

RTI Data Distribution Service

The Real-Time Publish-Subscribe Middleware

Getting Started Guide

Addendum for Database Setup

Version 4.5





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Addendum for Database Setup

In most cases, *RTI® Data Distribution Service* does not use or require a database. However, if you want to use some of the durability features of *RTI Data Distribution Service*, or to use *RTI Real-Time Connect*, you need a relational database, such as Oracle TimesTen or MySQL. This document describes how to install and configure a database for use with *RTI Data Distribution Service*.

- ❑ **Durable Writer History**—This feature allows a *DataWriter* to locally persist its history cache so that it can survive shutdowns, crashes and restarts. When an application restarts, each *DataWriter* that has been configured to have durable writer history automatically loads all the data in its history cache from disk and can carry on sending data as if it had never stopped executing. To the rest of the system, it will appear as if the *DataWriter* was temporarily disconnected from the network and then reappeared.
- ❑ **Durable Reader State**—This feature allows a *DataReader* to persist its state and remember which data it has already received. When an application restarts, each *DataReader* that has been configured to have durable reader state automatically loads its state from disk and can carry on receiving data as if it had never stopped executing. Data that was received by the *DataReader* before the restart will be suppressed, so it is not sent over the network.
- ❑ **RTI Persistence Service**—The *RTI Persistence Service* provides reliable data availability. The service saves data from *RTI Data Distribution Service* publishing applications in memory or permanent storage, so it can be delivered to subscribing applications that join the system at a later time—even if the publishing application has already terminated. *RTI Persistence Service* implements the optional Persistence Profile, defined in the OMG's Data Distribution Service for Real-time Systems specification.

In principle, you can use any database that provides an ODBC driver, since ODBC is a standard. However, not all ODBC databases support the same feature set. Therefore, there is no guarantee that the persistent durability features will work with an arbitrary ODBC driver.

RTI has tested *RTI Persistence Service, Durable Writer History, and Durable Reader State* with the following databases:

- Oracle TimesTen 11.2.1
- MySQL 5.1.44 with MySQL ODBC 5.1.6

Performance will be better with Oracle TimesTen, because it is an in-memory database.

Note: The usage of MySQL requires the separate installation of the MySQL ODBC 5.1.6 (or higher) driver. For non-Windows platforms, the installation of UnixODBC 2.2.12 (or higher) is also required.

1 Installing Oracle TimesTen

If Oracle TimesTen 11.2.1 is not installed in your system, please contact sales@rti.com for information on obtaining TimesTen from the RTI Customer Portal, accessible from <http://www.rti.com/support>¹. Once you have logged into the portal, select the **Downloads** link, then select the distribution that matches your target architecture.

1.1 Installing TimesTen on a Linux System

This section provides basic information on how to install Oracle TimesTen 11.2.1 on a Linux system. For detailed information see the *Oracle TimesTen In-Memory Database Installation Guide*.

1. Unpack the distribution.

On Linux systems, unpack using the `tar` command. For example (your filename may be different):

```
tar xzfv timesten604.linux86.tar.gz
```

1. You will need your username and password to log in; these are included in the letter confirming your purchase or evaluation copy. If you do not have this letter, please contact license@rti.com.

2. Follow the instructions in the *Oracle TimesTen In-Memory Database Installation Guide*, which can be found in `<unpack-folder>/doc/doc.zip` or at the following address: http://download.oracle.com/docs/cd/E13085_01/welcome.html.

When installing Oracle TimesTen, you can accept all default options. However, if you want to allow direct database access to users of any OS group (world accessibility), make sure you answer 'no' to the following questions:

- Restrict access to the TimesTen installation to the group 'xxxx'?
 - Do you want to restrict access to the TimesTen installation to a different group?
3. Add the path to the Oracle TimesTen libraries to the beginning of `LD_LIBRARY_PATH`. For example:

```
> setenv LD_LIBRARY_PATH
/opt/TimesTen/tt112/lib:$LD_LIBRARY_PATH
```

Create a Data Source:
RTI Data Distribution Service uses the Oracle TimesTen ODBC driver to access data sources. The connection information for each data source is stored in an ODBC INI file. This can be a file called `.odbc.ini` in the user's home directory or it can be configured using the environment variable `ODBCINI`. The stored information describes each data source in detail, specifying the driver name, a description, and any additional information the driver needs to connect to the data source.

To create the ".odbc.ini" file with a DSN named "Example", follow these steps:

- a. Create a new text file named ".odbc.ini" in your home directory.
- b. Insert these lines in the file:

```
[ODBC Data Source]
Example=TimesTen Driver
[Example]
DRIVER=/opt/TimesTen/tt112/lib/libtten.so
DataStore=/tmp/Example
DatabaseCharacterSet=AL32UTF8
```

Note: Make sure that `DRIVER` points to the valid location of the Oracle TimesTen ODBC driver on your system. You may want to choose a different `DataStore` path than the one shown above.

4. Before you can use Oracle TimesTen, you need to get a TimesTen user account to an existing datastore (database). To create a TimesTen database and an user account 'test' follow these steps:

- a. Log in as Oracle TimesTen administrator (we assume root is the administrator):

```
> su - root
```

- b. Use the file created in step 4 to configure the data store.
- c. If Oracle TimesTen was not installed with world accessibility, the operating system user (for example 'local') who is going to log in to the database as "test" must be added to the Oracle TimesTen user's group.

```
> useradd -G <TimesTen users group> local
```

For additional information on installation requirements for operating system group and file permissions, see the *Oracle TimesTen In-Memory Database Installation Guide*.

- d. Create the new datastore by executing the following command:

```
> <TimesTen installation directory>/bin/ttIsql -connStr "DSN=Example"  
command> exit
```

- e. Creates the 'test' user account:

```
> <TimesTen installation directory>/bin/ttIsql -connStr "DSN=Example"  
command> create user test identified by test;  
command> grant all privileges to test;  
command> exit
```

1.2 Installing TimesTen on a Windows System

1. Unzip the Oracle TimesTen distribution file.
2. Run **setup.exe** and follow the instructions in the Oracle TimesTen In-Memory Database Installation Guide. When installing Oracle TimesTen, you can accept all default options. However, if you want to allow direct database access to users of any OS group, make sure you select the checkbox in the 'File and Data Accessibility' screen. If you do not select this option, permissions are restricted to users who are member of the Administrator group.
3. Verify that the Oracle TimesTen In-Memory database is properly installed on your system.
 - a. Check that the TimesTen 11.2.1 Start menu shortcut has been added to the Windows Desktop **Start, Programs** menu.

- b. Open the ODBC Data Source Administrator. (On the Windows Desktop, choose **Start, Settings, Control Panel, Administrative Tools, Data Sources (ODBC)**).
 - c. Click **Drivers**.
 - d. Check to see that the correct drivers are installed. You should at least see the TimesTen Data Manager driver.
 - e. Click **OK**.
 - f. Check to see if the TimesTen Data Manager 11.2.1 service has started:
On the Windows Desktop, choose **Start, Settings, Control Panel, Administrative Tools, Services** and check that the TimesTen Data Manager 11.2.1 service has the word "Started" in the Status field.
4. Create a Data Source:

RTI Data Distribution Service uses the Oracle TimesTen ODBC driver to access data sources. The connection information for each data source is stored in the Windows registry. The stored information describes each data source in detail, specifying the driver name, a description, and any additional information the driver needs to connect to the data source.

To add a data source named "Example", follow these steps:

- a. Open the ODBC Data Source Administrator:
 - On Windows 2000 systems: choose **Start, Control Panel, Performance and Maintenance, Administrative Tools, Data Sources (ODBC)**.
 - On Windows XP systems: choose **Start, Settings, Control Panel, Administrative Tools, Data Sources (ODBC)**.
- b. Select the **User DSN** tab.
- c. Click **Add**; the Create New Data Source dialog appears.
- d. Select **TimesTen Data Manager 11.2.1** from the list of drivers.
- e. Click **Finish**; the TimesTen ODBC Setup dialog appears.
- f. Fill out the fields in the dialog:
 - Enter "Example" as the Data Source Name (DSN).
 - Enter a Data Store Path; the path must exist, so you may want to create a new directory first.

The data store path name uniquely identifies the physical data store. It is the full path name of the data store (e.g., **C:\data\AdminData**). Note that this name is not a file name—the actual data store file names have suffixes (e.g., **C:\data\AdminData.ds0**, **C:\data\AdminData.log0**).

- Set **Database Character Set** to **AL32UTF8**

g. Click **OK**.

5. Before you can use Oracle TimesTen, you need to get a TimesTen user account to an existing datastore (database). To create a TimesTen database and an user account 'test' follow these steps:

- a. Log in as the instance administrator (the user that installed TimesTen).
- b. Create a DSN for the new TimesTen database as indicated in step 4.
- c. Create the new datastore by executing the following command:

```
> <TimesTen installation directory>\bin\ttIsql -connStr "DSN=Example"  
command> exit
```

d. Creates the 'test' user account:

```
> <TimesTen installation directory>\bin\ttIsql -connStr "DSN=Example"  
command> create user test identified by test;  
command> grant all privileges to test;  
command> exit
```

2 Setting Up MySQL

To use MySQL as the database, you will need all of the following:

- MySQL 5.1.44 or higher

The installation of MySQL is beyond the scope of this document. Please refer to the MySQL Reference Manual for the process to install and configure MySQL.

- MySQL ODBC 5.1.6 driver or higher

The driver is not bundled with the MySQL server and must be installed separately.

The ODBC connector can be downloaded from:

<http://dev.mysql.com/downloads/connector/odbc/5.1.html>

The installation guide can be found here:

<http://dev.mysql.com/doc/refman/5.1/en/connector-odbc-installation.html>

- ❑ UnixODBC 2.2.12 or higher

The MySQL ODBC driver requires an ODBC driver manager. We recommend using UnixODBC, a complete, free and open ODBC solution for Linux systems. The driver manager can be downloaded from <http://www.unixodbc.org>.

2.1 Creating a Data Source for MySQL on a Linux System

RTI Data Distribution Service uses the MySQL ODBC driver to access data sources.

The connection information for each data source is stored in an ODBC INI file. This can be a file called `.odbc.ini` in the user's home directory, or it can be configured using the environment variable `ODBCINI`. The stored information describes each data source in detail, specifying the driver name, a description, and any additional information the driver needs to connect to the data source.

To create the ".odbc.ini" file with a DSN named "Example", follow these steps:

1. Create a new text file named ".odbc.ini" in your home directory.
2. Insert these lines in the file:

```
[ODBC Data Source]
Example=MySQL Driver
[Example]
DRIVER=/usr/lib/libmyodbc5.so
Database=test
```

NOTE: Make sure that `DRIVER` points to the valid location of the MySQL ODBC driver on your system.

2.2 Creating a Data Source for MySQL on a Windows System

RTI Data Distribution Service uses the MySQL ODBC driver to access data sources.

The connection information for each data source is stored in the Windows registry. The stored information describes each data source in detail, specifying the driver name, a description, and any additional information the driver needs to connect to the data source.

To add a data source named "Example", follow these steps:

1. Open the ODBC Data Source Administrator:
 - On Windows 2000 systems: choose **Start, Control Panel, Performance and Maintenance, Administrative Tools, Data Sources (ODBC)**.
 - On Windows XP systems: choose **Start, Settings, Control Panel, Administrative Tools, Data Sources (ODBC)**.

2. Select the **System DSN** tab.
3. Click **Add**; the Create New Data Source dialog appears.
4. Select the MySQL driver from the list of drivers.
5. Click **Finish**; the MySQL ODBC Driver Configuration dialog appears.
6. Fill out the fields in the dialog.
 - a. Enter "Example" as the Data Source Name (DSN).
 - b. Enter a valid username and password.
 - c. Select a database (for example, "test").
All other fields can be left empty.
 - d. Click **OK**.