



Sybase IQ 15.0

Database Migration



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Introduction

Sybase IQ 15.0 includes many new features: enhanced multiplex capabilities, table spaces and data partitioning that support Information Lifecycle Management (ILM) capabilities and extensive query parallelism. Additionally, its class-leading performance has also been significantly strengthened. To achieve this, parts of the server have undergone substantial changes; in the case of the catalog store; a new storage format has been adopted.

The catalog store in Sybase IQ 12.7 worked with all earlier versions of the product; the server included logic that supported all functionality in each earlier version. Database migration was straightforward—users simply performed an “alter database upgrade” when upgrading to the next version of Sybase IQ. This simple process was called upgrading the database. From an engineering perspective, however, the support for legacy versions imposed severe limitations, making it cumbersome to deliver new and innovative features. Additionally, legacy code also restricted the type of optimizations that could be performed.

As part of the upgrade to Sybase IQ 15.0, a database file migration is now required, rather than a simple database upgrade. A new fully automated migration tool—`iqunload`—included with Sybase IQ 15.0, re-creates the catalog store and reloads it with the existing database schema metadata. Only the catalog is re-created; the IQ data and temp dbspaces are not changed.

The migration process is completely automated, self-contained, and does not require your existing Sybase IQ 12.7 software. There are a few premigration steps you need to follow to ensure a smooth and error-free migration.

The remainder of this document discusses the highlights of database migration to Sybase IQ 15.0.

Note: If you are migrating a 12.7 multiplex database, see Chapter 5, “Migrating Data, in the *Installation and Configuration Guide* for additional instructions. There are some key pre- and postmigration steps that a multiplex requires.

Prerequisites

`iqunload` has two working modes: schema unload and migration. Migration mode uses a special engine bundled with Sybase IQ 15.0, and does not require any earlier versions of Sybase IQ. Schema unload mode requires that the database be running in an existing Sybase IQ server—12.6 ESD #11, or later, or Sybase IQ 12.7 ESD #5, or later. Schema unload is not supported with IQ 15.0 or later servers.

Embedded IQ 12.7 engine

The special database engine that comes with Sybase IQ 15.0 is called the unload support engine—“iqunlspt”. The unload support engine is a self-contained subset of the Sybase IQ 12.7 (ESD #5) database engine.

This engine is installed when you install Sybase IQ 15.0 works only with the migration tool in an embedded manner—that is, it runs in the background and contains no console or GUI window. When you run the migration tool, you will see the iqunlspt process running.

iqunlspt accepts startup arguments if your database requires special switches or memory settings. This is useful for providing diagnostic switches, such as `-z` or `-zr`, while troubleshooting. Since the migration process re-creates only your database schema, it is unlikely that you will need to set any command line arguments for the unload support engine.

New migration tool—iqunload

iqunload has the same look and feel as other IQ command line tools. It also accepts the same format for command line arguments. For example, it accepts the same network connectivity options via `-c "..."`, as `dbisql` or `dbping`.

Unlike “alter database upgrade,” iqunload migrates database options. During migration, all existing database options for which values are no longer the default value are saved, and a new database is created with Sybase IQ 15.0 options. Afterwards, the saved options are applied, overwriting any Sybase IQ 15.0 options. Options that are no longer available in Sybase IQ 15.0 are ignored.

Remember that only the catalog is re-created; no existing data in the IQ data stores are affected or changed. As an extra precaution, dbspaces are opened in read-only mode during the migration process. This provides a window of opportunity during which you can revert back to Sybase IQ 12.7/12.6 in the event of failure.

iqunload has two modes of operation:

- Schema unload mode
- Migration mode

The following sections discuss the differences between these two modes.

Schema unload mode

The schema unload mode results in `iqunload` generating a reload SQL file that contains all the SQL statements necessary to re-create the schema for a database. You can use schema unload mode to create an empty version of a database. When you execute `iqunload` in schema unload only mode, using the command line argument `-n`, a file that contains all the SQL necessary to create the database schema is created.

Once the schema SQL file is generated, manually create a new database and execute the generated SQL file. No data is migrated. To migrate data into the new database, manually extract the data from your older database and manually load it into the new database.

The schema unload mode does *not* use the special unload support engine that comes with Sybase IQ 15.0. To run the schema unload mode, you must connect to your existing Sybase IQ database server. In addition, you must copy three supporting SQL files from your Sybase IQ 15.0 installation to your earlier-version server. See Chapter 6, “Migrating Data” in the *Sybase IQ 15.0 Installation and Configuration Guide*.

Database migration mode

Use database migration mode to migrate a database to Sybase IQ 15.0. During migration, `iqunload` automatically uses the unload support engine to start your existing database, then uses the Sybase IQ 15.0 server to re-create the catalog store. `iqunload` interfaces with both database engines to carry out the migration in an automated fashion.

`iqunload`:

1. Starts the Sybase IQ 12.7/12.6 database with the unload database engine.
2. Performs various internal database checks.
3. Determines if the database is a multiplex write server, in which case some extra steps are taken to migrate the writer to an IQ 15.0 coordinator.
4. Generates the schema (similar to schema unload mode).
5. Starts the Sybase IQ 15.0 server.
6. Creates a new database.

7. Applies the generated schema.
8. Executes various internal database checks to validate the metadata for migrated objects.
9. Backs up the operating system files. This does not use the SQL backup command.

Database migration process overview

With the unload support engine, the Sybase IQ 15.0 database server, and iqunload, you are ready to begin the migration process. Even though iqunload is automated, there are several steps you must manually perform, to ensure there are no pre- or postmigration data errors. These steps also provide you the opportunity to create a backup of the database and to check for objects that are no longer supported in Sybase IQ 15.0.

The migration process steps are:

1. Start your existing database with Sybase IQ 12.7/12.6 and verify your database is clean and error-free by calling the *sp_iqcheckdb* stored procedure.
2. Use the SQL backup command to back up the Sybase IQ 12.7 database.
3. Check for unsupported object types. See Chapter 6, “Migrating Data,” in the *Sybase IQ 15.0 Installation and Configuration Guide*.
4. Shut down the Sybase IQ 12.7/12.6 servers that are using the database.
5. Run “iqunload –au ...” to migrate the database.
6. Start the migrated database in read-only mode with the Sybase IQ 15.0 server, and perform some data verification checks. If there is an error, you can revert to the previous database as long as you *do not* perform step 7. See the following section “Postmigration Data Verification” for further details.
7. If step 6 has no errors, restart the database in write mode with Sybase IQ 15.0 server.

Following these steps results in a migrated database that is ready for Sybase IQ 15.0.

Migration example

Assuming you have checked your database for errors, performed a successful backup, and shut down the Sybase IQ 12.7/12.6 server running the database (steps 1 – 4 from above) you are ready to execute the migration tool.

If you were going to migrate the Sybase IQ 12.7 Windows demo database, the command is:

➤ `iqunload -au -c "dbf=%ASDIR%\demo\asiqdemo.db;uid=DBA;pwd=SQL"`

Only the full path to the database, the user ID, and password are required.

Note: %ASDIR% is the Windows environment variable, for UNIX, use \$ASDIR.

You see:

Iqunload output

```
Sybase IQ Unload Utility Version 15.0.0.5120
Connecting and initializing
Unloading user and group definitions
Unloading table definitions
Unloading index definitions
Unloading functions
Unloading view definitions
Unloading procedures
Unloading triggers
Unloading SQL Remote definitions
Unloading MobiLink definitions
Creating new database
Reloading user and group definitions
Reloading table definitions
Reloading index definitions
Reloading functions
Reloading view definitions
Reloading procedures
Reloading triggers
Reloading SQL Remote definitions
Reloading MobiLink definitions
Successfully backed up file "d:\sybase\asiq-12.7\demo\asiqdemo.db" by renaming it to
"d:\sybase\asiq-12.7\demo\asiqdemo.db.before_schema_reload".
Successfully backed up file "d:\sybase\asiq-12.7\demo\asiqdemo.iqmsg" by renaming it
to "d:\sybase\asiq-12.7\demo\asiqdemo.iqmsg.before_schema_reload".
Successfully reloaded schema of database "d:\sybase\asiq-12.7\demo\asiqdemo.db".
```

The above output corresponds to the different steps iqunload performs. You next see:

```
Connecting and initializing
```

iqunload starts both the unload support engine on the database, and a Sybase IQ 15.0 utility server. Once both servers are running, various database checks are performed against your old database.

```
Unloading user and group definitions
Unloading table definitions
Unloading index definitions
Unloading functions
Unloading view definitions
Unloading procedures
Unloading triggers
Unloading SQL Remote definitions
Unloading MobiLink definitions
```

Using the unload support engine, iqunload examines the metadata present in the catalog store and unloads the objects by generating SQL statements to re-create them. The SQL statements are stored in temporary operating system files for usage later on.

```
Creating new database
```

Once all the SQL statements are generated, iqunload instructs the Sybase IQ 15.0 utility server to create a new database. The database is created with a new IQ_SYSTEM_MAIN dbspace and given a default file name of "new_main_store.iq". The size of the dbspace is computed by iqunload, however, you can change either or both of these options using the command line arguments `-ms_filename` and `-ms_size`.

Once the new database is successfully created, iqunload instructs the Sybase IQ 15.0 utility server to load the new database. iqunload then connects to this database.

```
Reloading user and group definitions
Reloading table definitions
Reloading index definitions
Reloading functions
Reloading view definitions
Reloading procedures
Reloading triggers
Reloading SQL Remote definitions
Reloading MobiLink definitions
```

Once connected, iqunload requests the Sybase IQ 15.0 server to execute the generated SQL statements, which re-creates the database schema. Since Sybase IQ 15.0 is being run by iqunload, the server knows to re-create only the metadata for the IQ objects in the catalog. Existing IQ data dbspaces are not affected by this process. Once the generated SQL has been executed, iqunload adds the existing dbspaces as user dbspaces to the new Sybase IQ 15.0 database.

```
Successfully backed up file "d:\sybase\asiq-12.7\demo\asiqdemo.db" by renaming it to
"d:\sybase\asiq-12.7\demo\asiqdemo.db.before_schema_reload".
```

```
Successfully backed up file "d:\sybase\asiq-12.7\demo\asiqdemo.iqmsg" by renaming it  
to "d:\sybase\asiq-12.7\demo\asiqdemo.iqmsg.before_schema_reload".  
Successfully reloaded schema of database "d:\sybase\asiq-12.7\demo\asiqdemo.db".
```

Finally, iqunload performs a file system backup of your existing catalog related files. These are operating-system files, and not a result of SQL backup database command.

Before and after migration files

The follow table lists the files that are part of the IQ 12.7 demo database, and what the corresponding files are after migration.

Before	After	Description
asiqdemo.db	asiqdemo.db.before_schema_reload	The IQ 12.7 catalog database. This file is copied at the OS level upon successful migration; it is not a result of the SQL backup command.
asiqdemo.log	asiqdemo.log	The database log file is regenerated when the migrated database is used with the IQ 15.0 server.
asiqdemo.iq	asiqdemo.iq	The old IQ 12.7 IQ_SYSTEM_MAIN dbspace. This file and all other user dbspaces are not affected by the migration process. This dbspace is added as a file to a user main dbspace.
asiqdemo.iqtmp	asiqdemo.iqtmp	The IQ_SYSTEM_TEMP dbspace. No operations are performed on this dbpace during migration. This file becomes the IQ 15.0 database temporary store.
asiqdemo.iqmsg	asiqdemo.iqmsg.before_schema_reload	The IQ 12.7 message file. This file is copied at the OS level upon successful migration.
	asiqdemo.db	The new IQ 15.0 migrated catalog database.
	new_main_store.iq	The new IQ_SYSTEM_MAIN dbspace for the migrated database.

Postmigration data verification

Sybase recommends that you manually perform these postmigration data checks while the database remains in read-only mode:

- `sp_iqcheckdb()`
- `select(s)` on your tables

If you encounter a problem while performing these data checks with the database in read-only mode, you can revert back to the IQ 12.7 catalog by simply copying all the “.before_schema_reload” files to the same file without the “.before_schema_load” file extension.

Once you have successfully performed the read-only checks, stop the database server and restart it in write mode.

Note: When you start the migrated database in write mode, Sybase IQ 15.0 flags the database files as 15.0, and IQ 12.x servers can no longer use the database files. To return to version 12.x, you must fully restore the older database.

See Chapter 6, “Migrating Data,” in the *Sybase IQ 15.0 Installation and Configuration* manual for additional postmigration details.

Congratulations, you now have a migrated database and are ready to explore the new features of Sybase IQ 15.0!

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