Oracle Connector

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Table of Contents

Table of Contents **2**
Oracle Connector Help 4
Overview 4
Initial Setup Considerations **5**
Oracle Connector Setup **6**
Manufacturing Execution System (MES) Configuration 7
Manufacturing Operations Center (MOC) Configuration 9
Oracle Connector Tag Browser 13
System Tags **14**
Error Descriptions **15**
A connection with the name <connection name> already exists. 16
Attempt to add Oracle Connector client item <item name> failed. 16
Error logging on connection <connection name>. Data has been lost. Make sure the oracle connection information and table are correct. 16
Failed to initialize Oracle interface <connection name>. 16
Failed to register connection <connection name> with the Oracle interface (unable to access storage-forward file). 17
Failed to uninitialize Oracle interface <connection name>. 17
Names must contain one or more characters and cannot contain periods, double quotations or start with an underscore. 17
The rate must be within the range of 10 milliseconds and 49 days. 17
Failed to register MOC connection <connection name> with the Oracle interface <Oracle error>. 18
Failed to register MOC item <item name> on connection <connection name> with the Oracle interface <Oracle error>. 18
Failed to send data update for MOC item <item name> on connection <connection name> with the Oracle interface <Oracle error>. 18
Failed to unregister MOC connection <connection name> with the Oracle interface <Oracle error>. 19
Failed to unregister MOC item <item name> on connection <connection name> with the Oracle interface <Oracle error>. 19
Tag <tag name> does not exist or you are trying to add a dynamic reference which is not allowed for MOC connections. 19
Failed to add MES item <item name> with the Oracle interface <Oracle error>. 20
Failed to delete MES item <item name> with the Oracle interface <Oracle error>. 20
Failed to register MES connection <connection name> with the Oracle interface <Oracle error>. 20
Failed to register MES item <item name> on connection <connection name> with the Oracle interface <Oracle error>. 21
Failed to register MES item <item name> on connection <connection name> with the Oracle interface (ORA-04063: package body "DATABASE.QA_DEVICE_PUB" has errors ORA-06508: PL/SQL: could not find program unit being called: "DATABASE.QA_DEVICE_PUB" ORA-06512: at line 1). 21
Failed to send data update for MES item <item name> on connection <connection name> with the Oracle interface <Oracle error>. 21
Failed to unregister MES connection <connection name> with the Oracle interface <Oracle error>. 21
Failed to unregister MES item <item name> on connection <connection name> with the Oracle interface <Oracle error>. 22
Tag <tag name> does not exist or you are trying to add a dynamic, complex or array reference which is not allowed for MES connections. 22

Index 23

Oracle Connector Help

Help version 1.025

CONTENTS

Overview
What is the Oracle Connector?

Initial Setup Considerations
What are the Oracle Connector's software and hardware requirements?

Oracle Connector Setup
How do I configure the Oracle Connector?

System Tags
What are the Oracle Connector's System Tags?

Error Descriptions
What error messages does the Oracle Connector produce?

Overview

The Oracle Connector is an application that sends data to an Oracle Database that is configured for MES or MOC processing. The Oracle Connector is tightly integrated with the OPC server, and provides benefits such as installation, configuration, high-efficiency performance, and easy tag browsing. This allows plant process data to be gathered in real-time for analysis, without the need of a third-party collection system.

MES

Manufacturing Execution System (MES) is an enterprise-level system used for managing the production process.

MOC

Manufacturing Operations Center (MOC) is a plant-level system used for managing plant operation and synchronizing plant floor data with Enterprise Resource Planning systems. Data is used for long term analysis of plant efficiency.

Feature Highlights

- User-friendly installation and configuration.
- Flexible triggering completed on a fixed time basis or through trigger conditions.
- Data retention.
- Inclusion of the OPC server Simulator Driver.
- Inclusion of a two-hour demo for evaluation.

Runtime Performance Features

- Runs as a System Service.
- Logs data directly from the local item list so that there is no need for an external OPC server.
- Error recovery.
- Transaction buffering support (which places updates into a buffer until the connection to the Oracle database is restored).
- Optional automatic configuration backup (which saves the most recent copy of a configuration file).

Initial Setup Considerations

Software Requirements

The following Microsoft Windows operating systems are supported:

- Windows 7
- Windows Server 2008*
- Windows Vista Business/Ultimate*
- Windows Server 2003 SP2*
- Windows XP SP2*

*When installed on a 64 bit operating system, the application will run in a subsystem of Windows called Windows-on-Windows 64 bit (WOW64). WOW64 is included on all 64 bit versions of Windows and is designed to make operating systems' differences transparent to users.

Hardware Requirements

At a minimum, the following hardware is required for the server:

- 2.0 GHz processor.
- 1 GB installed RAM.
- 180 MB available disk space.
- Ethernet card.

At a minimum, the following hardware is required for Oracle:

- 512 MB Physical Memory (RAM).
- 1 GB Swap Space (or twice the size of RAM).
- 400 MB available disk space in /tmp.
- 2 GB available disk space for software files.*
- 1.2 GB available disk space for database files.

*This includes 1 GB required for installation.

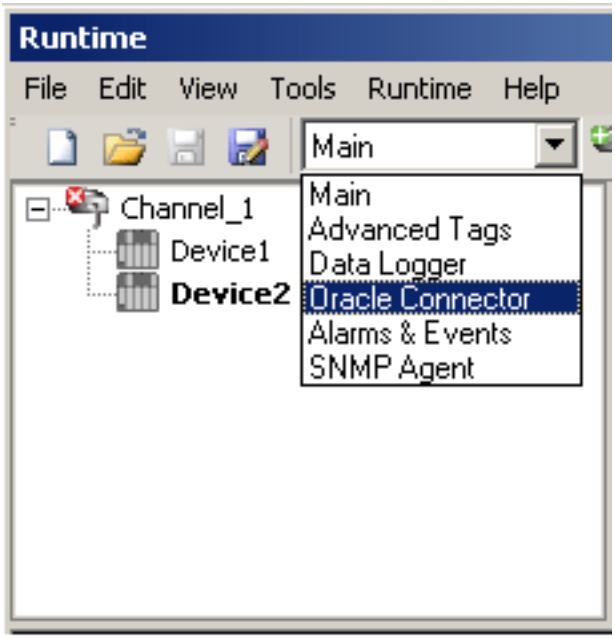
Oracle Connector Setup

The Oracle Connector configuration defines how a connection will be established in the Oracle database. It also specifies how the items will be pushed to the MES or MOC tables configured in the Oracle database. Although there is one Oracle Connector for each server, multiple connections may be configured to Oracle databases.

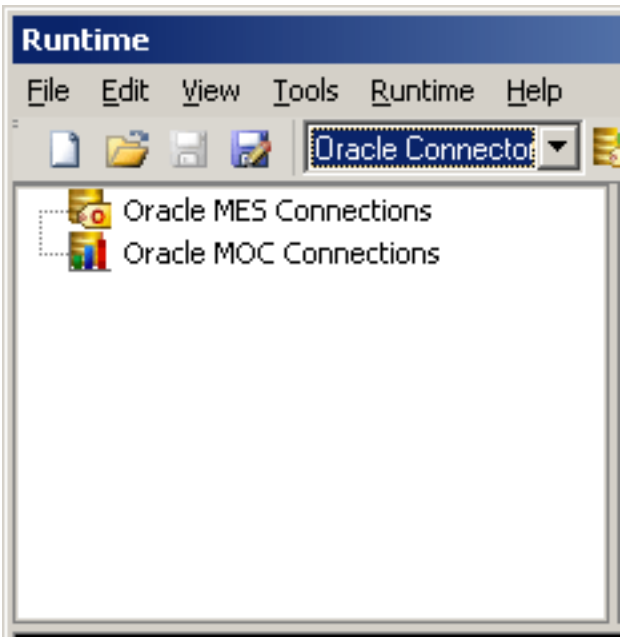
Launching the Oracle Connector

For information on configuring the Oracle Connector, refer to the instructions below.

1. Open the OPC server. To leverage Oracle connectivity, either open an existing project or create a new project.
2. Next, use the drop-down menu to select **Oracle Connector**.



Note: The first time an Oracle Connector configuration is created for the server project, the screen will appear as shown below.

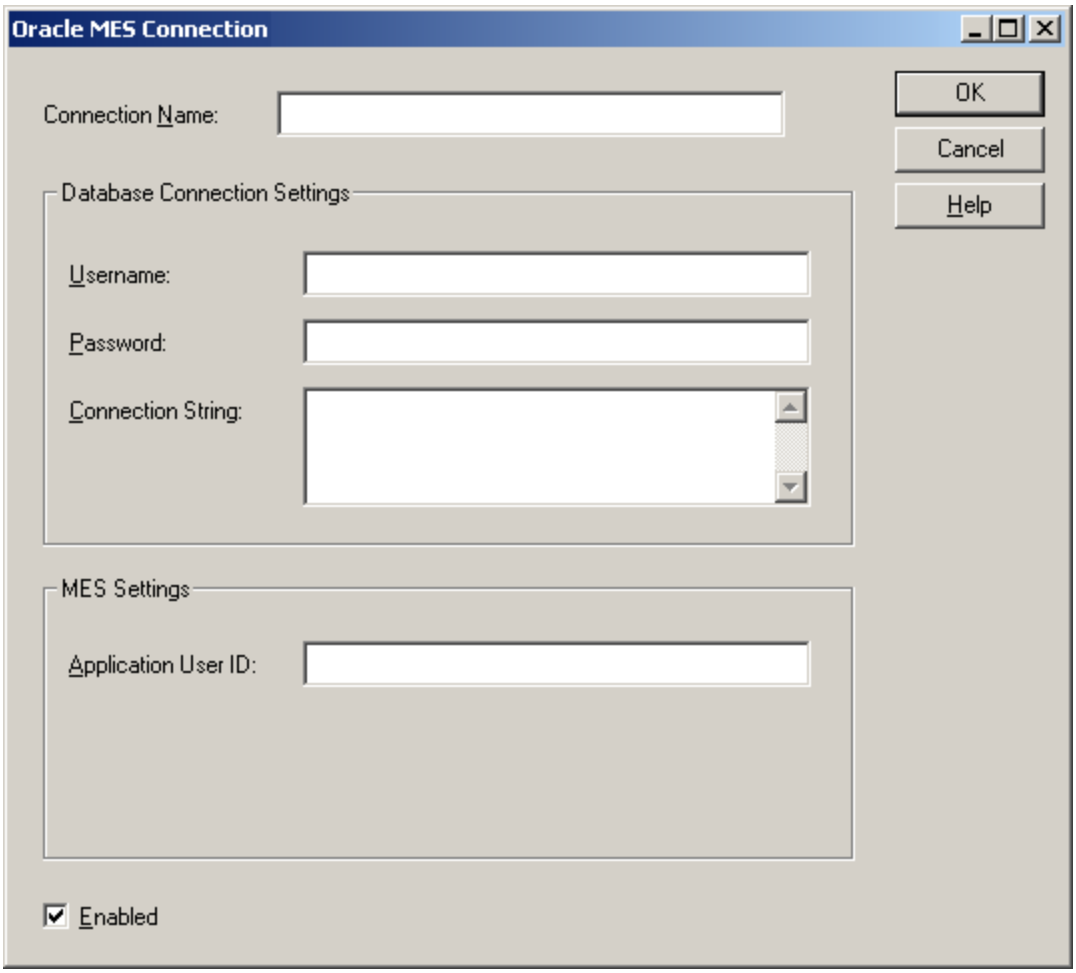


3. To make a new MES connection, right-click on **Oracle MES Connections** and then select **New MES Connection**. Alternatively, click the **MES** icon .
4. To make a new MOC connection, right-click on **Oracle MOC Connections** and then select **New MOC Connection**. Alternatively, click the **MOC** icon .

Manufacturing Execution System (MES) Configuration

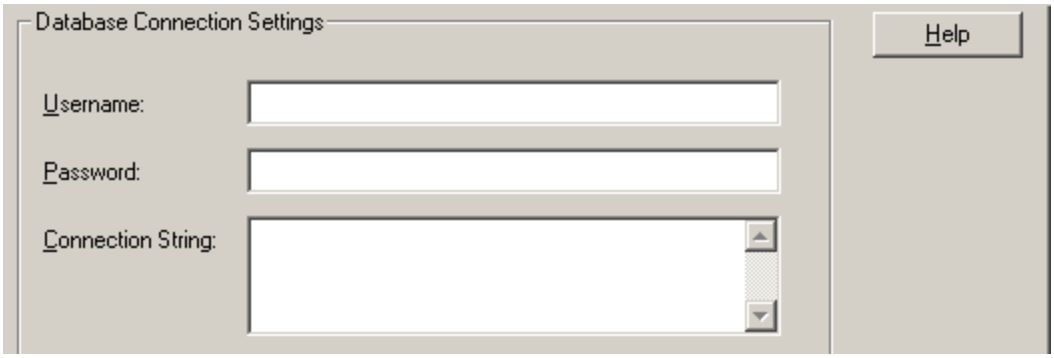
For information on configuring the Manufacturing Execution System (MES), refer to the instructions below.

1. To start, right-click on **Oracle MES Connections** and then select **New MES Connection**.



2. In **Connection Name**, specify a name that is unique across all MOC and MES connections.

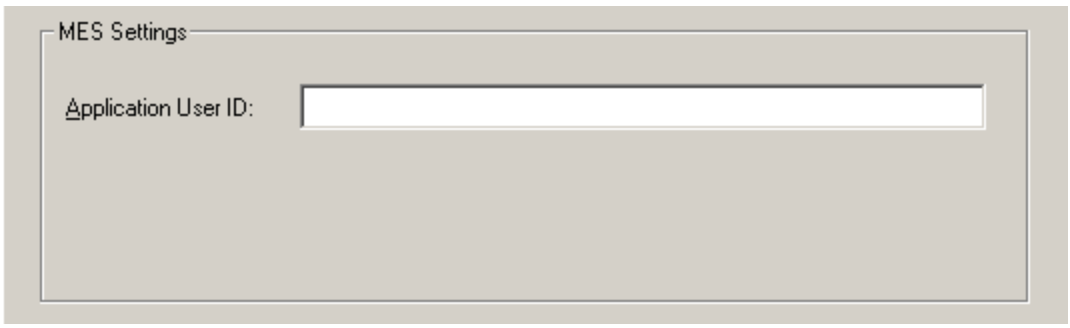
3. In **Username** and **Password**, specify the valid username and password as provided by the Oracle Database Administrator. These are required for connection to the Oracle Database.



4. Next, specify the **Connection String**. For more information, refer to the table below.

Connection String	The connection string is passed to Oracle using the Net Keyword value pair method. A sample string is as follows: (DESCRIPTION = (ADDRESS_LIST = (ADDRESS = (PROTOCOL = TCP) (HOST = Test Data)(PORT = 1521)))(CONNECT_DATA = (SID = Oracletest) (SERVER =DEDICATED))) **Breakdown of String** Description Address List Address Protocol = TCP *'Type of connection to Oracle Host* Host = Test Data *'Name of Oracle Host* Port = 1521 *'TCP Port that host is listening on* Address Address List Connect_Data SID = Oracletest *'Service ID for the named service* Server = Dedicated *'Type of connection* Connect_Data Description **Note:** The SQL URL Connection string method can also be found. For more information on both methods, refer to the Oracle documents *Oracle C++ Call Interface Programmer's Guide* and *Net Services Reference Guide*.

5. In **Application User ID**, specify the station or connection from which the data will be received. This must be a valid User ID as defined in the Oracle MES User Manager.

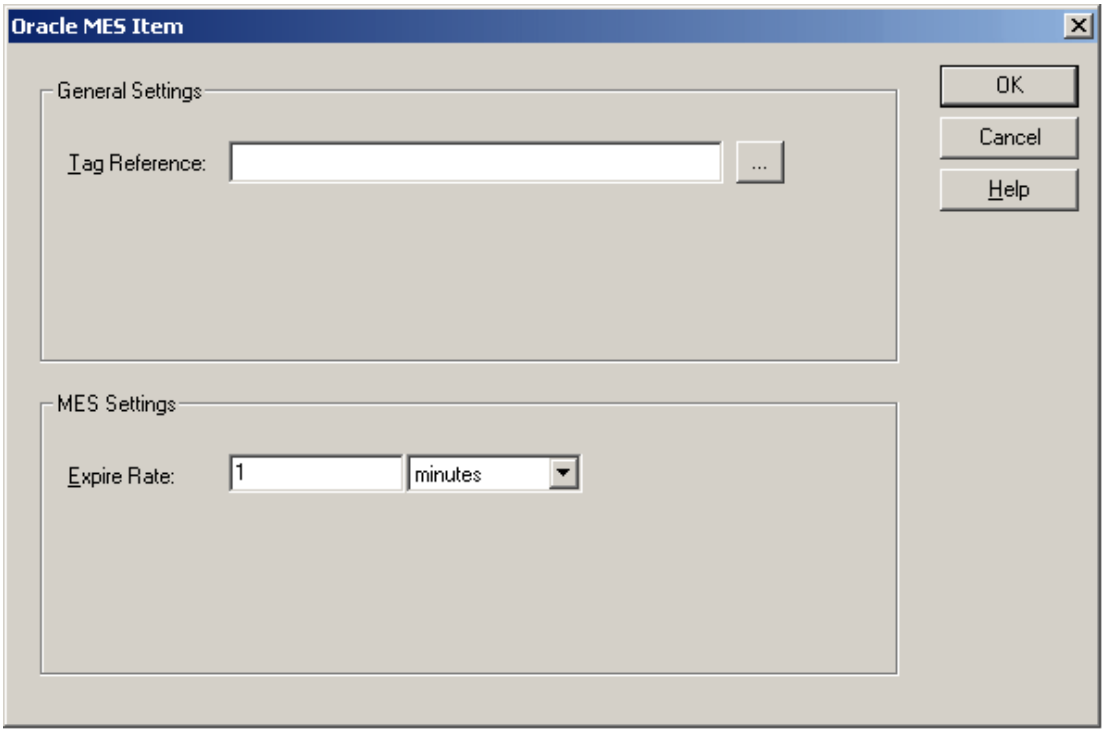


6. Next, check **Enabled**. If it is not checked, a connection to the database will not be made and data will not be sent to Oracle.

7. To save and apply the connection settings, click **OK**.

Assigning Items to be Inserted

1. To start, select the connection to which items will be assigned.
2. To reference an item that will be sent to Oracle, right-click in the **Tag Reference** area and then select **New MES Item**. Alternatively, click the **New Oracle MES Item** icon.
3. Next, click **Browse** to open the **Tag Browser**.



4. Select a tag, and then click **Apply**.
5. In **MES Settings**, specify the **Expire Rate**.

   Note: Since MES reads the data asynchronously when the server pushes the data into MES, this setting instructs MES on how old the data can be to still be considered valid. The rate can be set in Milliseconds, Seconds, Minutes, Hours, or Days. The valid range is 10 milliseconds to 49 days.
6. Once finished, click **OK**

Note: The MES connection does not support Dynamic, Complex, or Array Tags.

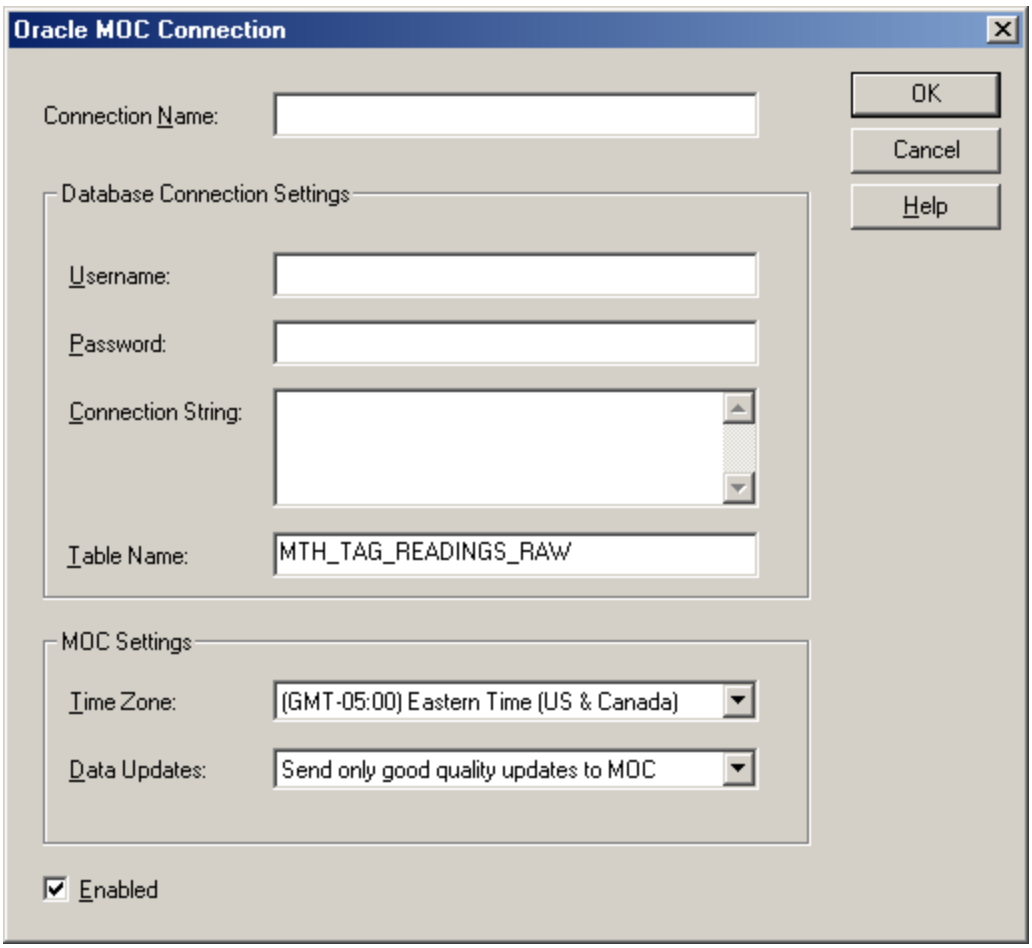
Referenced Tags

There are two tables in Oracle MES connections: one for item values and one for item information. Each item that is referenced in the connection will have a single record created for it in each table. These records will be updated with changes in item values or information.

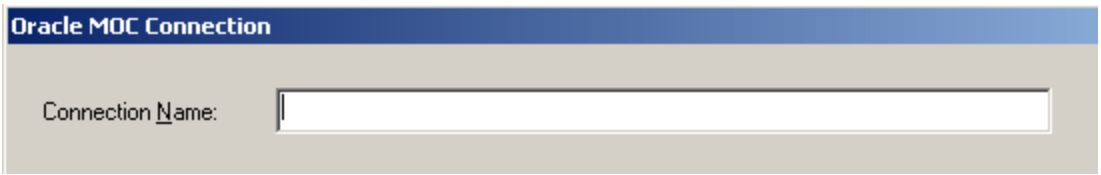
Manufacturing Operations Center (MOC) Configuration

For information on configuring the Manufacturing Operations Center (MOC), refer to the instructions below.

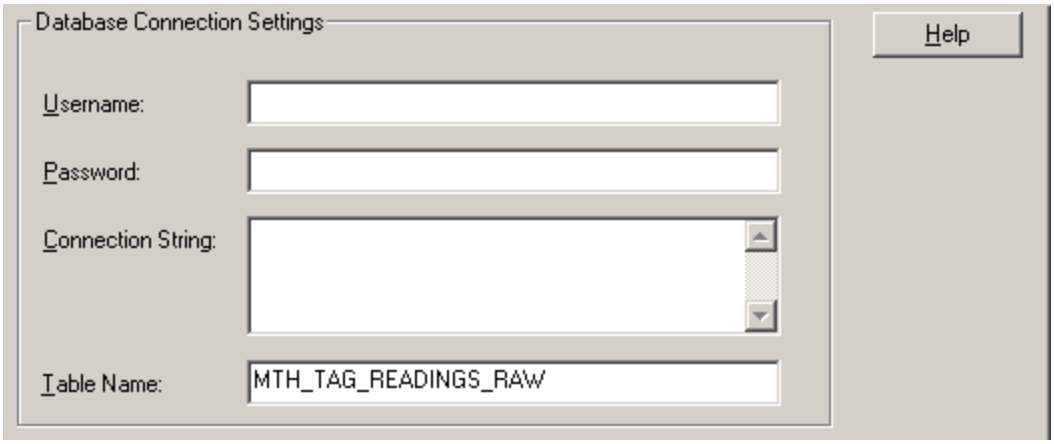
1. To start, right-click on **Oracle MOC Connections** and then select **New MOC Connection**.



2. In **Connection Name**, specify a name that is unique across all MOC and MES connections.



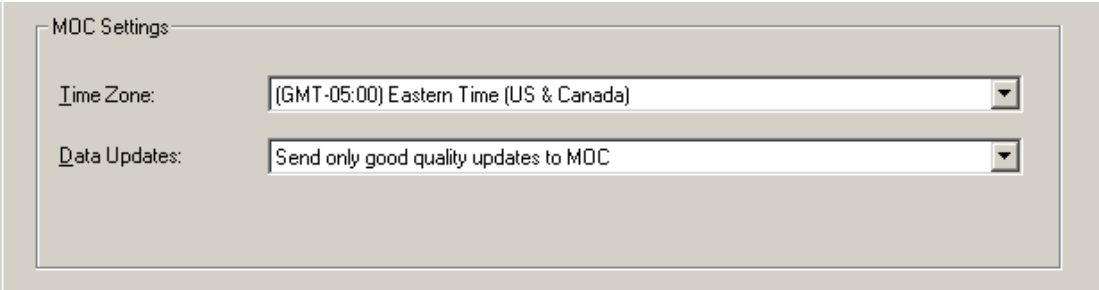
3. In **Username** and **Password**, specify the valid username and password as provided by the Oracle Database Administrator. These are required for connection to the Oracle Database.



4. Next, specify the **Connection String** and **Table Name** parameters. For more information, refer to the table below.

Connection String	The connection string is passed to Oracle using the Net Keyword value pair method. A sample string is as follows: (DESCRIPTION = (ADDRESS_LIST = (ADDRESS = (PROTOCOL = TCP) (HOST = Test Data) (PORT = 1521)))(CONNECT_DATA = (SID = Oracletest)(SERVER =DEDICATED))) **Breakdown of String** Description Address List Address Protocol = TCP '*Type of connection to Oracle Host* Host = Test Data '*Name of Oracle Host* Port = 1521 '*TCP Port that host is listening on* Address Address List Connect_Data SID = Oracletest '*Service ID for the named service* Server = Dedicated '*Type of connection* Connect_Data Description **Note:** The SQL URL Connection string method can also be found. For more information on both methods, refer to the Oracle documents *Oracle C++ Call Interface Programmer's Guide* and *Net Services Reference Guide*.
Table Name	This parameter specifies the name of the table in the Oracle Database to which the MOC will connect. The table name is limited to thirty characters. The default name is "MTH_TAG_READINGS_RAW". **Note:** The table must already exist in the database: the connection will not create it.

5. In **Time Zone**, specify the time zone that the server will convert the timestamp to before pushing the data into Oracle. The server timestamps all data stored internally in Coordinated Universal Time (UTC).



6. In **Data Updates**, select either **Send only good quality updates** or **Send all updates (including bad quality notifications) to MOC**.

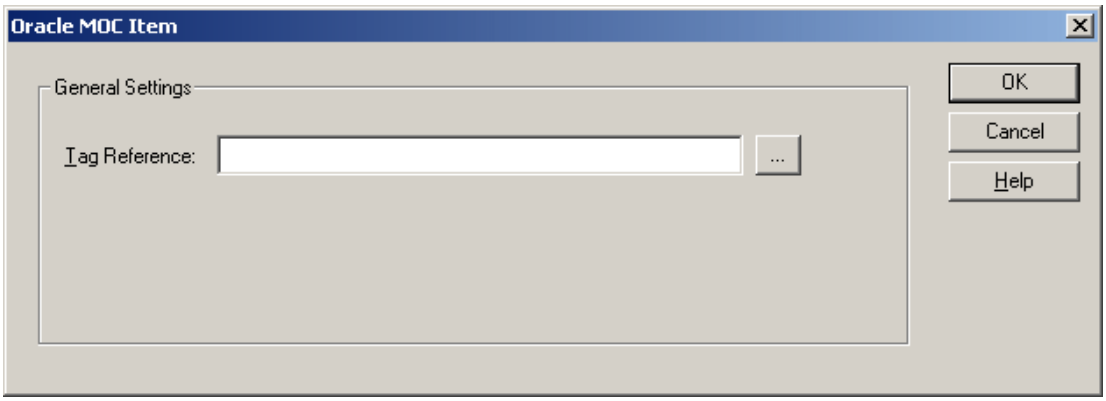
   Note: The server updates client connections when data or quality changes. When quality changes, the server reports the last known value in the change event with a quality of 'bad'. When evaluating data in a graph or averaging data over time, the analysis data may appear skewed.

7. Next, check **Enabled**. If it is not checked, a connection to the database will not be made and data will not be sent to Oracle.

8. To save and apply the connection settings, click **OK**.

Assigning Items to be Inserted

1. To start, select the connection to which items will be assigned.
2. To reference an item that will be sent to Oracle, right-click in the **Tag Reference** area and then select **New MOC Item**. Alternatively, click the **New Oracle MOC Item** icon.



3. Next, click **Browse** to open the **Tag Browser**.
4. Select a tag, and then click **Apply**.
5. Once finished, click **OK**.

Referenced Tags

For MOC connections, there is one table into which all referenced items will be inserted. Once inserted, each item will be assigned a unique GroupID. Complex Tags (which are comprised of several server tags) will be assigned the same GroupID when inserted.

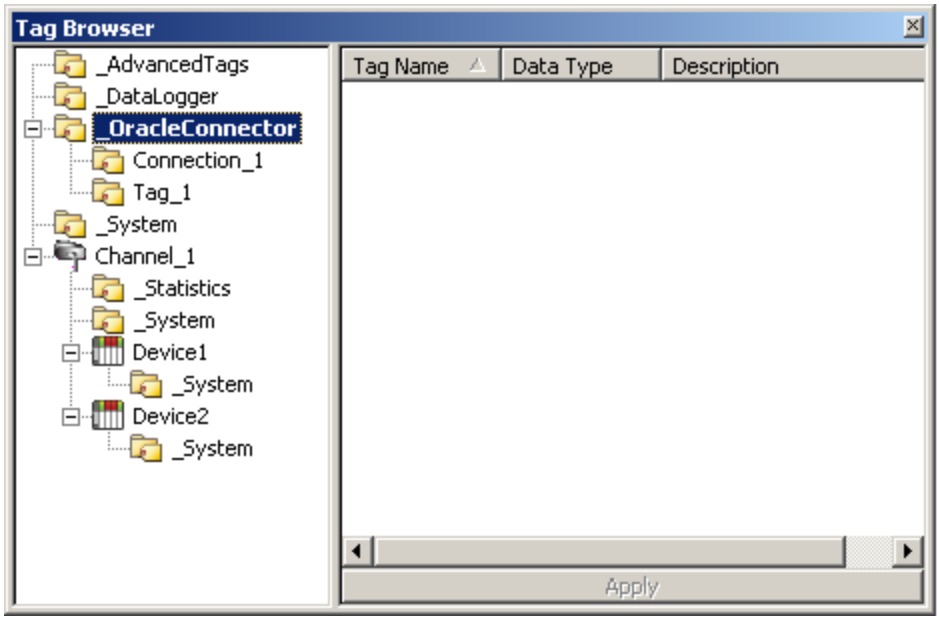
Example

A Complex Tag references the server tags "Channel1.Device 1.Tag1" and "Channel1.Device1.Tag2" and a single tag "Channel1.Device1.Tag3". The items and their corresponding values would be inserted as shown below.

Group ID	Item Name
00001	Channel1.Device 1.Tag1
00001	Channel1.Device 1.Tag2
00002	Channel1.Device 1.Tag3
00003	Channel1.Device 1.Tag1
00003	Channel1.Device 1.Tag2
00004	Channel1.Device 1.Tag3
00005	Channel1.Device 1.Tag1
00005	Channel1.Device 1.Tag2
00006	Channel1.Device 1.Tag3
00007	Channel1.Device 1.Tag1
00007	Channel1.Device 1.Tag2
00008	Channel1.Device 1.Tag3
00009	Channel1.Device 1.Tag1
00009	Channel1.Device 1.Tag2
00010	Channel1.Device 1.Tag3

Oracle Connector Tag Browser

The Tag Browser opens the server's tag database for browsing.



To select a Server Tag, double-click on it. Alternatively, highlight it and then press **Apply**. This will return the Server Tag to the connector.

System Tags

_OracleConnector.<connection name>

Tag	Access	Description
_Enabled	Read/Write	1. The connection is connected to Oracle. 2. The connection is attempting to connect to Oracle.
_Error	Read Only	The connection is in an error state.

Error Descriptions

The following error/warning messages may be generated. Oracle Connector errors can appear in two places: in message boxes (while editing or creating a connection) or in the server Event Log. Click on the link for a detailed description of the message.

Oracle Connector General Messages

A connection with the name <connection name> already exists.
Attempt to add Oracle Connector client item <item name> failed.
Error logging on connection <connection name>. Data has been lost. Make sure the oracle connection information and table are correct.
Failed to initialize Oracle interface <connection name>.
Failed to register connection <connection name> with the Oracle interface (unable to access storage-forward file).
Failed to uninitialize Oracle interface <connection name>.
Names must contain one or more characters and cannot contain periods, double quotations or start with an underscore.
The rate must be within the range of 10 milliseconds and 49 days.

MOC-Specific Messages

Failed to register MOC connection <connection name> with the Oracle interface <Oracle error>.
Failed to register MOC item <item name> on connection <connection name> with the Oracle interface <Oracle error>.
Failed to send data update for MOC item <item name> on connection <connection name> with the Oracle interface <Oracle error>.
Failed to unregister MOC connection <connection name> with the Oracle interface <Oracle error>.
Failed to unregister MOC item <item name> on connection <connection name> with the Oracle interface <Oracle error>.
Tag <tag name> does not exist or you are trying to add a dynamic reference which is not allowed for MOC connections.

MES-Specific Messages

Failed to add MES item <item name> with the Oracle interface <Oracle error>.
Failed to delete MES item <item name> with the Oracle interface <Oracle error>.
Failed to register MES connection <connection name> with the Oracle interface <Oracle error>.
Failed to register MES item <item name> on connection <connection name> with the Oracle interface <Oracle error>.
Failed to register MES item <item name> on connection <connection name> with the Oracle interface (ORA-04063: package body "DATABASE.QA_DEVICE_PUB" has errors ORA-06508: PL/SQL: could not find program unit being called: "DATABASE.QA_DEVICE_PUB" ORA-06512: at line 1).
Failed to send data update for MES item <item name> on connection <connection name> with the Oracle interface <Oracle error>.
Failed to unregister MES connection <connection name> with the Oracle interface <Oracle error>.
Failed to unregister MES item <item name> on connection <connection name> with the Oracle interface <Oracle error>.
Tag <tag name> does not exist or you are trying to add a dynamic, complex or array reference which is not allowed for MES connections.

A connection with the name <connection name> already exists.

Error Type:
Warning

Possible Cause:
A new connection was created with the same name as one that already exists.

Solution:
Rename the connection with a name unique to all MOC and MES connections.

Attempt to add Oracle Connector client item <item name> failed.

Error Type:
Warning

Possible Cause:

1. An item referenced in the connector no longer exists in the server project.
2. While saving and editing the project in the XML format, an item referenced in the connector has had its name changed.

Solution:

1. Rename or re-add the item being referenced from the connector.
2. Remove the item reference from the connector.

Error logging on connection <connection name>. Data has been lost. Make sure the oracle connection information and table are correct.

Error Type:
Error

Possible Cause:

1. The connection to the database was lost.
2. The table no longer exists.

Solution:

1. Verify that the database is still available by connecting an SQL client or by pinging a remote database.
2. Ensure that the table being logged to is available.

Note:
MES connections default to tables "QA_DEVICE_DATA_VALUES" and "QA_DEVICE_INFO". MOC connections allow the table name to be configured.

Failed to initialize Oracle interface <connection name>.

Error Type:
Warning

Possible Cause:
One or more of the required Oracle files may not be installed or may be out of sequence.

Solution:

1. Verify that all required files were installed correctly.
2. Check the returned Oracle Error with the Database Administrator, the Oracle Documentation or the **Oracle Database Errors** on the Oracle website.

Failed to register connection <connection name> with the Oracle interface (unable to access storage-forward file).

Error Type:
Error

Possible Cause:

1. Two MES connections are connected to the same database using the same connection string, username, and password.
2. Two MOC connections are connected to the same database using the same connection string, username, and table name.

Solution:

1. For MES connections, only one connection is allowed per database. Combine the MES items for duplicate connections, and then remove the duplicate connections.
2. For MOC connections, only one connection and table pair are allowed per database. Combine the MOC items for duplicate connection and table pairs, and then remove the duplicates.

Notes:

1. If multiple MES connections are desired, use a different username and password for each connection.
2. If multiple MOC connections to a database and table are desired, use a different username and password for each connection.

Failed to uninitialize Oracle interface <connection name>.

Error Type:
Warning

Possible Cause:

1. One or more of the required Oracle files may not be installed or may be out of sequence.
2. The connection to the database may be unresponsive or unrecovered.

Solution:

1. Verify that all required files where properly installed.
2. Check the returned Oracle Error with the Database Administrator, the Oracle Documentation or the **Oracle Database Errors** on the Oracle website.

Names must contain one or more characters and cannot contain periods, double quotations or start with an underscore.

Error Type:
Warning

Possible Cause:
Either the connection name was left blank, or it contains one or more reserved characters.

Solution:
Name or rename the connection without any reserved characters.

The rate must be within the range of 10 milliseconds and 49 days.

Error Type:
Warning

Possible Cause:
The Expire Rate of the MES Item was set to less than 10 M/SEC or greater than 49 days.

Solution:
Reset the Expire Rate to be within the range of 10 M/SEC to 49 days.

Failed to register MOC connection <connection name> with the Oracle interface <Oracle error>.

Error Type:
Warning

Possible Cause:

1. One or more of the connection string parameters may be incorrect.
2. One or more of the Oracle Interface Files may not be present.
3. The Oracle interface service may have stopped.

Solution:

1. Verify and correct all parameters in the connection string.
2. Verify that all Oracle files have been installed.
3. Check the returned Oracle Error with the Database Administrator, the Oracle Documentation or the **Oracle Database Errors** on the Oracle website.

Failed to register MOC item <item name> on connection <connection name> with the Oracle interface <Oracle error>.

Error Type:
Warning

Possible Cause:

1. The MOC "MTH Raw Data" table does not exist.
2. A timeout occurred while waiting to register the item.

Solution:

1. Ensure that the Oracle MOC Package has been installed correctly.
2. Ensure that no table from the Oracle Database has been deleted or removed.
3. Check the returned Oracle Error with the Database Administrator, the Oracle Documentation or the **Oracle Database Errors** on the Oracle website.

Failed to send data update for MOC item <item name> on connection <connection name> with the Oracle interface <Oracle error>.

Error Type:
Warning

Possible Cause:

1. The database may be busy.
2. The database connection may be in an unresponsive or unrecovered state.

Solution:

Check the returned Oracle Error with the Database Administrator, the Oracle Documentation, or the **Oracle Database Errors** on the Oracle website.

Failed to unregister MOC connection <connection name> with the Oracle interface <Oracle error>.

Error Type:
Warning

Possible Cause:

1. One or more of the required Oracle files may not be installed or may be out of sequence.
2. The connection to the database may be unresponsive or unrecovered.

Solution:

1. Verify that all required files were installed correctly.
2. Check the returned Oracle Error with the Database Administrator, the Oracle Documentation or the **Oracle Database Errors** on the Oracle website.

Failed to unregister MOC item <item name> on connection <connection name> with the Oracle interface <Oracle error>.

Error Type:
Warning

Possible Cause:

1. One or more of the required Oracle files may not be installed or may be out of sequence.
2. The connection to the database may be unresponsive or unrecovered.

Solution:

1. Verify that all required files were installed correctly.
2. Check the returned Oracle Error with the Database Administrator, the Oracle Documentation or the **Oracle Database Errors** on the Oracle website.

Tag <tag name> does not exist or you are trying to add a dynamic reference which is not allowed for MOC connections.

Error Type:
Warning

Possible Cause:

1. An attempt was made to reference a physical PLC address (Dynamic addressing).
2. The user manually entered a tag reference and mistyped it.
3. The user created the server project using an XML editor and referenced tags that did not exist in the Oracle Connector portion of the project file.

Solution:

1. Create a tag for the desired item and then reference the tag correctly.
2. Enter a correct tag reference.

Failed to add MES item <item name> with the Oracle interface <Oracle error>.

Error Type:
Warning

Possible Cause:

1. The MES Item Value and Item Info tables do not exist.
2. A timeout has occurred while waiting to add the item.
3. The login does not have the access to add items to the tables.

Solution:

1. Ensure that Oracle MES Package has been installed correctly.
2. Ensure that no table from the Oracle Database has been deleted or removed.
3. Check the returned Oracle Error with the Database Administrator, the Oracle Documentation or the **Oracle Database Errors** on the Oracle website.

Failed to delete MES item <item name> with the Oracle interface <Oracle error>.

Error Type:
Warning

Possible Cause:

1. The MES Item Value and Item Info tables do not exist.
2. A timeout has occurred while waiting to remove the item.
3. The login does not have the access to add items to the tables.

Solution:
Check the returned Oracle Error with the Database Administrator, the Oracle Documentation or the **Oracle Database Errors** on the Oracle website.

Failed to register MES connection <connection name> with the Oracle interface <Oracle error>.

Error Type:
Warning

Possible Cause:

1. One or more of the connection string parameters may be incorrect.
2. One or more of the Oracle Interface Files may not be present.
3. The Oracle interface service may have stopped.

Solution:

1. Verify and correct all parameters in the connection string.
2. Verify that all Oracle files have been installed.
3. Check the returned Oracle Error with the Database Administrator, the Oracle Documentation or the **Oracle Database Errors** on the Oracle website.

Failed to register MES item <item name> on connection <connection name> with the Oracle interface <Oracle error>.

Error Type:
Warning

Possible Cause:

1. The MES "QA_Device_Data_Values" and the "QA_Device_Info" tables may not exist.
2. A timeout occurred while waiting to register the item.

Solution:

1. Ensure that the Oracle MES Package has been installed correctly.
2. Ensure that no table from the Oracle Database has been deleted or removed.
3. Check the returned Oracle Error with the Database Administrator, the Oracle Documentation, or the **Oracle Database Errors** on the Oracle website.
4. Verify that a valid Application User ID has been specified. The User ID must be added to the Oracle MES User Manager.

Failed to register MES item <item name> on connection <connection name> with the Oracle interface (ORA-04063: package body "DATABASE.QA_DEVICE_PUB" has errors ORA-06508: PL/SQL: could not find program unit being called: "DATABASE.QA_DEVICE_PUB" ORA-06512: at line 1).

Error Type:
Error

Possible Cause:
The MES tables "QA_DEVICE_DATA_VALUES" and "QA_DEVICE_INFO" are not available.

Solution:

1. Ensure that the database is available by using a SQL client or by pinging the remote server.
2. Ensure that the database has tables named "QA_DEVICE_DATA_VALUES" and "QA_DEVICE_INFO". To do so, try writing to and reading from these tables using a SQL client.

Failed to send data update for MES item <item name> on connection <connection name> with the Oracle interface <Oracle error>.

Error Type:
Warning

Possible Cause:

1. The database may be busy.
2. The database connection may be in an unresponsive or unrecovered state.

Solution:
Check the returned Oracle Error with the Database Administrator, the Oracle Documentation, or the **Oracle Database Errors** on the Oracle website.

Failed to unregister MES connection <connection name> with the Oracle interface <Oracle error>.

Error Type:

Warning

Possible Cause:

1. One or more of the required Oracle files may not be installed or may be out of sequence.
2. The connection to the database may be unresponsive or unrecovered.

Solution:

1. Verify that all required files were installed correctly.
2. Check the returned Oracle Error with the Database Administrator, the Oracle Documentation or the **Oracle Database Errors** on the Oracle website.

Failed to unregister MES item <item name> on connection <connection name> with the Oracle interface <Oracle error>.

Error Type:
Warning

Possible Cause:

1. One or more of the required Oracle files may not be installed or may be out of sequence.
2. The connection to the database may be unresponsive or unrecovered.

Solution:

1. Verify that all required files where installed correctly.
2. Check the returned Oracle Error with the Database Administrator, the Oracle Documentation or the **Oracle Database Errors** on the Oracle website.

Tag <tag name> does not exist or you are trying to add a dynamic, complex or array reference which is not allowed for MES connections.

Error Type:
Warning

Possible Cause:

1. An attempt was made to reference a physical PLC address (Dynamic addressing).
2. The user manually entered a tag reference rather and mistyped it.
3. The user created the server project using an XML editor and referenced tags that did not exist in the Oracle Connector portion of the project file.

Solution:

1. Create a tag for the desired item and then reference the tag correctly.
2. Enter a correct tag reference.

Index

A

A connection with the name <connection name> already exists. 16
Attempt to add Oracle Connector client item <item name> failed. 16

E

Error Descriptions 15
Error logging on connection <connection name>. Data has been lost. Make sure the oracle connection information and table are correct. 16

F

Failed to add MES item <item name> with the Oracle interface <Oracle error>. 20
Failed to delete MES item <item name> with the Oracle interface <Oracle error>. 20
Failed to initialize Oracle interface <connection name>. 16
Failed to register connection <connection name> with the Oracle interface (unable to access storage-forward file). 17
Failed to register MES connection <connection name> with the Oracle interface <Oracle error>. 20
Failed to register MES item <item name> on connection <connection name> with the Oracle interface <Oracle error>. 21
Failed to register MES item <item name> on connection <connection name> with the Oracle interface (ORA-04063: package body 'DATABASE.QA_DEVICE_PUB' has errors ORA-06508: PL/SQL could not find program unit being called: 'DATABASE.QA_DEVICE_PUB' ORA-06512: at line 1). 21
Failed to register MOC connection <connection name> with the Oracle interface <Oracle error>. 18
Failed to register MOC item <item name> on connection <connection name> with the Oracle interface <Oracle error>. 18
Failed to send data update for MES item <item name> on connection <connection name> with the Oracle interface <Oracle error>. 21
Failed to send data update for MOC item <item name> on connection <connection name> with the Oracle interface <Oracle error>. 18
Failed to uninitialize Oracle interface <connection name>. 17
Failed to unregister MES connection <connection name> with the Oracle interface <Oracle error>. 21
Failed to unregister MES item <item name> on connection <connection name> with the Oracle interface <Oracle error>. 22
Failed to unregister MOC connection <connection name> with the Oracle interface <error message>. 19
Failed to unregister MOC item <item name> on connection <connection name> with the Oracle interface <Oracle error>. 19

H

Help Contents 4

I

Initial Setup Considerations 5

M

Manufacturing Execution System (MES) Configuration 7
Manufacturing Operations Center (MOC) Configuration 9

N

Names must contain one or more characters and cannot contain periods, double quotations or start with an underscore. 17

O

Oracle Connector Setup 6
Oracle Connector Tag Browser 13
Overview 4

S

Software Requirements 5
System Tags 14

T

Tag <tag name> does not exist or you are trying to add a dynamic complex or array reference which is not allowed for MES connections. 22
Tag <tag name> does not exist or you are trying to add a dynamic reference which is not allowed for MOC connections. 19
The rate must be within the range of 10 milliseconds and 49 days. 17