**SAP**

**Quick Start**

# SAP Sybase IQ 16.0 SP2

UNIX/Linux

# Contents

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# Quick Start Tutorial

The SAP® Sybase® IQ Quick Start shows you how to deploy a single server, convert the server to multiplex, and run a query that distributes processing across all nodes in the multiplex.

Tasks in this guide are sequential and progressive. Complete the tasks in one sequence before you progress to the next. The time required to complete all tasks is about 20 minutes.

1. *Create a Single Server*

   The first set of tasks describes how to deploy the demo database in a single-server environment.

2. *Convert the Server to Multiplex*

   Convert the demo database to multiplex.

3. *Distribute the Workload*

   In a multiplex environment, the query optimizer breaks complex queries into fragments and distributes the fragments to different nodes for processing.

## Create a Single Server

The first set of tasks describes how to deploy the demo database in a single-server environment.

1. *Setting the Environment Variables*

   SAP Sybase IQ environment variables point to different directories and file locations. Normally, the installer automatically sets many of these variables, but if you work in a new terminal or console, you must manually set these variables.

2. *Creating the Demo Database*

   SAP Sybase IQ includes a demo database that includes sample data about a fictional company that sells athletic clothing. Scripts that create and load the demo database are installed as part of SAP Sybase IQ Server Suite.

3. *Starting SCC*

   SAP Control Center is a Web-based tool for managing and monitoring SAP Sybase IQ single-node and multiplex servers. Run the scc command to start SAP Control Center.

4. *Registering the SAP Sybase IQ Server*

   Sybase Control Center can manage many SAP Sybase resources. Register your SAP Sybase IQ server to identify the server and provide its connection information to Sybase Control Center.

5. *Registering and Authenticating the SCC Agent*

The installer automatically installs the Sybase Control Center agent, which runs on a managed SAP Sybase IQ server. Register and authenticate the agent to perform management tasks like starting the server and adding secondary nodes for a multiplex.

**6.** *Running a Sample Query*

Run a sample query against the demo database.

**See also**

• *Convert the Server to Multiplex* on page 6

## Setting the Environment Variables

SAP Sybase IQ environment variables point to different directories and file locations. Normally, the installer automatically sets many of these variables, but if you work in a new terminal or console, you must manually set these variables.

**1.** Open a console or terminal.

**2.** Set *$SYBASE* to the parent installation directory.

| Shell | Command |
|-------|---------|
| tcsh or C (csh) | `setenv SYBASE <directory name>` |
| Korn (ksh), Bash, or Bourne (sh) | `SYBASE=<directory name>;`<br>`export SYBASE` |

**3.** Set *$IQDIR16* to the SAP Sybase IQ product directory.

| Shell | Command |
|-------|---------|
| tcsh or C (csh) | `source $SYBASE/IQ-16_0/`<br>`IQ-16_0.csh` |
| Korn (ksh), Bash, or Bourne (sh) | `$SYBASE/IQ-16_0/IQ-16_0.sh` |

**Note:** For additional information about environment variables, see *Reference: Building Blocks, Tables, and Procedures > File Locations and Installation Settings > Environment Variables.*

## Creating the Demo Database

SAP Sybase IQ includes a demo database that includes sample data about a fictional company that sells athletic clothing. Scripts that create and load the demo database are installed as part of SAP Sybase IQ Server Suite.

These instructions differ from those in the *Installation and Configuration Guide*. This task creates the demo database with an absolute path in a temporary directory named `myiqdemo`.

1. Change to the `$SYBASE` directory.

2. Create a subdirectory named `myiqdemo`.

   This is the temporary directory for the demo database. The full path to this directory is: .
   `$SYBASE/myiqdemo`

3. Change to `myiqdemo`.

4. Enter:

   ```
   $IQDIR16/demo/mkiqdemo.sh -absolute
   ```

   The **-absolute** switch creates the demo database with an absolute path, which is required to convert the demo database to multiplex. For other options, enter:

   ```
   $IQDIR16/demo/mkiqdemo.sh -help
   ```

5. Start the demo database:

   ```
   start_iq @iqdemo.cfg iqdemo.db
   ```

## Starting SCC

SAP Control Center is a Web-based tool for managing and monitoring SAP Sybase IQ single-node and multiplex servers. Run the **scc** command to start SAP Control Center.

### Prerequisites

- You will need the SCC administrator user name and password specified during installation.
- You must have sourced the *$SYBASE*/`SYBASE.csh` file.

### Task

1. Open a console or terminal.

2. Change directory to *$SYBASE*/`SCC-3_2/bin`, enter:

   ```
   scc.sh
   ```

3. Start your browser and enter this address:

   ```
   https://<scc-hostname>:8283/scc/
   ```

4. Enter the user name and password that you supplied when installing Sybase Control Center, and click **Log In**.

## Registering the SAP Sybase IQ Server

Sybase Control Center can manage many SAP Sybase resources. Register your SAP Sybase IQ server to identify the server and provide its connection information to Sybase Control Center.

**Prerequisites**

Ensure that the SAP Sybase IQ server does not have multiple databases. Sybase Control Center for SAP Sybase IQ supports a maximum of one database per server.

**Task**

The **Perspective Resources** is open by default.

1. From the **main menu bar**, choose **Resource > Register**.

   SCC starts the **Resource Registration Wizard** and prompts you to define the resource:

| Title | Field Names | Description |
|-------|-------------|-------------|
| **Resource Type** | **Resource name** | Resource name, type and description. |
| | **Resource type** | Use *<localhost>*_iqdemo as the **Resource name** and identify the **Resource type** as an **IQ Server**. **Description** is optional. |
| | **Description** | |
| **Connection Information** | **IQ host name** | JDBC connection information: |
| | **IQ port number** | Use *<localhost>* as the **IQ host name** and 2638 as the **IQ port number**. Entering the **Database** name (iqdemo.db) is optional. |
| | **Database** | **Note:** Sybase Control Center for SAP Sybase IQ supports a maximum of one database per SAP Sybase IQ server. |
| **Authentication Information** | **IQ Username** | Demo database user name and password. |
| | **IQ Password** | Use DBA or dba (case-insensitive) as the **IQ Username** and sql (case-sensitive) as the **IQ Password**. |
| **Options** | **Post registration options** | Choose **Add this resource to the current perspective** and (if Resource Explorer is closed) **Open the resource explorer to view this new resource**. |

2. Click **Finish**.

   This step closes the **Resource Registration Wizard**. **Perspective Resources** now lists *<localhost>_iqdemo* as an SCC resource.

3. On the **Perspective Resources** dialog, click the **drop-down arrow** next to the server name, choose **Authenticate**.

4. On the **Authentication** dialog, enter your authentication information.

   For the Quick Start, SCC uses the demo database login as the authentication credentials. Choose **Specify different credentials**. Use DBA or dba (case-insensitive) as the **IQ Username** and sql (case-sensitive) as the **IQ Password**. Choose **Remember these credentials for future sessions**.

5. Click **OK**.

## Registering and Authenticating the SCC Agent

The installer automatically installs the Sybase Control Center agent, which runs on a managed SAP Sybase IQ server. Register and authenticate the agent to perform management tasks like starting the server and adding secondary nodes for a multiplex.

1. On **Perspective Resources**, click the **drop-down arrow** next to the server name, choose **Administration Console**.

2. On the **Browse** tab, click **IQ Servers** to add *<localhost>_iqdemo* to the list of IQ Servers.

3. On the **IQ Servers** tab, click the **drop-down arrow** next to the *<localhost>_iqdemo*, choose **Register Agent**.

| Field Name | Value |
|---|---|
| SCC agent host | <localhost> |
| SCC agent port | default is *9999* |

4. Click OK

5. Click the **drop-down arrow** next to the server name, choose **Authenticate Agent**. Supply these default credentials:

| Field Name | Value |
|---|---|
| SCC agent user | uafadmin |
| SCC agent password | Enter the password specified during installation. |

## Running a Sample Query

Run a sample query against the demo database.

1. On the **Administration Console** , click the **drop-down arrow** next to *<localhost>_iqdemo*, choose **Execute SQL**.

2. In the **SQL Statements** window, enter:

```
SELECT
SalesOrders.ID,
```

```
SalesOrders.OrderDate,
Customers.CompanyName

FROM SalesOrders
KEY JOIN Customers
WHERE OrderDate > '1994/01/01'
ORDER BY OrderDate
```

**3.** Click **Execute**.

Other query options are available, see *Installation and Configuration > Testing Installed Products > Demo Database > Table Names* for a list of tables and table names.

**4.** Click **Execute** to run the query.

**5.** Click **Close**.

# Convert the Server to Multiplex

Convert the demo database to multiplex.

Although there are command line equivalents, all server-related tasks in this sequence use Sybase Control Center, an administrative console for Sybase products. Sybase Control Center lets you administer servers in a graphical environment.

Sybase Control Center shows changes to your processing environment as they occur.

**1.** *Starting Sybase Control Center*

Start Sybase Control Center and connect to your server.

**2.** *Defining the Multiplex Server*

Use Add Secondary Servers wizard to convert a single server to multiplex.

**3.** *Loading Data into the Multiplex*

Use the coordinator and writer to load the multiplex to make the best use of multiplex resources.

**See also**
*   *Create a Single Server* on page 1
*   *Distribute the Workload* on page 10

## Starting Sybase Control Center

Start Sybase Control Center and connect to your server.

**Prerequisites**

Install Adobe Flash Player in the browser you will use for Sybase Control Center.

**Task**

1. Start Sybase Control Center.

   Execute **scc.sh**.

   Messages on the progress of the launch appear in a command window. When Sybase Control Center runs, the command window becomes the Sybase Control Center console; you can issue commands to get status information for SCC and its ports, plug-ins, and services.

2. Open a Web browser and enter `https://<hostname>:8283/scc`.

## Defining the Multiplex Server

Use Add Secondary Servers wizard to convert a single server to multiplex.

**Prerequisites**
You will need the user name and password for the SCC agent administrator supplied during SCC installation.

**Task**
This *Quick Start* uses the placeholder *<localhost>* to identify the host. When you see this placeholder in any instruction, substitute your host name.

1. In the Perspective Resources view, select *<localhost>*_**iqdemo** and choose **Resource > Administration Console**.

2. In the left pane, select **IQ Servers**.

3. Select the server *<localhost>*_**iqdemo**.

4. Hover over the server, click the arrow to the right of the server name and select **Add Secondary Servers**.

5. Type a name for the new multiplex. For this Quick Start, use *<localhost>_iqdemo_mpx*.

6. On the Server Definitions page, click **Add** and specify options.

| Option | Description |
|---|---|
| Server name | Name of the first secondary server in your multiplex. Use a different name from that of the server you are converting, which becomes the coordinator server for the multiplex. Use `<localhost>_iqdemo_w1`. |
| Host | Host name for the new write server. Use `<localhost>`. |
| Database path | Absolute path to database stores. The *<pathname>* placeholder refers to the path. When you see this placeholder, substitute the full path name. <br><br> For the Quick Start, set the path to `<pathname>/myiqdemo/w1/iq-demo_w1.db`. |

| Option | Description |
|--------|-------------|
| SCC agent port | Port number for the Sybase Control Center agent. Defaults to 9999. If other users run SCC on your system, assign a new port number. |
| SCC agent user | User ID for the Sybase Control Center agent. Use the ID provided during installation. |
| SCC agent password | Password for the Sybase Control Center agent. Use the password provided during installation. |
| Public host/ port pairs | Host/port pairs in the format **host1:port1,host 2:port2**, and so on. The supplied pairs are used by this server for public TCP/IP connections between multiplex servers. Supply a single pair. Use $<local-host>:<unique\_port\_number>$. |
| Private host/ port pairs | Not applicable for the Quick Start. Leave blank. In production systems, this contains the host name and port number for private TCP/IP connections between multiplex servers. |
| Role | Change from **Reader** to **Writer**. You will use this node later to load data. |
| Status | For the Quick Start, all servers should have status **Included**. If a server will be shut down for an extended period, exclude that server from the multiplex after shutdown. |
| Local temp dbspace path | Temporary store path. For the Quick Start, set the path to $<pathname>$/myiqdemo/w1/iq-demo\_w1.iqtmp . |
| Local temp dbspace size (MB) | Size, in megabytes, of the temporary IQ store. Deselect **Raw device** to activate the default (1000). |
| Local temp dbspace reserve (MB) | The amount of space, in megabytes, to reserve for future expansion in the temporary IQ store. Accept the default (300). |
| Raw device | Deselect the check box for the Quick Start. |

7. Click **OK** and **Next**.
8. On the Execution page, click **Execute**.

## Loading Data into the Multiplex

Use the coordinator and writer to load the multiplex to make the best use of multiplex resources.

### Prerequisites

- The coordinator and writer are started.

• The SAP Sybase IQ Agent is running, registered, and authenticated.

## Task

Because we want to load the same data we used to create the demo database, the sample LOAD scripts include a **TRUNCATE** statement, which deletes all rows in the target table before loading the data.

1. In the Administration Console right pane, highlight the coordinator in the Server column.
2. Hover to the right of the server name, click the dropdown arrow, and select **Execute SQL**.

   Interactive SQL starts with a connection to the coordinator.
3. In Interactive SQL, enter:
```
TRUNCATE TABLE Contacts;
LOAD TABLE Contacts (ID, Surname,GivenName,
Title, Street, City, State, Country, PostalCode,
Phone, Fax, CustomerID)
USING FILE '../IQ-16_0/demo/adata/contact.dat'
ROW DELIMITED BY '|'
ESCAPES OFF;
COMMIT;
```

   Enter the full path to the data file on a single line.
4. Press **Execute** to load the Contacts table on the coordinator.
5. Close Interactive SQL.
6. In the Administration Console right pane, highlight the **<localhost>-iqdemo_w1** in the Server column and choose **Execute SQL**.

   Interactive SQL starts with a connection to the writer.
7. In Interactive SQL, enter:
```
TRUNCATE TABLE SalesOrderItems;

LOAD TABLE SalesOrderItems (ID, LineID,
ProductID, Quantity, ShipDate)
USING FILE '../../IQ-16_0/demo/adata/sales_oi.dat'
ROW DELIMITED BY '|'
ESCAPES OFF;
COMMIT;
```

   Enter the full path to the data file on the single line.
8. Press **Execute** to load the SalesOrderItems Table on the writer.
9. Close Interactive SQL.

# Distribute the Workload

In a multiplex environment, the query optimizer breaks complex queries into fragments and distributes the fragments to different nodes for processing.

Distributing a query involves a leader node and one or more worker nodes. A query originates on the leader node. A worker node can be any node in the multiplex that can accept some of the query processing work. Any multiplex node type (reader, writer, or coordinator) can be a leader or a worker node.

The query optimizer determines whether to distribute the query. To distribute the query, the leader node breaks the query into parallel fragments and assigns the fragments to the worker nodes. The workers process the fragments and return the intermediate results. Queries that are unlikely to scale appropriately or degrade performance are not distributed; they are executed on a single node in the multiplex.

This part of the Quick Start shows how to change the multiplex to accommodate a large volume of data and run a distributed query.

1. *Adding Shared Temporary Storage*

   Distributed Query Processing (DQP) requires temporary storage that all multiplex nodes can share. This task creates a resource on the coordinator that provides temporary storage for the coordinator and writer.

2. *Increasing the iq_main File Size*

   Before you run a distributed query, increase the file size in user dbspace iq_main.

3. *Running a Distributed Query*

   SAP Sybase IQ is more likely to distribute a query that processes a large number of rows than those that require fewer resources.

4. *Reviewing the Query Plan*

   Check the multiplex node directories to review the query plan. The comprehensive query plan is in the leader node directory, and each distributed work unit has an HTML file generated by the node that received it.

**See also**
- *Convert the Server to Multiplex* on page 6

## Adding Shared Temporary Storage

Distributed Query Processing (DQP) requires temporary storage that all multiplex nodes can share. This task creates a resource on the coordinator that provides temporary storage for the coordinator and writer.

### Prerequisites

- You have the SAP Sybase IQ MANAGE ANY DBSPACE system privilege.
- The SAP Sybase IQ resource is authenticated and running.

### Task

1. In the Perspective Resources view, select *<localhost>_iqdemo_mpx* and select **Resource > Administration Console**.
2. In the left pane, select **IQ Servers > Space Management > DB Files**.
3. Click the arrow next to **DB Files** and select **New**.
   The Create DB File Wizard appears.
4. On the DB Files page, select the resource *<localhost>_iqdemo* (the coordinator) and the dbspace IQ_SHARED_TEMP.
5. Click **Add**.
6. On the DB File Details page, specify:

| Option | Description |
|---|---|
| **Logical name** | User-defined name of the dbfile. Use `shared_temp`. |
| **Path to physical file on disk** | Path to the physical file on disk. Enter the value `<pathname>/myiqdemo/shared_temp.iqtmp`. |
| **Raw device** | Click to unselect the check mark. |
| **File size** | 300MB. |
| **Reserve size** | 90MB. |
| **Mode** | Select Read/Write. |

7. Click **OK** to return to the DB Files page, then click **Finish**.
   The right pane in the Administration Console lists the new `shared_temp` file.

## Increasing the iq_main File Size

Before you run a distributed query, increase the file size in user dbspace iq_main.

### Prerequisites

- This task requires the SAP Sybase IQ MANAGE ANY DBSPACE system privilege.
- The SAP Sybase IQ server must be authenticated and running.

### Task

1. In the Perspective Resources view, select *<localhost>_iqdemo_mpx* and select **Resource > Administration Console**.
2. In the left pane, select **IQ Servers > Space Management > DB Files**.
3. On the DB Files page, select IQ_SYSTEM_MAIN from the right pane and either:
   a) Click the arrow to the right of the name and select **Properties**, or
   b) From the Administration Console menu bar, select **Resource > Properties**.
4. On the Properties sheet, change the **Modify file size** to 200.
5. Click **Apply > OK**.

## Running a Distributed Query

SAP Sybase IQ is more likely to distribute a query that processes a large number of rows than those that require fewer resources.

This task includes two scripts that load and query a significant amount of sample data (10 million rows). The first script creates and loads a Fact table and a Dimension table. The second script runs a query that fetches 3 rows, and generates a query plan in the coordinator and write server directories.

**Note:** Depending on your system configuration and amount of data, SAP Sybase IQ may choose a query plan that does not distribute to the write server.

1. Enter the **dbisql** command to start Interactive SQL.
2. On the **Connect** dialog, enter:

| Tab Name | Field | Value |
|----------|-------|-------|
| Identifica-tion | Authentication | Database |
| | User ID | DBA or dba (case-insensitive) |
| | Password | sql (case-sensitive) |
| | Action | Connect to a running database on this computer |

| Tab Name | Field | Value | |
|---|---|---|---|
| | **Server name** | *<localhost>_iqdemo* | |
| | **Database name** | iqdemo | |
| **Network** | **TCP/IP protocol options** | **Host** | *<localhost>* |
| | | **Port** | **2638** |

**3.** Click **Connect**.

**4.** In Interactive SQL, click **File > Open**.

**5.** Browse to $IQDIR16/demo, and choose dqpdata.sql.

**6.** Click **Open**.

**7.** Press **F9** to create and load the Dimension table and Fact table.

**8.** Click **File > Open**.

**9.** Browse to $IQDIR16/demo, and choose dqpquery.sql.

**10.** Click **Open**.

**11.** Press **F9** to run the script that runs the query and generates the query plan.

## Reviewing the Query Plan

Check the multiplex node directories to review the query plan. The comprehensive query plan is in the leader node directory, and each distributed work unit has an HTML file generated by the node that received it.

To open the query plan in a Web browser, double-click the leader node directory. The query plan is represented visually by a structure called the query tree.

**Figure 1: Sybase IQ Sample Query Plan**
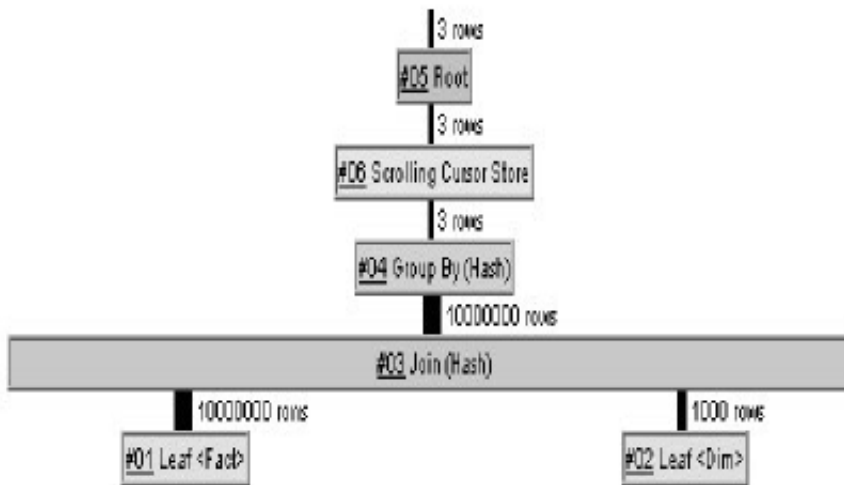


*Query Tree*

A query tree represents the query's data flow, and the query tree consists of nodes that represent a stage of work. Each node has a name and a data flow operator (DFO) number. All nodes in the tree are hyperlinked to more detailed information.

The lowest nodes on the tree are leaf nodes. Each leaf node represents a table or a prejoin index set in the query. At the top of the plan is the root of the operator tree. Information flows up from the tables and through any operators representing joins, sorts, filters, stores, aggregation, and subqueries.

The three vertical bars that connect the query operators indicate distribution. For example, between the group by node and the join, the three bars indicate that this operation occurs over parallel threads and is distributed over multiple servers. The operation between the join and leaf #01 is also distributed.

**Note:** For additional information about query plans, see the *Performance and Tuning Guide*.

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