sqllib/samples/repl/mig97/q/asnqcapluwv97.sql` script in the installation directory.

b. Edit the script to replace the schema name and table space names as required. Complete instructions are in the scripts.

c. Run the script.

7. If all of the Q Apply programs that this Q Capture program replicates to are migrated to Version 9.7, change the value of the COMPATIBILITY column in the IBMQREP_CAPPARMS table to 0907. You can run the `asnqupdcompv97.sql` script in the `sqllib/samples/repl/mig97/q/` directory, or use one of the following methods:

Method	Description

SQL	Run the following statement:
	`UPDATE schema.IBMQREP_CAPPARMS`
	`SET COMPATIBILITY = '0907';`

Replication Center	Use the Change Parameters - Saved window for Q Capture. To open the window, right-click the Q Capture server that contains the newly migrated control tables and select **Change Parameters** > **Saved**.

8. Start the Q Capture program with the **migrate**=y parameter and **startmode**=warmns.

   Recommendation: Start the Q Capture program as soon as possible after the migration, before you start other applications if possible. DB2 provides replication with the first valid log sequence number (LSN) within the current set of active log files as determined by the LOGPRIMARY database parameter. You should start Q Capture soon enough to ensure that all of the transactions that need to be captured can be found in the active log files.

Migrating a Q Apply program to Version 9.7 (Linux, UNIX, Windows)

To migrate a Q Apply program to Version 9.7, you install IBM InfoSphere Replication Server V9.7 and then run an SQL script that updates the Q Apply control tables at the target server.

About this task

After you migrate your DB2 instance to Version 9.7, you must migrate all of the Q Apply control tables that are defined in the instance to Version 9.7. If you have more than one Q Apply program, migrate each Q Apply program with this procedure.

The order in which you migrate the Q Apply and Q Capture programs might differ depending upon your Q Replication or Event Publishing configuration. For details, see "Migrating different Q Replication and Event Publishing environments to Version 9.7" on page 20.

Procedure

To migrate a Q Apply program to Version 9.7:

1. Stop the Version 9.5 Q Apply program.

2. Optional: Stop the Q Capture program and let Q Apply process any remaining transaction in its receive queues.

Note: If your Q Capture program is processing a high volume of data, a send queue might fill while the Q Apply program is stopped, which might prompt Q Capture to stop. If this happens, you can restart Q Capture after you migrate Q Apply and Q Apply starts processing messages that originate from the send queue.

3. Install InfoSphere Replication Server V9.7 on the system where the Q Apply program runs.

   From this point, do not use the replication administration tools to change your configuration (for example, do not add a Q subscription) until the Q Apply control tables are migrated.

4. Upgrade the DB2 instance that your Q Apply program runs under. See Upgrade essentials for DB2 servers in the DB2 Information Center for details.

5. Optional: If you are migrating directly from Version 9.1 or Version 8.2 to Version 9.7, run the migration scripts for previous versions (either V9.5, or V9.1 and V9.5). Follow these steps:

   a. Locate the scripts in the installation directory.

      The script file path for V9.5 is `sqllib/samples/repl/mig95/q/` and for V9.1 `sqllib/samples/repl/mig9/q/`. Table 4 and Table 5 show the scripts for various database systems for each version:

Table 4. SQL scripts for migrating Q Apply control tables to V9.5 on different database systems

Platform	SQL script file
Linux, UNIX, Windows	`asnqappluwv95.sql`
Oracle target	`asnqapporav95.sql`
Sybase target	`asnqappsybv95.sql`
Informix target	`asnqappinfxv95.sql`
Microsoft SQL Server target	`asnqappmssqlv95.sql`

Table 5. SQL scripts for migrating Q Apply control tables to V9.1 on different database systems

Platform	SQL script file
Linux, UNIX, Windows	`asnqappluw.sql`
Oracle target	`asnqappora.sql`
Sybase target	`asnqappsyb.sql`
Informix target	`asnqappinfx.sql`
Microsoft SQL Server target	`asnqappmssql.sql`

   b. Edit the script to replace the schema name and table space names as required. Complete instructions are in the scripts.

   c. Run the script.

   d. Use the DB2 REORG utility to reorganize the IBMQREP_EXCEPTIONS control table.

6. Migrate the Q Apply control tables to the Version 9.7 level by running the migration script for your database system. Follow these steps:

   a. Locate the script in the installation directory.

      Table 6 on page 27 shows the scripts for various database systems. The file path is `sqllib/samples/repl/mig97/q/`.

Table 6. SQL scripts for migrating Q Apply control tables on different database systems

Platform	SQL script file
Linux, UNIX, Windows	`asnqappluwv97.sql`
Oracle target	`asnqapporav97.sql`
Sybase target	`asnqappsybv97.sql`
Informix target	`asnqappinfxv97.sql`
Microsoft SQL Server target	`asnqappmssqlv97.sql`

    b. Edit the script to replace the schema name and table space names as required. Complete instructions are in the scripts.

    c. Run the script.

7. **Required for Sybase targets:** If you are replicating to a Sybase target, bind the Q Apply program packages to the Version 9.7 federated database with the cursor stability (CS) isolation level by entering the following command:

   `db2 bind @qapply.lst isolation CS blocking all grant public`

8. Start the Q Apply program.

9. Start the Q Capture program if you stopped it.

If you migrated the Q Apply program first, the program can continue to work with a Version 9.5, Version 9.1, or Version 8.2 Q Capture program. When you migrate the Q Capture control tables to Version 9.7, you can change the value of the COMPATIBILITY column in the IBMQREP_CAPPARMS table to 0907. This change prompts the Q Capture program to begin sending Version 9.7 messages to the Q Apply program and enables the full functionality of Version 9.7.

Chapter 6. Migrating to replication and publishing Version 9.5

Migrating to replication and publishing Version 9.5 from Version 9.1 or Version 8.2 involves adding new control tables, adding new columns to existing control tables, and updating the architecture level and compatibility information in the control tables.

Migrating your control tables to Version 9.5 differs depending on your operating system:

z/OS

> To migrate to the Version 9.5 level on z/OS, you first apply the PTF for APAR PK49430. This PTF adds the functionality of Version 9.5 even though there is no Version 9.5 replication or Event Publishing product on z/OS. After applying the PTF, you run SQL scripts in the ASNQMZ95 sample data set to migrate the control tables to the V9.5 level.

Linux UNIX Windows

> On Linux, UNIX, and Windows, first you upgrade your DB2 instance to Version 9.5, and then you install WebSphere Replication Server Version 9.5 or WebSphere Data Event Publisher Version 9.5. Finally, you run SQL scripts to migrate the control tables to Version 9.5.

Migrating from Version 8.2 is a two-step process: First you run a script to migrate the control tables to Version 9.1, and then you run a second script to migrate the control tables Version 9.5.

The V9.1 Q Capture and Q Apply servers can be migrated independently. "Coexistence support in Version 9.5 Q Replication and Event Publishing" on page 30 describes the ability of the Version 9.5, Version 9.1, and Version 8.2 replication and publishing programs to work together so that you can upgrade your environment in stages.

Using the replication administration tools with different versions

You can use the Version 9.5 replication tools with any combination of V9.5, V9.1 and V8.2 Q Capture and Q Apply servers. The product function that is available with the tools is based on the lowest level of Q Capture or Q Apply program that exists in a scenario. For example, if you use a V9.5 ASNCLP command-line program to create a Q subscription between a Version 9.5 Q Capture and Version 9.1 Q Apply, the Q subscription will be at the V9.1 level and will not have the full function of V9.5.

When you use the ASNCLP command-line program or Replication Center to create control tables, the architecture level of the control tables might differ depending on your operating system:

z/OS

> On z/OS, the administration tools create control tables based on the level of the tools rather than the DB2 version. So a Version 9.5 tool always creates V9.5 control tables, a V9.1 tool creates V9.1 control tables, and so on.

On Linux, UNIX, and Windows, the tools create different levels of control tables depending upon the level of the tools and the DB2 level:

Version 9.5 tools

Create V9.5 control tables on a V9.5 DB2, V9.1 control tables on a V9.1 DB2, and V8.2 control tables on a V8.2 DB2.

Version 9.1 tools

Create V9.1 control tables on a V9.1 DB2, and V8.2 control tables on a V8.2 DB2.

Version 8.2 tools

Create V8.2 control tables. V8.2 tools will not create control tables on a V9.1 or V9.5 DB2.

If your tools are at a higher version than your Q Capture or Q Apply control tables, the tools can work with the lower-level control tables but you will not be able to use new function that is introduced in the higher version.

When you create publications, the tools create definitions that are based on the Q Capture server level.

Migrating the Replication Alert Monitor to Version 9.5

If you are using a Monitor program from Version 8, you must migrate to a Version 9.5 Monitor to work with Version 9.5 replication and Event Publishing programs. A Monitor program at Version 9.5 or Version 9.1 can work with Version 9.5, Version 9.1, or Version 8.2 replication and publishing programs. You do not need to migrate the Monitor control tables when you migrate the replication and event publishing programs.

Coexistence support in Version 9.5 Q Replication and Event Publishing

The Q Capture and Q Apply programs support full interoperability between Version 9.5, Version 9.1, and Version 8.2.

After you install a Version 9.5 Q Replication or Event Publishing program on the system where Q Capture runs, you migrate the Q Capture control tables to Version 9.5. You might need to change the value of the `compatibility` parameter depending on the version of your Q Apply program or programs.

Important: The compatibility level of the Q Capture server must be lower than, or at the same level as, the architecture level of the consuming Q Apply program's control tables.

New functions that are introduced in Version 9.5 are not enabled until both the Q Capture and Q Apply control tables are migrated to Version 9.5.

Figure 2 on page 31 shows relationships between Version 8 and Version 9 replication programs and the effect of the `compatibility` parameter.
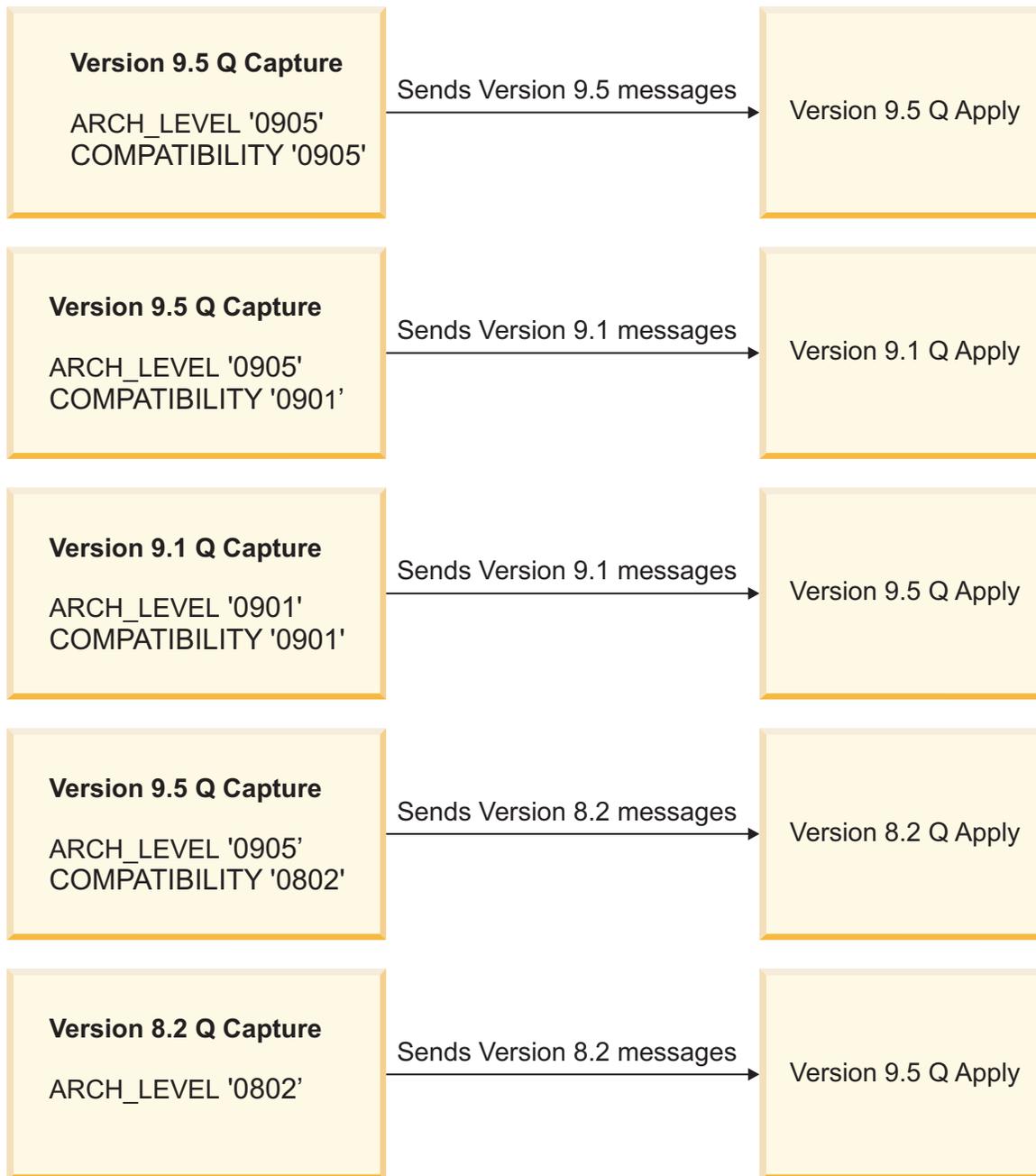
Figure 2. Effect of compatibility parameter on level of messages sent from Q Capture to Q Apply

Other coexistence features for Version 9.5

The following list details other coexistence features of Version 9.5 Q Replication and event publishing:

Bidirectional and peer-to-peer replication

Servers in a bidirectional or peer-to-peer replication environment can operate at a mixed level, with some servers at Version 9.5 and some at Version 9.1. However, the paired Q Capture and Q Apply programs at each server must be at the same level. For example, when you migrate a server to Version 9.5, you must migrate both the Q Capture and Q Apply control tables at that server.

ASNCLP and Replication Center

You can use replication administration tools at the Version 9.5 level to manage Version 9.5, Version 9.1, and Version 8.2 Q Replication and Event Publishing environments. If your tools are at Version 8, you can use them only to manage Version 8 environments.

Replication Alert Monitor

If you are using a Monitor program from Version 8, you must migrate to a Version 9.5 Monitor to work with Version 9.5 Q Replication and Event Publishing programs. A Monitor program at Version 9.5 or Version 9.1 can work with Version 9.5, Version 9.1, or Version 8.2 replication and event publishing programs.

Queue formatting program

The Version 9.5 asnqmfmt program can format and display Version 9.5, Version 9.1, and Version 8.2 messages.

Q Analyzer program

The Version 9.5 asnqanalyze program works with Version 9.5, Version 9.1, and Version 8.2 Q Replication and Event Publishing control tables.

Table differencing and repair programs

The Version 9.5 asntdiff and asntrepair programs work with source and target tables in Version 9.5, Version 9.1, and Version 8.2 DB2 servers.

Note: None of the utilities supports forward compatibility. For example, a V8.2 Monitor program or V8.2 asnqanalyze program cannot handle V9.5 replication servers.

Migrating different Q Replication and Event Publishing environments to Version 9.5

The steps that are required to migrate to Version 9.5 differ for unidirectional replication, bidirectional or peer-to-peer replication, and Event Publishing.

Migrating a unidirectional Q Replication environment to Version 9.5

The recommended approach to migrating a unidirectional Q Replication environment is to migrate the Q Apply program at the target server first, and then to migrate the Q Capture program at the source server.

About this task

When you migrate the Q Apply program first, Q Apply can continue to process Version 9.1 messages from the Q Capture program until you migrate the Q Capture program. After you migrate Q Capture, you can change the value of the COMPATIBILITY column in the IBMQREP_CAPPARMS table from 0901 to 0905 so that Q Capture begins to send Version 9.5 messages.

These instructions can be used with any of the following replication scenarios:
- One Q Capture program that replicates to one Q Apply program
- One Q Capture program that replicates to multiple Q Apply programs
- Multiple Q Capture programs that replicate to one Q Apply program

Procedure

To migrate a unidirectional Q Replication environment to Version 9.5:

1. Optional: Stop the Replication Alert Monitor program to prevent the monitor from issuing alerts while the replication programs are stopped for migration.

   If the Monitor is at Version 8.2, you must migrate the Monitor to Version 9.5. You can wait to migrate the monitor until after your Q Capture and Q Apply programs are migrated.

2. Migrate the Q Apply program. See "Migrating a Q Apply program to Version 9.5 (Linux, UNIX, Windows)" on page 38for details.

   You do not need to migrate all of your Q Apply programs at once. However, all of the Q Apply programs that work with a Version 9.5 Q Capture program must be migrated before you update the the COMPATIBILITY column in the IBMQREP_CAPPARMS table to 0905.

3. Migrate the Q Capture program. See "Migrating a Q Capture program to Version 9.5 (Linux, UNIX, Windows)" on page 36 for details. You do not need to migrate all of your Q Capture programs at once.

4. If necessary, migrate the Replication Alert Monitor program, and then start it.

Migrating a bidirectional or peer-to-peer Q Replication environment to Version 9.5

You migrate a bidirectional or peer-to-peer environment one server at a time. After you migrate the Q Capture and Q Apply control tables at each server, you instruct the Q Capture programs to begin sending Version 9.5 messages.

About this task

You can migrate each peer server at a different time based on your business needs. The coexistence rules for Version 9.5 replication allow Version 9.5, Version 9.1, and Version 8.2 servers to participate together in a bidirectional or peer-to-peer replication environment.

Procedure

To migrate a bidirectional or peer-to-peer Q Replication environment to Version 9.5:

1. Optional: Stop the Replication Alert Monitor program to prevent the monitor from issuing alerts while the replication programs are stopped for migration.

   If the Monitor is at Version 8.2, you must migrate the Monitor to Version 9.5. You can wait to migrate the monitor until after your Q Capture and Q Apply programs are migrated.

2. At one of the peer servers, migrate the Q Capture and Q Apply programs. Follow these steps:

   a. Apply the PTF for APAR PK49430 on z/OS or install IBM WebSphere Replication Server V9.5 on Linux, UNIX, and Windows.

   b. Stop the Q Capture and Q Apply programs.

      The other peer servers can continue to replicate while you migrate the first server.

   c. Optional: Back up the database that contains the Q Capture and Q Apply control tables to allow for fallback and recovery.

      From this point, do not use the replication administration tools to change your configuration (for example, do not add a Q subscription) until the Q Capture and Q Apply control tables are migrated.

d. Migrate the Q Capture and Q Apply control tables at the server. Take the following steps depending on the operating system of the server:

z/OS

1) Optional: If you are migrating directly from Version 8.2 to Version 9.5, you need to run the Version 9.1 migration scripts before you run the Version 9.5 migration scripts. The scripts are part of the ASNQMZV9 sample job in the SASNSAMP partitioned data set. The sample contains SQL statements for migrating Q Capture, Q Apply, and Monitor control tables to V9.1. Follow instructions in the script to replace the schema name and table space names as required.

2) Migrate the control tables to the Version 9.5 level by running the ASNQMZ95 sample job in the SASNSAMP partitioned data set. The sample contains SQL statements for migrating Q Capture, Q Apply, and Monitor control tables. Follow instructions in the script to replace the schema name and table space names as required.

3) Start the Q Capture program and Q Apply program at the migrated server. Ensure that you start the Q Capture and Q Apply programs with the PTF for APAR PK49430 instead of the Q Capture and Q Apply programs that you stopped before you migrated the control tables.

Linux UNIX Windows

1) Upgrade the DB2 instance that your Q Capture and Q Apply programs runs under to Version 9.5. See Upgrade essentials for DB2 servers in the DB2 Information Center for details.

2) Optional: If you are migrating directly from Version 8.2 to Version 9.5, you need to run the Version 9.1 migration scripts for your DB2 platform before you run the Version 9.5 migration scripts. Follow instructions in the script to replace the schema name and table space names as required.

Table 7 and Table 8 show the scripts for various platforms.

Table 7. SQL scripts for migrating Q Capture control tables to V9.1 on Linux, UNIX, and Windows

Platform	SQL script file
Linux UNIX	sqllib/samples/repl/mig9/q/asnqcapluw.sql
Windows	sqllib\samples\repl\mig9\q\asnqcapluw.sql

Table 8. SQL scripts for migrating Q Apply control tables to V9.1 on Linux, UNIX, and Windows

Platform	SQL script file
Linux UNIX	sqllib/samples/repl/mig9/q/asnqappluw.sql
Windows	sqllib\samples\repl\mig9\q\asnqappluw.sql

3) Migrate the control tables to the Version 9.5 level by running the migration script for your DB2 platform. Follow instructions in the script to replace the schema name and table space names as required.

Table 9 and Table 10 show the scripts for various platforms.

Table 9. SQL scripts for migrating Q Capture control tables to V9.5 on Linux, UNIX, and Windows

Platform	SQL script file
Linux UNIX	`sqllib/samples/repl/mig95/q/` `asnqcapluwv95.sql`
Windows	`sqllib\samples\repl\mig95\q\` `asnqcapluwv95.sql`

Table 10. SQL scripts for migrating Q Apply control tables to V9.5 on Linux, UNIX, and Windows

Platform	SQL script file
Linux UNIX	`sqllib/samples/repl/mig95/q/` `asnqappluwv95.sql`
Windows	`sqllib\samples\repl\mig95\q\` `asnqappluwv95.sql`

  4) Start the Q Capture program in warm mode (WARMSI), and start the Q Apply program at the migrated server.
3. Repeat Step 2 for each remaining peer server (you can migrate the servers at different times).
4. After you migrate all of the peer servers to Version 9.5, follow these steps at each server to inform the Q Capture programs that all of the Q Apply programs are migrated:
   a. Stop the Q Capture program.
   b. Change the value of the COMPATIBILITY column in the IBMQREP_CAPPARMS table to 0905. You can run the `asnqupdcompv95.sql` script in the `sqllib/samples/repl/mig95/q/` directory, or use one of the following methods:

Method	Description

SQL	Run the following statement:
	`UPDATE schema.IBMQREP_CAPPARMS`
	`SET COMPATIBILITY = '0905';`

Replication Center	Use the Change Parameters - Saved window for Q Capture. To open the window, right-click the Q Capture server that contains the newly migrated control tables and select **Change Parameters** > **Saved**.

   c. Start the Q Capture program in warm mode (WARMSI).
5. If necessary, migrate the Replication Alert Monitor program, and then start it. See one of the following topics for details:
   - Migrating the Replication Alert Monitor to Version 9.5 (z/OS)
   - Migrating the Replication Alert Monitor to Version 9.5 (Linux, UNIX, Windows)

Migrating an Event Publishing environment to Version 9.5

When you migrate an Event Publishing environment, you migrate the Q Capture program and then set the COMPATIBILITY column in the IBMQREP_CAPPARMS table to 0905 to prompt Q Capture to begin sending Version 9.5 messages to subscribing applications.

Procedure

To migrate an Event Publishing environment to Version 9.5:

1. Optional: Stop the Replication Alert Monitor program to prevent the monitor from issuing alerts while the replication programs are stopped for migration.

   If the Monitor is at Version 8.2, you must migrate the Monitor to Version 9.5. You can wait to migrate the monitor until after your Q Capture program is migrated.

2. Migrate the Q Capture program. See "Migrating a Q Capture program to Version 9.5 (Linux, UNIX, Windows)" for details.

3. If necessary, migrate the Replication Alert Monitor program, and then start it.

Migrating Q Replication and Event Publishing programs to Version 9.5 (Linux, UNIX, and Windows)

After you install a Version 9.5 Q Replication or Event Publishing product, the migration process involves running SQL scripts to update the Q Capture, Q Apply, or Replication Alert Monitor control tables to the Version 9.5 level.

On Linux, UNIX, and Windows, you must migrate your DB2 instance to Version 9.5 before you run the scripts to migrate the control tables. After you migrate your DB2 instance to Version 9.5, all Q Capture and Q Apply programs within the instance must be migrated to Version 9.5 to operate.

For the Q Capture program, you also set the `compatibility` parameter when all of the Q Apply programs or subscribing applications that the Q Capture program works with are migrated to Version 9.5.

Migrating a Q Capture program to Version 9.5 (Linux, UNIX, Windows)

You migrate a Q Capture program to Version 9.5 by installing WebSphere Replication Server V9.5 and then running an SQL script that updates the Q Capture control tables at the source server. You might also need to change the value of the COMPATIBILITY column in the IBMQREP_CAPPARMS table.

About this task

After you migrate your DB2 instance to Version 9.5, you must migrate all of the Q Capture control tables that are defined in the instance to Version 9.5. If you have more than one Q Capture program, migrate each Q Capture program with this procedure.

The order in which you migrate the Q Capture and Q Apply programs might differ depending upon your Q Replication or Event Publishing configuration. For details, see "Migrating different Q Replication and Event Publishing environments to Version 9.5" on page 32.

Recommendation: Before you migrate a Q Capture program to V9.5, migrate all of the Q Apply programs that it works with.

Procedure

To migrate a Q Capture program to Version 9.5:

1. Optional: Stop your applications and let the Q Capture program process any remaining transaction in the DB2 recovery log.
2. Stop the Q Capture program. Any Q Apply programs or subscribing applications can be running or stopped.
3. Install one of the following products on the system where the Q Capture program runs:
   - IBM WebSphere Replication Server V9.5
   - IBM WebSphere Data Event Publisher V9.5

   From this point, do not use the replication administration tools to change your configuration (for example, do not add a Q subscription) until the Q Capture control tables are migrated.
4. Migrate the DB2 instance that your Q Capture program runs under. See Upgrade essentials for DB2 servers in the DB2 Information Center for details.
5. Optional: If you are migrating directly from Version 8.2 to Version 9.5, you need to run the Version 9.1 migration scripts for your DB2 platform before you run the Version 9.5 migration scripts. Follow these steps:
   a. Locate the script in the installation directory.

      Table 11 shows the scripts for various platforms.

Table 11. SQL scripts for migrating Q Capture control tables to V9.1 on different platforms

Platform	SQL script file
Linux UNIX	`sqllib/samples/repl/mig9/q/asnqcapluw.sql`
Windows	`sqllib\samples\repl\mig9\q\asnqcapluw.sql`

   b. Edit the script to replace the schema name and table space names as required. Complete instructions are in the scripts.
   c. Run the script.
6. Migrate the Q Capture control tables to the Version 9.5 level by running the migration script for your DB2 platform. Follow these steps:
   a. Locate the script in the installation directory.

      Table 12 shows the scripts for various platforms.

Table 12. SQL scripts for migrating Q Capture control tables to V9.5 on different platforms

Platform	SQL script file
Linux UNIX	`sqllib/samples/repl/mig95/q/` `asnqcapluwv95.sql`
Windows	`sqllib\samples\repl\mig95\q\` `asnqcapluwv95.sql`

   b. Edit the script to replace the schema name and table space names as required. Complete instructions are in the scripts.
   c. Run the script.
7. Optional: If all of the Q Apply programs that this Q Capture program replicates to are migrated to Version 9.5, change the value of the COMPATIBILITY

column in the IBMQREP_CAPPARMS table to 0905. You can run the
`asnqupdcompv95.sql` script in the `sqllib/samples/repl/mig95/q/` directory, or
use one of the following methods:

Method	Description

SQL	Run the following statement:
	
	`UPDATE schema.IBMQREP_CAPPARMS`
	`SET COMPATIBILITY = '0905';`

Replication Center	Use the Change Parameters - Saved window for Q Capture. To open the window, right-click the Q Capture server that contains the newly migrated control tables and select **Change Parameters** > **Saved**.

8. Start the Q Capture program with the **migrate**=y parameter and
   startmode=warmns.

   Recommendation: Start the Q Capture program as soon as possible after the
   migration, before you start other applications if possible. DB2 provides
   replication with the first valid log sequence number (LSN) within the current
   set of active log files as determined by the LOGPRIMARY database parameter.
   You should start Q Capture soon enough to ensure that all of the transactions
   that need to be captured can be found in the active log files.

Migrating a Q Apply program to Version 9.5 (Linux, UNIX, Windows)

You migrate a Q Apply program to Version 9.5 by installing WebSphere Replication
Server V9.5 and then running an SQL script that updates the Q Apply control
tables at the target server.

About this task

After you migrate your DB2 instance to Version 9.5, you must migrate all of the Q
Apply control tables that are defined in the instance to Version 9.5. If you have
more than one Q Apply program, migrate each Q Apply program with this
procedure.

The order in which you migrate the Q Apply and Q Capture programs might
differ depending upon your Q Replication or Event Publishing configuration. For
details, see "Migrating different Q Replication and Event Publishing environments
to Version 9.5" on page 32.

Procedure

To migrate a Q Apply program to Version 9.5:
1. Stop the Version 9.1 Q Apply program.
2. Optional: Stop the Q Capture program and let Q Apply process any remaining
   transaction in its receive queues.

   Note: If your Q Capture program is processing a high volume of data, a send
   queue could fill while the Q Apply program is stopped, which might prompt Q
   Capture to stop. If this happens, you can restart Q Capture after you migrate Q
   Apply and Q Apply starts processing messages that originate from the send
   queue.

3. Install IBM WebSphere Replication Server V9.5 on the system where the Q Apply program runs.

   From this point, do not use the replication administration tools to change your configuration (for example, do not add a Q subscription) until the Q Apply control tables are migrated.

4. Upgrade the DB2 instance that your Q Apply program runs under. See Upgrade essentials for DB2 servers in the DB2 Information Center for details.

5. Optional: If you are migrating directly from Version 8.2 to Version 9.5, you need to run the Version 9.1 migration scripts for your DB2 platform before you run the Version 9.5 migration scripts. Follow these steps:

   a. Locate the script in the installation directory.

      Table 13 shows the scripts for various platforms. The file path is `sqllib/samples/repl/mig9/q/` on Linux and UNIX and `sqllib\samples\repl\mig9\q\` on Windows.

Table 13. SQL scripts for migrating Q Apply control tables to V9.1 on different platforms

Platform	SQL script file
Linux, UNIX	`asnqappluw.sql`
Windows	`asnqappluw.sql`
Oracle target	`asnqappora.sql`
Sybase target	`asnqappsyb.sql`
Informix target	`asnqappinfx.sql`
Microsoft SQL Server target	`asnqappmssql.sql`

   b. Edit the script to replace the schema name and table space names as required. Complete instructions are in the scripts.

   c. Run the script.

   d. Use the DB2 REORG utility to reorganize the IBMQREP_EXCEPTIONS control table.

      Because the V9.1 migration changes the data type of the SRC_COMMIT_LSN column in the IBMQREP_EXCEPTIONS table from CHAR(10) to VARCHAR(48), you must issue the REORG TABLE command for this control table.

6. Migrate the Q Apply control tables to the Version 9.5 level by running the migration script for your DB2 platform. Follow these steps:

   a. Locate the script in the installation directory.

      Table 14 shows the scripts for various platforms. The file path is `sqllib/samples/repl/mig95/q/` on Linux and UNIX and `sqllib\samples\repl\mig95\q\` on Windows.

Table 14. SQL scripts for migrating Q Apply control tables on different platforms

Platform	SQL script file
Linux, UNIX	`asnqappluwv95.sql`
Windows	`asnqappluwv95.sql`
Oracle target	`asnqapporav95.sql`
Sybase target	`asnqappsybv95.sql`
Informix target	`asnqappinfxv95.sql`
Microsoft SQL Server target	`asnqappmssqlv95.sql`

b. Edit the script to replace the schema name and table space names as required. Complete instructions are in the scripts.

c. Run the script.

7. Optional: If you are replicating to a Sybase target, bind the Q Apply program packages to the Version 9.5 federated database using cursor stability (CS) isolation level by entering the following command:

```
db2 bind @qapply.lst isolation CS blocking all grant public
```

8. Start the Q Apply program.

9. Start the Q Capture program if you stopped it.

If you migrated the Q Apply program first, the program can continue to work with a Version 9.1 or Version 8.2 Q Capture program. When you migrate the Q Capture control tables to Version 9.5, you can change the value of the COMPATIBILITY column in the IBMQREP_CAPPARMS table to 0905. This change prompts the Q Capture program to begin sending Version 9.5 messages to the Q Apply program and allows you to use the full functionality of Version 9.5.

Chapter 7. Replication Center supported on Linux and Windows platforms

Starting with Version 9.1, the Replication Center is supported on only Linux and Windows platforms. In previous releases, the Replication Center and other DB2 Administration Tools were supported on all platforms.

The Replication Center and other DB2 Administration Tools are now supported on the Windows x86, Windows x64 (for AMD64 and Intel EM64T), 32-bit Linux x86, and Linux for AMD64 and Intel EM64T operating systems.

Chapter 8. Migrating to SQL Replication Version 10.1.3 (Linux, UNIX, and Windows)

When you upgrade your servers to DB2 10.1 for Linux, UNIX, and Windows, you must migrate the SQL Replication control tables and change-data (CD) tables, and in some cases your consistent-change-data (CCD) tables because of changes to the structure of DB2 recovery log records.

Log sequence numbers (LSN), which help the SQL Replication programs keep data synchronized between source and target, have lengthened from 10 bytes to 16 bytes so that DB2 can differentiate between multiple members in a DB2 pureScale® configuration.

You must migrate the Capture control tables and update CD table structures when Capture is upgraded to Version 10.1.3 and the Apply control tables when Apply is upgraded to Version 10.1.3. If both Capture and Apply are at Version 10.1.3, you also must update the values in the control tables and your CD tables and target CCD tables to handle 16-byte LSNs in the columns that store synchpoint data.

If you are not ready to upgrade all of the servers in your environment, SQL Replication Version 10.1.3 offers compatibility features that enable you to replicate between Version 10.1.3 and older versions:

- The new COMPATIBILITY column in the IBMSNAP_CAPPARMS control table enables SQL Replication to handle mixed-level servers. After Capture is upgraded to Version 10.1.3, you set COMPATIBILITY=0801 until you have upgraded all of the Apply programs that Capture works with to Version 10.1.3. This setting prompts the programs to continue to use 10-byte LSNs in all control tables. When you are ready, you set COMPATIBILITY=1001 and the programs begin using 16-byte LSNs.

  Important: Capture and Apply must be current in their processing before you before you upgrade Capture to Version 10.1.3. Capture must have read all the log records in the DB2 log and inserted all transactions into the CD table. The DB2 10.1 log read API does not read log records from local log files that were created in a prior version of DB2. The Apply program must have applied all the transactions in the CD table because the LSN fields before and after the migration to Version 10.1.3 are not compatible. Also, after you upgrade Capture to Version 10.1.3, you must start Capture using **startmode**=cold, regardless of whether the Apply program is upgraded.

- A Version 9 Apply program can work with an Apply control server that is at DB2 Version 10.1 as long as the Apply control tables are not migrated to Version 10.1.3.

- SQL Replication uses the new IBMSNAP_APPLEVEL table and its ARCH_LEVEL column to keep track of the level of the Apply control tables.

- The Capture and Apply migration scripts that are provided with Version 10.1.3 include SQL statements for altering the data length of synchpoint columns in CD and CCD tables to VARCHAR(16) FOR BIT DATA to handle the longer LSNs. The migration scripts also include statements for changing existing synchpoint values in the control tables, CD tables, and CCD tables so that the synchpoint values work with the longer data lengths.

Other considerations for planning your Version 10.1.3 migration:

Federated targets

Apply control servers that maintain federated targets do not require any extra steps during migration because all of the Apply control tables are on a DB2 for Linux, UNIX, and Windows database. The Version 10.1.3 migration does not affect federated targets.

External CCD tables

External CCD tables that are maintained by the Apply program are target CCD tables and can be migrated as part of the Apply control server migration (if the Capture program is upgraded to Version 10.1.3). External CCD tables that are maintained by the Q Apply program cannot be migrated in Version 10.1.3 at this time.

All other CCD tables do not need to be migrated. This includes external CCD tables that are maintained by IMS™ and federated sources (internal CCD tables). A CCD target table migration includes updates of its nickname and native DDL definitions.

External CCD tables that are also used as a source for subsequent SQL Replication targets cannot be migrated because old and new LSN values cannot be mixed. These tables will need to be fully refreshed.

Staged migration of LSN data

On the Apply side, control tables are migrated first and the version of the Apply control tables is reflected in the ARCH_LEVEL column of the IBMSNAP_APPLEVEL table. Migration of the LSN data can occur later for the appropriate subscription sets. When the Apply control server services multiple Capture servers, LSN data in the Apply control tables might include both 10-byte and 16-byte LSN values until all Capture servers have migrated to a compatibility value of 1001. Because of this, an Apply control server might go through more than one LSN migration step. For a subscription that is being processed by a Capture program that uses 16-byte LSNs, you must set the ARCH_LEVEL to 1001 in the ASN.IBMSNAP_SUBS_SET table.

On the Capture side, control tables are also migrated first. Migration of the LSN data can occur later for the appropriate registrations.

Considerations for DB2 pureScale feature with multiple members

If you use the DB2 pureScale feature with multiple members as a source database, you must upgrade the Apply program to Version 10.1.3 and migrate the Apply control tables to the Version 10.1.3 level (ARCH_LEVEL 1001). Upgrading Apply and migrating the control tables enables Apply to work with the 16-byte LSNs that a Version 10.1.3 Capture program uses in a multi-member system. The old, 10-byte LSN columns cannot hold the information that is needed for multiple members.

A DB2 10.1 for Linux, UNIX, and Windows source with multiple members cannot be a replication source for targets on DB2 for z/OS or IBM i.

Migrating from a single-member source to multiple members

When a source server is moved from DB2 10.1 for Linux, UNIX, and Windows with a single pureScale member to a multi-member configuration, existing LSN data in the following locations must be migrated by concatenating six hexadecimal zeros before each LSN value:

- Capture control tables
- CD tables

- Apply control tables
- Target CCD tables

The LSN data migration is required to ensure the accuracy of ORDER BY queries because strings are sorted from left to right. The Capture migration script, `SQLLIB/samples/repl/mig10/sql/asncapluwv10.sql`, includes statements for migrating existing data in the Capture control tables and CD tables. The Apply migration script, `SQLLIB/samples/repl/mig10/sql/asnappluwv10.sql`, includes statements for migrating existing data in the Apply control tables and CCD tables.

These migrations are required before you start capturing from a multi-member pureScale instance.

Migration scenarios

SQL Replication Version 10.1 on Linux, UNIX, and Windows supports mixed-level source and target servers; however, the migration procedures differ depending on whether you upgrade the Capture server, Apply server, Apply control server, or all three to Version 10.

Capture and Apply both upgraded to Version 10.1

Under this scenario you upgrade the Capture server, Apply server, and Apply control server to Version 10.1.

About this task

Because the Capture, Apply, and Apply control servers are all upgraded to Version 10.1, it does not matter whether the Capture program runs in a database with one DB2 pureScale member or with two or more members. After migration, all three servers can handle the 16-byte log sequence numbers that are used starting with DB2 10.1 for Linux, UNIX, and Windows.

Procedure

1. Quiesce all applications that update the source database.
2. Ensure that the Capture program has read all log records and inserted all replicated data into the CD table.
3. Ensure that the Apply program has applied all replicated data from the CD table.
4. Stop the Capture program.
5. Upgrade the DB2 instance to Version 10.1, which also upgrades the Capture server to Version 10.1. From this point, do not use the replication administration tools to modify your configuration (for example, add a registration) until the Capture control tables are migrated.
6. Locate the `asncapluwv10.sql` migration script in the `SQLLIB/samples/repl/mig10/sql` directory.
7. Change all instances of *!capschema!* and *!captablespace!* to match your schema and table space names.
8. Follow the instructions in Part 1 of the migration script to migrate the control tables.

   Part 1A

   - Alters the data type of all control table columns that store log sequence numbers to VARCHAR(16) FOR BIT DATA.

- Adds the COMPATIBILITY and LOGRDBUFSZ columns to the IBMSNAP_CAPPARMS table.
- Performs a REORG operation on the tables that were changed.
- Adds columns to the IBMSNAP_CAPMON table
- Adds two new tables.
- Sets the value of the COMPATIBILITY column in the IBMSNAP_CAPPARMS table to 0801.

Part 1B

Migrates your existing CD tables to the V10.1 level.

9. Update the values of *!CD_OWNER!.!CD_TABLE!* and *!capschema!* in Parts 2A and 2B of the migration script and run the SQL statements.

10. Stop the Apply program.

11. Optional: For all subscription-set members that replicate data from the Capture server that was migrated, change the value of the LOADX_TYPE column in the IBMSNAP_SUBS_MEMBR table on the Apply control server to 6. This change ensures that when you start Capture in cold mode, the Apply program does not perform a full refresh for each member. If full refreshes are acceptable, you can omit this step.

12. On the Apply server, upgrade the DB2 instance to Version 10.1, which also upgrades the Apply server to Version 10.1. From this point, do not use the replication administration tools to modify your configuration (for example, add a subscription-set member) until the Apply control tables are migrated.

13. Locate the `asnappluwv10.sql` migration script in the `SQLLIB/samples/repl/mig10/sql` directory and perform these tasks:

    a. On the Apply control server, run Part 1A of the script to migrate the Apply control tables to the Version 10.1 level. The script performs the following tasks:

       - Alters the data type of all control table columns that store log sequence numbers to VARCHAR(16) FOR BIT DATA.
       - Creates and populates the new IBMSNAP_APPLEVEL table.
       - Adds the REFRESH_COMMIT_CNT column to the IBMSNAP_APPLYPARMS table.
       - Performs REORG operations on the tables that were changed.

    b. Optional: On the target server, if you have CCD targets, follow the instructions in Part 1B of the script to migrate your existing target CCD tables to the Version 10.1 level. All columns in the CCD tables that store log sequence numbers will be migrated to VARCHAR(16) FOR BIT DATA to handle 16-byte log sequence numbers.

    c. Optional: Follow the instructions in Part 3 of the script to concatenate hex zeroes to the LSN columns in your CCD targets.

14. Start the Capture program with **startmode**=cold. DB2 has many internal changes for Version 10.1 and this start method is required. A cold start prompts Capture to deactivate all registrations.

15. Start the Apply program with **loadxit**=y. Apply detects any inactive registrations and inserts CAPSTART signals to activate these registrations. If you set LOADX_TYPE to 6, Apply does not reload target tables despite the Capture cold start.

16. Resume your applications.

After you perform these steps:

- The Version 10.1 Capture program updates its control table LSN columns and the LSN columns in CD tables by using 16-bytes LSNs.
- The Version 10.1 Apply program reads 16-byte LSNs from the CD tables and also updates its control table LSN columns and the LSN columns in target CCD tables by using 16-bytes LSNs.

Capture (1 member) upgraded to V10.1; Apply at V9.7

Under this scenario you upgrade the Capture program to Version 10.1 but leave the Apply program and Apply control server at Version 9.7.

About this task

This scenario covers a configuration in which the Capture program runs in a database with one DB2 pureScale member. If the database has two or more members, the Apply program and Apply control tables also must be migrated to Version 10.1.

When you upgrade the Capture program to Version 10.1, you must migrate the Capture control tables to the V10.1 level. But because a V9.7 Apply program cannot work with 16-byte log sequence numbers, with a single pureScale member at the source you can set the Capture compatibility to 0801 and the SQL Replication programs continue to use the older 10-byte log sequence numbers.

Note: Even if you upgrade the Apply program to Version 10.1, if the Apply control server remains at Version 9.7 or earlier you must follow this procedure so that 10-byte LSNs continue to be used.

Procedure
1. Quiesce all applications that update the source database.
2. Ensure that the Capture program has read all log records and inserted all replicated data into the CD table.
3. Ensure that the Apply program has applied all replicated data from the CD table.
4. Stop the Capture program.
5. Upgrade the DB2 instance to Version 10.1, which also upgrades the Capture server to Version 10.1. From this point, do not use the replication administration tools to modify your configuration (for example, add a registration) until the Capture control tables are migrated.
6. Locate the `asncapluwv10.sql` migration script in the `SQLLIB/samples/repl/mig10/sql` directory.
7. Change all instances of *!capschema!* and *!captablespace!* to match your schema and table space names.
8. Follow the instructions in Part 1 of the migration script to migrate the control tables.

   Part 1A
   - Alters the data type of all control table columns that store log sequence numbers to VARCHAR(16) FOR BIT DATA.
   - Adds the COMPATIBILITY and LOGRDBUFSZ columns to the IBMSNAP_CAPPARMS table.
   - Performs a REORG operation on the tables that were changed.
   - Adds columns to the IBMSNAP_CAPMON table

- Adds two new tables.
- Sets the value of the COMPATIBILITY column in the IBMSNAP_CAPPARMS table to 0801.

Part 1B

Migrates your existing CD tables to the V10.1 level.

9. Stop the Apply program.
10. Optional: For all subscription-set members that replicate data from the Capture server that was migrated, change the value of the LOADX_TYPE column in the IBMSNAP_SUBS_MEMBR table on the Apply control server to 6. This change ensures that when you start Capture in cold mode, the Apply program does not perform a full refresh for each member. If full refreshes are acceptable, you can omit this step.
11. Start the Capture program with **startmode**=cold. DB2 has many internal changes for Version 10.1 and this start method is required. A cold start prompts Capture to deactivate all registrations.
12. Start the Apply program with **loadxit**=y. Apply detects any inactive registrations and inserts CAPSTART signals to activate these registrations. If you set LOADX_TYPE to 6, Apply does not reload target tables despite the Capture cold start.
13. Resume your applications.

After you perform these steps:

- The Version 10.1 Capture program continues to populate CD tables and control tables with 10-byte LSNs, modifying the 16-byte LSNs that come from the DB2 recovery log.
- The Version 9.7 Apply program continues to read 10-byte LSNs from the CD tables and updates LSN columns in the Apply control tables by using 10-byte LSNs.

Apply upgraded to V10.1; Capture at V9.7

Under this scenario you upgrade the Apply program to Version 10.1 but leave the Capture program at Version 9.7.

About this task

The Apply control tables must be migrated to the V10.1 level to work with the V10.1 Apply program, but the Capture and Apply programs continue to use the older 10-byte log sequence numbers (LSN). If you have target CCD tables, you do not need to change the columns that store LSNs because the Capture program is at V9.7.

Procedure

1. Stop the Apply program.
2. Upgrade the DB2 instance to Version 10.1, which also upgrades the Apply server to Version 10. From this point, do not use the replication administration tools to modify your configuration (for example, add a subscription-set member) until the Apply control tables are migrated.
3. Locate the `asnappluwv10.sql` migration script in the `SQLLIB/samples/repl/mig10/sql` directory and perform these tasks:
   a. On the Apply control server, run Part 1A of the script to migrate the Apply control tables to the Version 10.1 level. The script performs the following tasks:

- Alters the data type of all control table columns that store log sequence numbers to VARCHAR(16) FOR BIT DATA.
- Creates and populates the new IBMSNAP_APPLEVEL table.
- Adds the REFRESH_COMMIT_CNT column to the IBMSNAP_APPLYPARMS table.
- Performs REORG operations on the tables that were changed.

b. Optional: On the target server, if you have CCD targets, follow the instructions in Part 1B of the script to migrate your existing target CCD tables to the Version 10.1 level. All columns in the CCD tables that store log sequence numbers will be migrated to VARCHAR(16) FOR BIT DATA to handle 16-byte log sequence numbers.

c. Optional: Follow the instructions in Part 3 of the script to concatenate hex zeroes to the LSN columns in your CCD targets.

4. Start the Apply program.

After you perform these steps:
- Capture continues to populate CD tables with 10-byte LSNs and the Version 10.1 Apply program reads 10-byte LSNs in the CD tables.
- The Version 10.1 Apply program updates its control table LSN columns and the LSN columns in target CCD tables by using 10-bytes LSNs.

Compatibility between Version 10.1.3 on Linux, UNIX, and Windows and earlier versions

The change from 10-byte to 16-byte log sequence numbers (LSN) in DB2 10.1 for Linux, UNIX, and Windows requires that you plan for compatibility of mixed-level or mixed-platform Capture servers, Apply servers, and Apply control servers.

To work with DB2 10.1, all replication control tables that store an LSN value and the programs that read and update the control tables must be updated. The new data type that is used to store LSNs in the control tables is VARCHAR(16) FOR BIT DATA.

Replication uses two methods to determine whether to use 16-byte LSN values or the older 10-byte LSNs: the COMPATIBILITY column in the IBMSNAP_CAPPARMS table and the ARCH_LEVEL column in the IBMSNAP_SUBS_SET table:

- If Capture is at Version 10.1.3 and the value of COMPATIBILITY is 1001, Capture uses 16-byte LSNs. The Apply program must be at Version 10.1.3 to handle the longer LSNs, and the value of ARCH_LEVEL in the IBMSNAP_SUB_SET table must be 1001.
- The Capture and Apply program use 10-byte LSNs under these conditions:
  - Capture is at Version 9.7. A Version 10.1.3 Apply program can handle 10-byte log sequence numbers from an older Capture program.
  - Capture is at Version 10.1.3 and the value of COMPATIBILITY is 0801. Apply can be pre-Version 10.1.3 or at Version 10.1.3. You must set ARCH_LEVEL in the IBMSNAP_SUB_SET table to 0801.

Table 15 on page 50 summarizes the compatibility support.

Table 15. Supported Apply versions and compatibility settings for Version 10.1.3 Capture program. "Pre-V10.1.3" refers to Version 9.7 or earlier on Linux, UNIX, and Windows or Version 10.1 or earlier on z/OS. ARCH_LEVEL refers to the column in the IBMSNAP_SUB_SET table.

Capture version	Capture compatibility setting	Capture LSN data length	Apply version	Apply LSN data length	ARCH_LEVEL
Pre-V10.1.3	NA	10 bytes	Any	10	0801
V10.1.3 with one DB2 pureScale member	0801	10 bytes	Any	10	0801
	1001	16 bytes	V10.1.3	16	1001
			V9.7 or below	Not allowed	
V10.1.3 with two or more DB2 pureScale members	Capture compatibility setting of 0801 and data length of 10 are not allowed				
	1001	16 bytes	V9.7 or below	Not allowed	
			V10.1.3	Data length of 10 and ARCH_:LEVEL of 0801 are not allowed	
				16	1001

Other compatibility considerations:

- For DB2 10.1 with more than one pureScale member, the value of the COMPATIBILITY column must be 1001.
- The replication programs always use 10-byte LSNs if either the source or target server is on z/OS.
- The replication administration tools only create control tables with an ARCH_LEVEL of 1001 on DB2 10.1 for Linux, UNIX, and Windows.

Apply program support

A Version 10.1.3 Apply program supports both Version 9 and Version 10.1.3 Apply control servers. The Apply program queries the ARCH_LEVEL column in the IBMSNAP_APPLEVEL table to determine the level of the Apply control tables.

The V10.1.3 Apply program also queries the COMPATIBILITY column of the IBMSNAP_CAPPARMS table to determine whether the Capture program is using 16-byte LSNs. If the COMPATIBILITY column does not exist (pre-V10.1.3), Apply assumes 10-byte LSNs. The Apply program queries the ARCH_LEVEL column in the IBMSNAP_SUBS_SET table to determine the level of the subscription set and this must match the COMPATIBILITY value.

Important: Pre-V10.1.3 Apply programs cannot handle 16-byte LSNs. If this type of LSN is encountered, Apply does not stop processing the subscription set, meaning that data might be incorrect. If you migrate the Apply control tables to V10.1.3, do not use an Apply program that is at Version 9.7 or earlier.

Compatibility of CCD target tables

When you create CCD target tables, the replication administration tools rely on the Capture compatibility value to determine the length of the IBMSNAP_COMMITSEQ and IBMSNAP_INTENTSEQ columns in the CCD tables.

If the compatibility value is 1001, the tools create CCD target tables with 16-byte LSN columns. If the value is 0801, the tools create CCD targets with 10-byte LSNs.

When you create Q subscriptions with CCD tables as both source and target, the administration tools require that source and target CCD tables use the same data length for columns that store LSNs; that is, 16 byte to 16 byte, and 10 byte to 10 byte.

External CCD sources

External CCD source tables, which are not maintained by the Capture program, are supported by the V10.1.3 Apply program whether the tables have 10-byte or 16-byte LSN column lengths. Pre-V10.1.3 Apply programs only support external CCD tables that use 10-byte LSNs.

Chapter 9. Migrating to SQL Replication Version 9.7 Fix Pack 3 or 3a (Linux, UNIX, Windows)

Migrating your control tables to Version 9.7 Fix Pack 3 or 3a is required on Linux, UNIX, and Windows after you upgrade your DB2 instance to Version 9.7 Fix Pack 3 or 3a.

Important: On Linux, UNIX, and Windows, after you migrate your DB2 instance to Version 9, any log files that were created by the Version 8 DB2 instance will be inaccessible to the Capture program. Any transactions that were not processed before migration will be lost. To avoid losing transactions, make sure to stop your DB2 applications and let the Capture program process any remaining transactions in the DB2 recovery log before you migrate the DB2 instance.

The following sections describe the migration process in more detail:
- "Migrating the Apply control server first"
- "Migrating the Capture control server before migrating multiple Apply control servers" on page 54

Migrating the Apply control server first

Follow these steps if you want to migrate the Apply control server first. You can use this procedure with a single Capture program that replicates to a single Apply program or to multiple Apply programs.

1. *Optional:* Stop the Replication Alert Monitor to prevent the monitor from issuing alerts while the replication programs are stopped for migration.
2. Stop the Apply program.
3. Migrate the DB2 instance to Version 9.7 Fix Pack 3 or 3a by running the fix pack installer, which also upgrades the Apply server to Version 9.7 Fix Pack 3 or 3a.

   From this point, do not use the replication administration tools to modify your configuration (for example, add a subscription-set member) until the Apply control tables are migrated.
4. Migrate the control tables:
   a. Find the `asnappluw97fp.sql` migration script in the `sqllib/samples/repl/mig97/sql/` directory.
   b. Replace the table space names as required and run the script.
5. You can now start the Version 9.7 Fix Pack 3 or 3a Apply program to work with your Capture program.

If you are ready to migrate the Capture server next, follow these steps:

1. Stop Capture.
2. Migrate the DB2 instance to Version 9.7 Fix Pack 3 or 3a by running the fix pack installer, which also upgrades the Capture server to Version 9.7 Fix Pack 3 or 3a.

   From this point, do not use replication administration to modify your replication configuration (for example to add a registration) until your Capture control tables are migrated.
3. Migrate the control tables:

a. Find the `asncapluw97fp.sql` migration script in the `sqllib/samples/repl/mig97/sql/` directory.

b. Replace the schema and table space names as required and run the script.

4. Start the Version 9.7 Fix Pack 3 or 3a Capture program.

   Recommendation: Start the Capture program as soon as possible after the migration, before you start other applications if possible. DB2 provides replication with the first valid log sequence number (LSN) within the current set of active log files as determined by the LOGPRIMARY database parameter. You should start Capture soon enough to ensure that all of the transactions that need to be captured can be found in the active log files.

5. Start the Replication Alert Monitor if you stopped it.

Migrating the Capture control server before migrating multiple Apply control servers

This procedure is a slight modification of the above procedures for use with multiple Capture or Apply servers.

1. Follow the steps above for migrating a Capture server.

2. Start the Version 9.7 Fix Pack 3 or 3a Capture program.

3. If you have more than one Capture program, migrate each one. Capture programs do not have to be migrated all at once.

4. Follow the steps above to migrate a Apply program.

5. You can now start the Version 9.7 Fix Pack 3 or 3a Apply program to work with your Version 9.7 Fix Pack 3 or 3a Capture program.

6. Repeat the migration steps for each Apply program that you want to migrate.

Chapter 10. Migrating to SQL Replication Version 9.7 Fix Pack 2

This migration is optional if you are upgrading from Version 9.7. For Version 9.7 Fix Pack 2, a new control table was added to maintain a history of changes to range-partitioned source tables on Linux, UNIX, or Windows systems. The new control table, IBMQREP_PART_HIST, is required only if you are replicating from range-partitioned tables on these systems. Because of this, the optional migration is limited to the Capture server.

If you need to migrate, follow these steps:

1. Install the fix pack.
2. Find the migration script at `samples/repl/mig97/sql/asncapluwv97fp.sql`.
3. Customize the migration script by replacing the schema of the control table. Follow the instruction in the script.
4. Stop the Capture program if it is running;
5. Optional: Stop the Replication Alert Monitor if it is running to avoid unnecessary alerts during migration.
6. Run the migration script.

   You can also use the following DDL to create the new control table:
   ```
   CREATE TABLE capture_schema.IBMQREP_PART_HIST
   (
   LSN               VARCHAR(16)    FOR BIT DATA NOT NULL,
   HISTORY_TIME      TIMESTAMP                   NOT NULL,
   TABSCHEMA         VARCHAR(128)                NOT NULL,
   TABNAME           VARCHAR(128)                NOT NULL,
   DATAPARTITIONID   INTEGER                     NOT NULL,
   TBSPACEID         INTEGER                     NOT NULL,
   PARTITIONOBJECTID INTEGER                     NOT NULL,
   PRIMARY KEY (LSN, TABSCHEMA, TABNAME, DATAPARTITIONID,
   TBSPACEID, PARTITIONOBJECTID)
   );
   ```
7. Start the Capture program with the **migrate**=y and **startmode**=WARMNS parameters.

   Recommendation: Start the Capture program as soon as possible after the migration, before you start other applications if possible. DB2 provides replication with the first valid log sequence number (LSN) within the current set of active log files as determined by the LOGPRIMARY database parameter. You should start Capture soon enough to ensure that all of the transactions that need to be captured can be found in the active log files.

No migration is required for Apply control servers or Monitor control servers for Version 9.7 Fix Pack 2.

Important: On Linux, UNIX, and Windows, after you migrate your DB2 instance to Version 9, any log files that were created by the Version 8 DB2 instance will be inaccessible to the Capture program. Any transactions that were not processed before migration will be lost. To avoid losing transactions, make sure to stop your DB2 applications and let the Capture program process any remaining transactions in the DB2 recovery log before you migrate the DB2 instance.

Chapter 11. Migrating to SQL Replication Version 9.7

This migration is optional if you are upgrading from Version 9.5. The migration enables you to store more historical data for the Capture program.

Important: On Linux, UNIX, and Windows, after you migrate your DB2 instance to Version 9, any log files that were created by the Version 8 DB2 instance will be inaccessible to the Capture program. Any transactions that were not processed before migration will be lost. To avoid losing transactions, make sure to stop your DB2 applications and let the Capture program process any remaining transactions in the DB2 recovery log before you migrate the DB2 instance.

For Version 9.7 (or Version 9.1 plus the PTF for APAR PK85947 on z/OS), four new columns are added to the IBMSNAP_CAPMON control table to provide more monitoring information. These columns are optional. Also, the data length of the CAP_SCHEMA_NAME column in the IBMSNAP_CAPSCHEMAS table is increased to VARCHAR(128) to accommodate longer Capture schemas. The Capture program runs as usual whether or not you make these changes. If you applied the PTF that corresponds to V9.7 on z/OS, the changes are already made. The Apply control tables have no changes between V9.5 and V9.7.

To make the Capture control table changes, you can run one of the following scripts:

Table 16. Sample scripts for migrating SQL Replication control tables to Version 9.7

Platform	Sample
Linux, UNIX, Windows	`SQLLIB/samples/repl/mig97/sql/asncapluwv97.sql`
Oracle sources	`SQLLIB/samples/repl/mig97/sql/asncaporav97.sql`
Sybase sources	`SQLLIB/samples/repl/mig97/sql/asncapsybv97.sql`
Informix sources	`SQLLIB/samples/repl/mig97/sql/asncapinfxv97.sql`
Microsoft SQL Server sources	`SQLLIB/samples/repl/mig97/sql/asncapmssqlv97.sql`

Chapter 12. Migrating to SQL Replication Version 9.5

This migration is optional if you are upgrading from Version 9.1. For Version 9.5, a new column was added to the IBMQREP_IGNTRAN control table that facilitates tracing of ignored transactions. This control table is shared by SQL Replication and Q Replication.

To add the column, you can run the `asnmz95.sql` script in the `sqllib\samples\repl\mig95\sql\` directory, or use the following SQL statement:

```
ALTER TABLE capture_schema.IBMQREP_IGNTRAN
ADD COLUMN IGNTRANTRC CHAR(1) NOT NULL DEFAULT 'Y';
```

Also, V9.5 SQL Replication supports a new type of consistent-change data (CCD) table that allows the Apply program to provide transaction commit information without joining the CD table and the IBMSNAP_UOW table. You do not need to migrate the control tables to use this new type of CCD table, but to migrate your existing CCD tables to the new type, you should follow the procedure in Chapter 14, "Migrating CCD tables to the type 9 CCD," on page 63.

Important: On Linux, UNIX, and Windows, after you migrate your DB2 instance to Version 9, any log files that were created by the Version 8 DB2 instance will be inaccessible to the Capture program. Any transactions that were not processed before migration will be lost. To avoid losing transactions, make sure to stop your DB2 applications and let the Capture program process any remaining transactions in the DB2 recovery log before you migrate the DB2 instance.

Chapter 13. Coexistence support in Version 10 and Version 9 SQL Replication

SQL Replication supports full coexistence between Version 10, Version 9.7, Version 9.5, and Version 9.1.

The V10, V9.7, V9.5, and V9.1 Capture programs are compatible with any of the V10, V9.7, V9.5, and V9.1 Apply programs, and vice-versa. The SQL Replication control tables do not contain any changes between these versions that prevent coexistence.

Using the replication administration tools with different versions

You can use the Version 10 replication tools with any combination of V10, V9.7, V9.5, and V9.1 Capture and Apply servers. The product function that is available with the tools is based on the lowest level of Capture or Apply program that exists in a scenario.

When you use the ASNCLP command-line program or Replication Center to create SQL Replication control tables, the architecture level of the control tables might differ depending on your operating system:

> z/OS
>
> On z/OS, the administration tools create control tables based on the level of the tools rather than the DB2 version. So a Version 10 tool always creates V10 control tables, a V9.7 tool creates V9.7 control tables, and so on.

> Linux UNIX Windows
>
> On Linux, UNIX, and Windows, the tools create different levels of control tables depending upon the level of the tools and the DB2 level:
>
> **Version 9.7 tools**
> > Create V9.7 control tables on a V9.7 DB2, V9.5 control tables on a V9.5 DB2, and V9.1 control tables on a V9.1 DB2.
>
> **Version 9.5 tools**
> > Create V9.5 control tables on a V9.5 DB2, and V9.1 control tables on a V9.1 DB2.
>
> **Version 9.1 tools**
> > Create V9.1 control tables on a V9.1 DB2.

Chapter 14. Migrating CCD tables to the type 9 CCD

Version 9.5 SQL Replication supports a new type of consistent-change data (CCD) table that allows the Apply program to provide transaction commit information without joining the CD table and the IBMSNAP_UOW table. You do not need to migrate the control tables to use this new type of CCD table, but to migrate your existing CCD tables to the new type, you should follow this procedure.

Procedure

To migrate CCD tables to the type 9 CCD:

1. Connect to the Apply control server.
2. Run the following statement:
   ```
   UPDATE ASN.IBMSNAP_SUBS_MEMBER SET TARGET_STRUCTURE=9
   WHERE APPLY_QUAL='applyqual' AND SET_NAME='setname'
   AND WHOS_ON_FIRST='whos_on_first'AND SOURCE_OWNER='source_owner'
   AND SOURCE_TABLE='source_table' AND SOURCE_VIEW_QUAL='srcviewqual'
   AND TARGET_OWNER='target_owner' AND TARGET_TABLE='target_table';
   ```
3. Connect to the first-tier Capture control server.
4. Run the following statement:
   ```
   UPDATE captureschema.IBMSNAP_PRUNCNTL SET TARGET_STRUCTURE=9
   WHERE SOURCE_OWNER='source_owner'AND SOURCE_TABLE='source_table'
   AND SOURCE_VIEW_QUAL='srcviewqual'AND APPLY_QUAL='applyqual'
   AND SET_NAME='setname' AND TARGET_SERVER='target_server'
   AND TARGET_OWNER='target_owner' AND TARGET_TABLE='target_table';
   ```
5. If the external CCD table is already participating in a three-tier architecture, go to step 6. Otherwise, process the next CCD target table.
6. Connect to the Capture control server at the second tier.
7. Run the following statement:
   ```
   UPDATE captureschema.IBMSNAP_REGISTER
   SET SOURCE_STRUCTURE=9 WHERE SOURCE_TABLE='ccd_table'
   AND SOURCE_OWNER='ccd_owner';
   ```
8. Connect to the Apply control server at the second tier.
9. If the value of MAX_SYNCH_MINUTES for the SET NAME and APPLY QUAL are not null, then update the IBMSNAP_SUBS_SET table and change the MAX_SYNCH_MINUTES to null by running the following statement:
   ```
   UPDATE ASN.IBMSNAP_SUBS_SET SET MAX_SYNCH_MINUTES=null
   WHERE SET_NAME='set _name'AND APPLY_QUAL='applyqual'
   AND WHOS_ON_FIRST='whos_on_first';
   ```

Contacting IBM

You can contact IBM for customer support, software services, product information, and general information. You also can provide feedback to IBM about products and documentation.

The following table lists resources for customer support, software services, training, and product and solutions information.

Table 17. IBM resources

Resource	Description and location
IBM Support Portal	You can customize support information by choosing the products and the topics that interest you at www.ibm.com/support/ entry/portal/Software/ Information_Management/ InfoSphere_Information_Server
Software services	You can find information about software, IT, and business consulting services, on the solutions site at www.ibm.com/ businesssolutions/
My IBM	You can manage links to IBM Web sites and information that meet your specific technical support needs by creating an account on the My IBM site at www.ibm.com/account/
Training and certification	You can learn about technical training and education services designed for individuals, companies, and public organizations to acquire, maintain, and optimize their IT skills at http://www.ibm.com/software/sw-training/
IBM representatives	You can contact an IBM representative to learn about solutions at www.ibm.com/connect/ibm/us/en/

Federation, replication, and event publishing products support

For support, go to:
- IBM InfoSphere Federation Server
  www.ibm.com/software/data/integration/support/federation_server/
- IBM InfoSphere Replication Server
  www.ibm.com/software/data/integration/support/replication_server/
- IBM InfoSphere Data Event Publisher
  www.ibm.com/software/data/integration/support/data_event_publisher/

Classic products support

For support, go to:
- IBM InfoSphere Classic Federation Server for z/OS
  www.ibm.com/software/data/integration/support/classic_federation_server_z/

- IBM InfoSphere Classic Replication Server for z/OS
  www.ibm.com/software/data/infosphere/support/replication-server-z/
- IBM InfoSphere Classic Data Event Publisher for z/OS
  www.ibm.com/software/data/integration/support/data_event_publisher_z/
- IBM InfoSphere Data Integration Classic Connector for z/OS
  www.ibm.com/software/data/integration/support/data_integration_classic_connector_z/

Providing feedback

The following table describes how to provide feedback to IBM about products and product documentation.

Table 18. Providing feedback to IBM

| Type of feedback	Action
Product feedback	You can provide general product feedback through the Consumability Survey at www.ibm.com/software/data/info/ consumability-survey
Documentation feedback	To comment on the information center, click the Feedback link on the top right side of any topic in the information center. You can also send comments about PDF file books, the information center, or any other documentation in the following ways: • Online reader comment form: www.ibm.com/software/data/rcf/ • E-mail: comments@us.ibm.com

How to read syntax diagrams

The following rules apply to the syntax diagrams that are used in this information:

- Read the syntax diagrams from left to right, from top to bottom, following the path of the line. The following conventions are used:
  - The >>--- symbol indicates the beginning of a syntax diagram.
  - The ---> symbol indicates that the syntax diagram is continued on the next line.
  - The >--- symbol indicates that a syntax diagram is continued from the previous line.
  - The --->< symbol indicates the end of a syntax diagram.
- Required items appear on the horizontal line (the main path).

```
►►──required_item────────────────────────────────────────────────►◄
```

- Optional items appear below the main path.

```
►►──required_item─────────────────────────────────────────────────►◄
               └─optional_item─┘
```
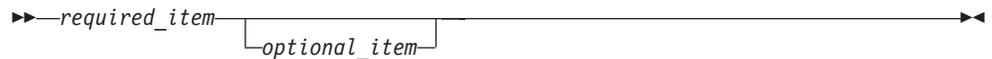
If an optional item appears above the main path, that item has no effect on the execution of the syntax element and is used only for readability.

```
            ┌─optional_item─┐
►►──required_item──┴───────────┴───────────────────────────────────►◄
```
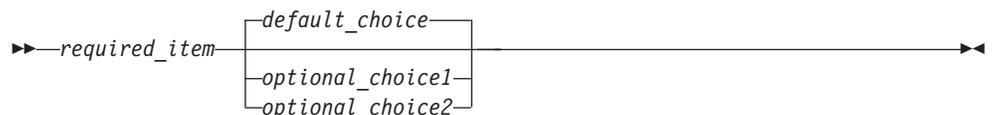
- If you can choose from two or more items, they appear vertically, in a stack.

  If you must choose one of the items, one item of the stack appears on the main path.

```
►►──required_item──┬─required_choice1─┬─────────────────────────────►◄
                └─required_choice2─┘
```
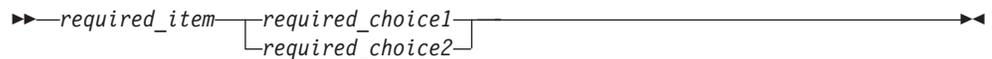
If choosing one of the items is optional, the entire stack appears below the main path.

```
►►──required_item─────────────────────────────────────────────────►◄
               ├─optional_choice1─┤
               └─optional_choice2─┘
```
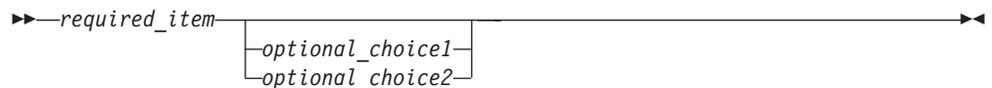
If one of the items is the default, it appears above the main path, and the remaining choices are shown below.

```
            ┌─default_choice───┐
►►──required_item──┼──────────────────┼─────────────────────────────►◄
               ├─optional_choice1─┤
               └─optional_choice2─┘
```

- An arrow returning to the left, above the main line, indicates an item that can be repeated.

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```
      ┌──────────────┐
►►──required_item──▼─repeatable_item──┴────────────────────────►◄
```

If the repeat arrow contains a comma, you must separate repeated items with a comma.

```
      ┌─,────────────┐
►►──required_item──▼─repeatable_item──┴────────────────────────►◄
```

A repeat arrow above a stack indicates that you can repeat the items in the stack.

- Sometimes a diagram must be split into fragments. The syntax fragment is shown separately from the main syntax diagram, but the contents of the fragment should be read as if they are on the main path of the diagram.

```
►►──required_item──┤ fragment-name ├─────────────────────────►◄
```

Fragment-name:

```
├──required_item───────────────────────┤
   └─optional_item─┘
```

- Keywords, and their minimum abbreviations if applicable, appear in uppercase. They must be spelled exactly as shown.
- Variables appear in all lowercase italic letters (for example, `column-name`). They represent user-supplied names or values.
- Separate keywords and parameters by at least one space if no intervening punctuation is shown in the diagram.
- Enter punctuation marks, parentheses, arithmetic operators, and other symbols, exactly as shown in the diagram.
- Footnotes are shown by a number in parentheses, for example (1).

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