# OT Connect

# Contents

# Chapter 7: Glossary                                        45

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# Chapter

# 1

# Overview

**Topics:**

# About OT Connect

OT Connect allows you to connect to and synchronize Tag metadata from an OPC-compliant historian. This also allows you to enable Tag subscriptions to view, analyze, and act on real time process data, such as temperature or pressure.

With OT Connect services, you can do the following:

- Set up a connection to a process historian to ingest Tag data, Tag Hierarchy, and query for Readings in the historian.
- Define scheduling to ingest and synchronize Tag metadata.
- Query historical Readings for Health Trends and Policy nodes.
- Enable tag subscriptions which trigger Health Indicators and Policy workflows.

# OT Connect System Requirements

### License Requirements

The APM OT Connect license is required to take full advantage of the OT Connect functionality.

**Note:** If you are upgrading from a 4.x version which is running PDI to use OT Connect, you must also activate the OPC Interfaces licenses.

### Additional Components Required

In addition to the basic APM system architecture, your system must also contain the following components:

- OT Connect Conductor service must be installed on the APM Server.
- OT Connect Process Data Server: A machine on which the OPC compliant software is installed. The software requirements of this server are determined by the third-party distributor of the software. OT Connect Adapter must be installed on the OT Connect Process Data Server.
- Process Historian: A machine on which the process historian software is installed. The software requirements of this machine are determined by the third-party distributor of the software.

**Important:** OT Connect supports the OPC Foundation Historical Data Access (OPC-HDA) specification version 1.20. To support direct consumption of readings by Asset Health indicators and triggered policies, the server must implement the End aggregate or preferably use the OT Connect OPC DA Protocol Adapter for the Data Access data.

Refer to the supported software and devices documentation for information about OT Connect Process Data Servers and Process Historians that are tested for the OT Connect feature. The OT Connect Adapter can be installed and run on the OT Connect Process Data Server in OT Source Capability Utility mode to validate the capabilities of specific OT Connect Process Data Servers and process historians on a case-by-case basis. Refer to the deployment section for more information on the OT Connect Adapter.

### System Architecture

The following image shows the basic system architecture for deploying OT Connect with one APM Server.

**GE Digital APM Server**

Contains
- OT Connect Conductor Service
- Redis Instance
- Policy Execution Service
- Policy Trigger Service
- Asset Health Indicator Service
- APM Web APIs (IIS)
- Messaging Service (Active MQ)

**Database Server**

Contains the GE Digital
APM database

**GE Digital APM Workstations**

**OT Connect Process Data Server**

Contains
- OPC Server or Protocol SDK
- OT Connect Adapter Service

**Process Historian**

**Deploying OT Connect**

After you have installed and configured the basic APM system architecture, you must perform some configuration steps specifically for OT Connect.

If you want to use OT Connect with Asset Health Manager and Policy Designer, you must also configure the services associated with these modules.

# Chapter
# 2

## Workflow
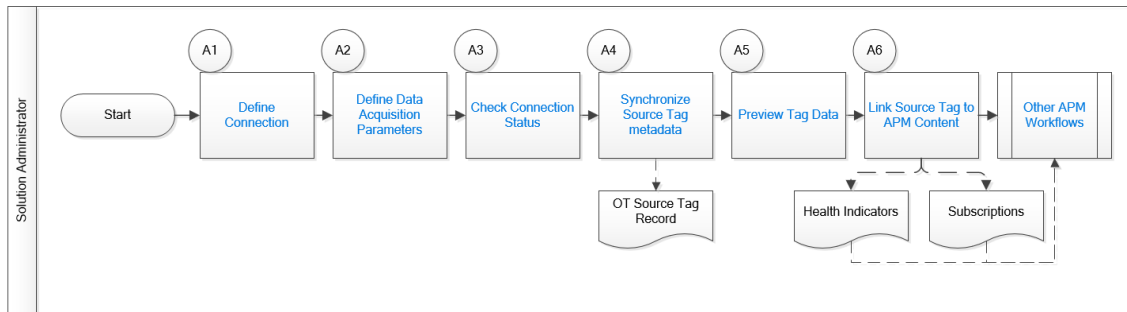
**Topics:**

# OT Connect Workflow



## A1 - Define connection to OT Source

Persona: Solution Administrator

Define OT Source connection endpoint. Standard OT Source interfaces offer connection to field device systems, such as condition monitoring devices, instrumentation, process historians, and so on.

## A2 - Define Data Acquisition Parameters of OT Source

Persona: Solution Administrator

Define parameters for the acquisition of data from the OT Source in APM. These parameters can include data polling frequency (that is, how often data will be acquired and aggregated for evaluation), filtering (for example, severity and type of data), and so on.

## A3 - Test connection to OT Source

Persona: Solution Administrator

After the data acquisition parameters are defined, test the connection to ensure that the OT Source is communicating with APM.

## A4 - Synchronize Source Tag Metadata from OT Source

Persona: Solution Administrator

An initial data synchronization is conducted that creates records representing Tags in APM. A Source Tag can represent a time series of data for a single monitored parameter, a summarized or calculated result, or a stream of events. Tags are kept in synchronization with changes in the field data systems. If a Tag used in APM is removed from the source system, the deleted Tag will be flagged as deleted. The Tag will not display in the user interface, but will remain in the APM database.

## A5 - Preview Source Tag Data

Persona: Solution Administrator

Interrogate synchronized Tags from APM to confirm data delivery and coherence.

## A6 - Link Source Tag to APM Content

Persona: Solution Administrator

Relate Tags to APM content (Health Indicators, Policy Instances, and so on) and Assets (Equipment and Functional Locations) to provide the correct context for data analysis. This can establish a subscription to retrieve data automatically, if the content requires it and the OT Source supports subscriptions.

Monitored data is used in Asset Health Management, Policies, and Production Loss Accounting processes. For more information, refer to the relevant workflows.

# Chapter

# 3

# OT Connect User Interface Pages

**Topics:**

# Connections

## Create OT Source

**Before You Begin**

Make sure that you are a part of the MI OT Connect Administrator Security Group.

**Procedure**

1. In the module navigation menu, select **Admin** > **Operations Manager** > **Connections**.
   The **Connections** page appears, displaying the **APM Connect** workspace.
2. Select **OT Sources**.
   The **OT Source** section appears.
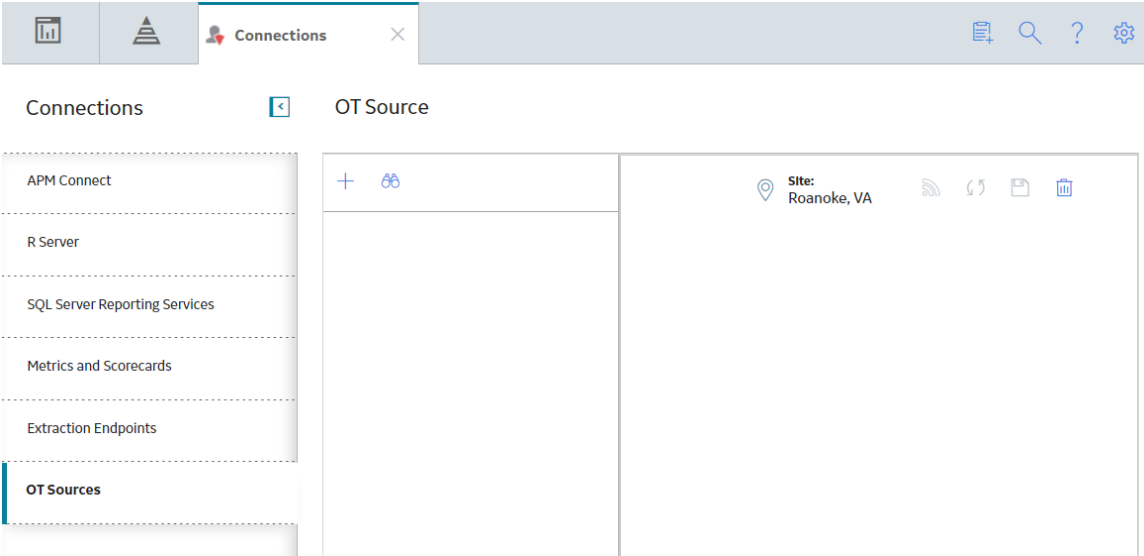


3. Select ➕.
   The **OT Source: <Source_Name>** page appears.

4. Complete the following general details:

   **Name**

   Define a unique name for the OT Source.

   **Source Type**

   Select the source type from the available options in the drop-down list.

   **Tag Subscription Rate**

   Specify the tag subscription rate in minutes.

5. Complete the following Connection details:

   **Prog Id**

   Define the program ID for the OT Source. This field is required if you select the Source Type as OPC-HDA.

6. **Optional:** Complete the following Tag Sync Details:

   **Tag Sync Enabled**

   Select this check box if you want to enable Tag Sync.

   **Tag Sync Interval**

   Define the tag sync interval in minutes.

   **Initial Start Time**

   Define the time for the initial sync of the tags.

   **Tag Filters**

   Define Regular Expression filters to exclude Tags you do not want to synchronize.

7. Select 💾.

   The OT Source record is created.

   **Note:** Creating an OT Source only defines the configuration of the source. To complete the connection, you must install and configure the OT Connect Adapter Service on the OT Connect Process Data Server. For more information, refer to the Deployment section.

**Note:** If the Adapter or Conductor is offline, the icon will be greyed out.

# Check Source Connection

**Procedure**

1. In the module navigation menu, select **Admin** > **Operations Manager** > **Connections**.
   The **Connections** page appears, displaying the **APM Connect** workspace.
2. Select **OT Sources**.
   The **OT Source** section appears, displaying all the available OT Sources.
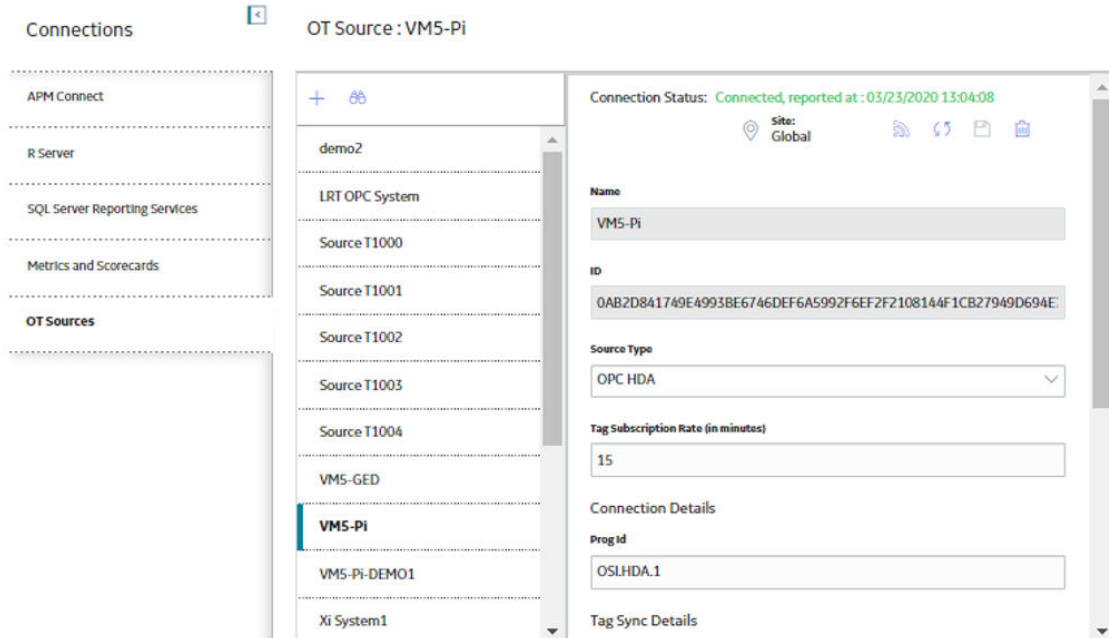


3. In the **OT Sources** pane, select the OT Source for which you want to check the connection.
   The details of the selected OT Source appears.

4. Select ⋙ to update the connection status.
   The OT Connect Connection Status is updated, providing a link to display the status information.

   Connection Status: Connected, reported at : 03/23/2020 13:04:08

5. **Optional:** On the OT Source header, select the Connection Status link.
   The **Connection Status** window appears, displaying the details of the connection.

## Connection Status

**Source Capabilities**

LastReading, StartToEndReadings, SubscribeReadings

✔ Message Bus

✔ Protocol Adapter

Connected successfully at 3/23/2020 4:18:06 PM

✔ Conductor

| | |
|---|---|
| Tag Sync | Started at 03/23/2020 13:03:29 |
| Succeeded | Ended at 03/23/2020 13:03:39 |
| Health Subscription Sync | Started at 03/23/2020 13:03:09 |
| Succeeded | Ended at 03/23/2020 13:03:11 |
| Policy Subscription Sync | Started at 03/23/2020 12:16:25 |
| Succeeded | Ended at 03/23/2020 12:16:27 |

| | |
|---|---|
| Minutes since last Status Report | Source Tags last updated at |
| 0 | 03/23/2020 13:03:39 |

OK

6. Select **OK** to close the window.

# Manually trigger a Tag Synchronization

**Procedure**

1. In the module navigation menu, select **Admin** > **Operations Manager** > **Connections**.
The **Connections** page appears, displaying the **APM Connect** workspace.
2. Select **OT Sources**.

The **OT Source** section appears, displaying all the available OT Sources.
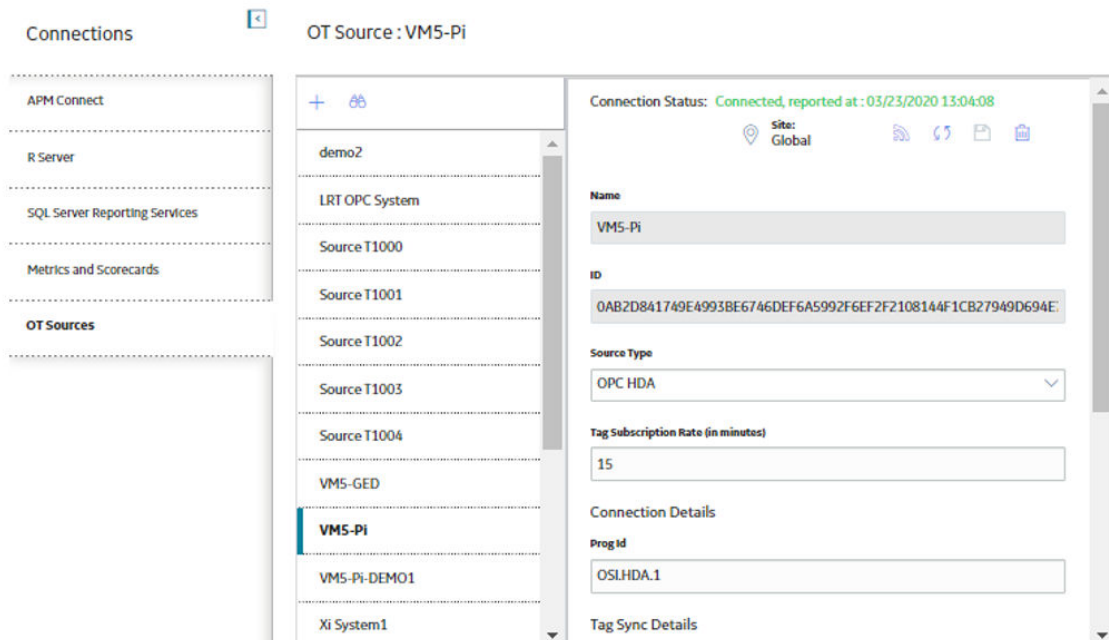


3. In the **OT Sources** pane, select the OT Source for which you want to trigger the tag synchronization. The details of the selected OT Source appears.
4. Select ⟳.
   The OT Connect Tag Synchronization is requested for the selected OT Source.

   **Note:** If a Tag Synchronization is already running, an error message appears.

# Delete OT Source

**Procedure**

1. In the module navigation menu, select **Admin** > **Operations Manager** > **Connections**.
   The **Connections** page appears, displaying the **APM Connect** workspace.
2. Select **OT Sources**.
   The **OT Source** section appears, displaying all the available OT Sources.
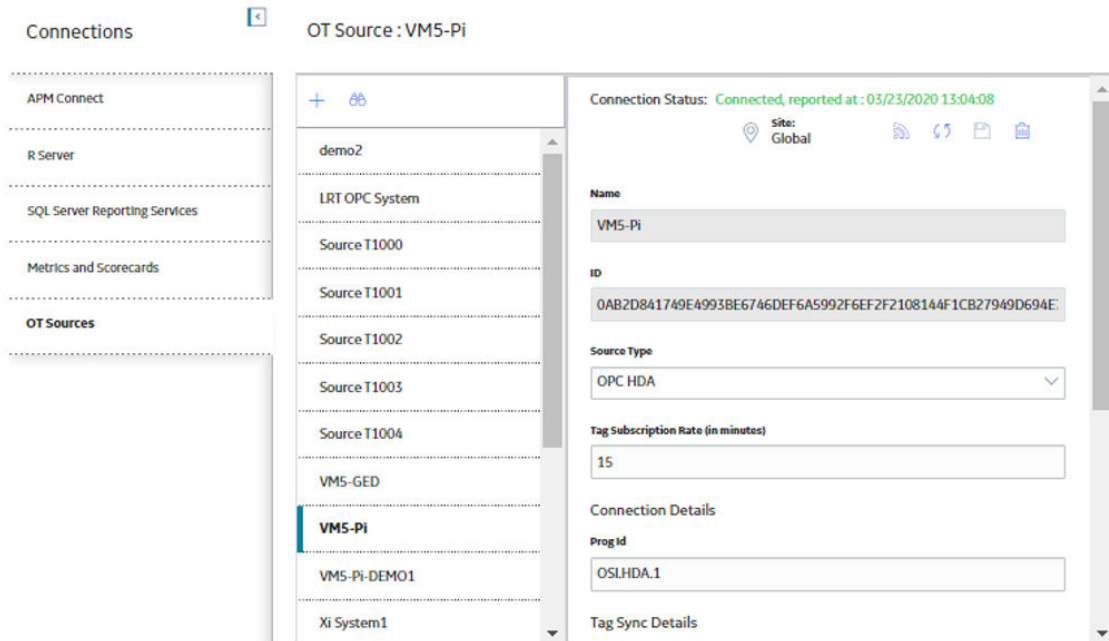
3. In the **OT Sources** pane, select the OT Source that you want to delete.
   The details of the selected OT Source appears.

4. Select 🗑.
   The selected OT Source is deleted.

   **Note:** You cannot delete an OT Source if it is associated with Source Tags. If source tags exist in APM, an error message appears.

# OT Connect Tag Browser

## View Source Tag Attributes in Tag Browser

**About This Task**

The OT Connect Tag Browser allows you to view the attributes of a Source Tag in an OT Source. You can also see a trend chart of readings for the Source tags.

**Procedure**

1. In the module navigation menu, select **Admin** > **Operations Manager** > **OT Connect Tag Browser**.
   The **Tag Browser** page appears, displaying the **OT Sources** workspace.
2. In the left pane, select the desired OT Source.
   The Source Tags for the selected OT Source appears.
3. Select the Source Tag for which you want to view the attributes.
   The tag attributes for the selected Source Tag appear in the right pane.
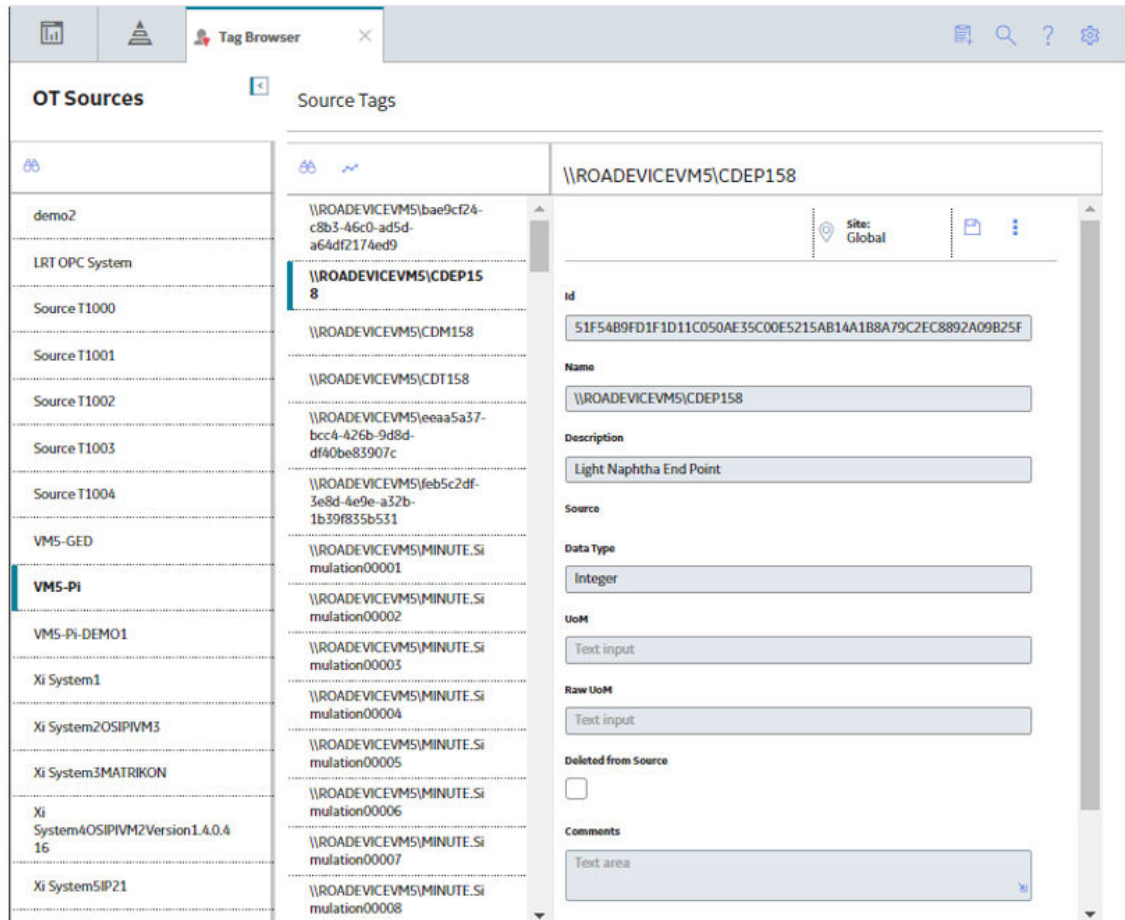
**Tip:** You can select search button (👓) and enter a source tag name to filter Source Tags by name.

**Note:** You can change the Site for a Source Tag by using the ⦿ button and then saving (🖫) the record. You cannot modify any other property.

## Visualize a Trend Chart

**About This Task**

OT Connect Tag Browser allows you to visualize the Trend Chart for the readings of a Source Tag.

**Procedure**

1. In the module navigation menu, select **Admin** > **Operations Manager** > **OT Connect Tag Browser**.
   The **Tag Browser** page appears, displaying the **OT Sources** workspace.
2. In the left pane, select the desired OT Source.
   The Source Tags for the selected OT Source appears.
3. Select the Source Tag for which you want to visualize the trend chart.
   The tag attributes for the selected Source Tag appear in the right pane.

4. In the header of the center pane, select ⌒.
   The trend chart appears in a new tab.
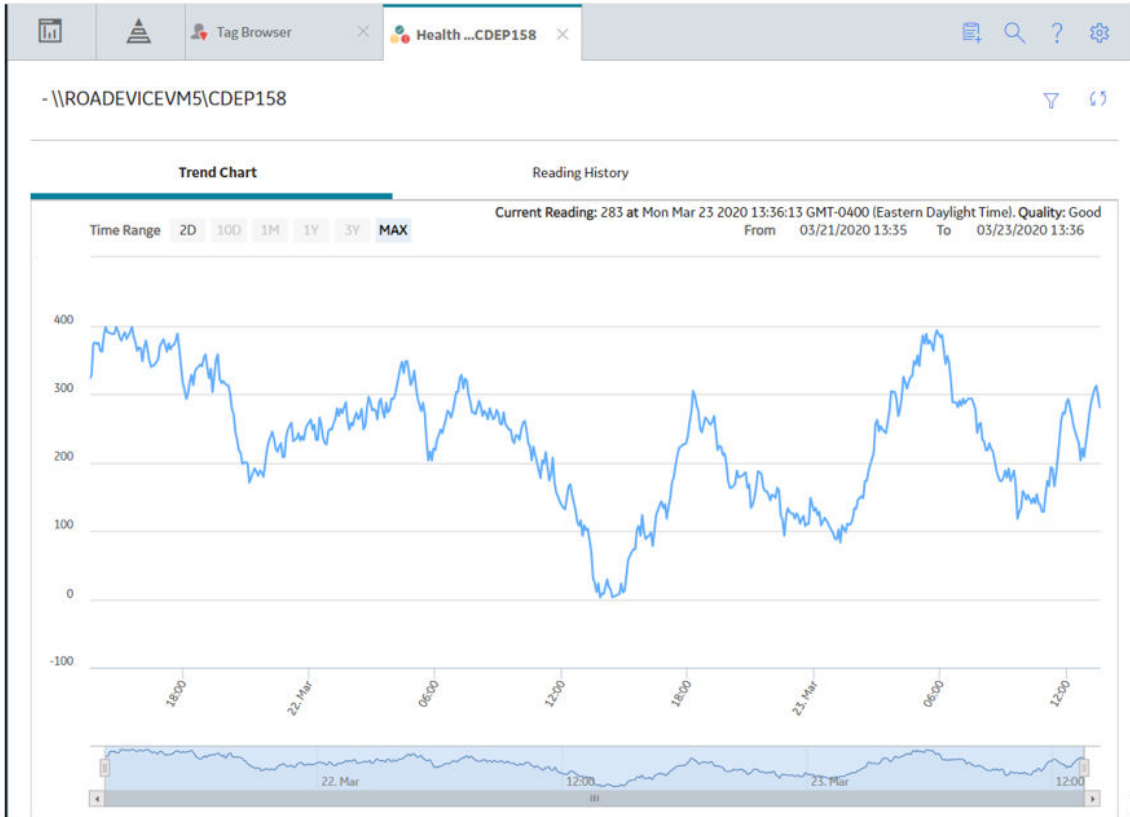
# Chapter
# 4

# Deployment

**Topics:**

# Deploy OT Connect for the First Time

**Before You Begin**

The following table outlines the steps that you must complete to deploy and configure this module for the first time. These instructions assume that you have completed the steps for deploying the basic system architecture.

These tasks may be completed by multiple people in your organization. GE Vernova recommends, however, that the tasks be completed in the order in which they are listed.

**Results**

| Step | Task | Notes |
|---|---|---|
| 1 | Ensure that your OT Connect Process Data Server and process historian are configured according to the OT Connect System Requirements on page 2. | This step is required. |
| 2 | On the OT Connect Process Data Server, Install OT Connect Adapter Service on page 23. | This step is required.<br><br>The OPC Server must be on the same machine as the OT Connect Adapter Service.<br><br>You must provide a unique name for each OT Connect Adapter Service on an OT Connect Process Data Server. |
| 3 | On the OT Connect Process Data Server, Configure OT Connect Adapter Service on page 24 to update the OT Connect Adapter Service configuration file to include the required properties. | This step is required.<br><br>The configuration file for an OT Connect Adapter Service is located in `C:\Program Files \Meridium\OTConnect\Adapters \{name}\appsettings.json`. |
| 4 | On the OT Connect Process Data Server, start the OT Connect Adapter Service. | This step is required.<br><br>When you start the service, the OT Connect Adapter Service attempts to connect and logs any errors.<br><br>The log file for this service is located in `C:\Program Files\Meridium \OTConnect\Adapters\{name} \Logs`. |
| 5 | On the APM server, verify the Message Bus Settings. | • Configure ActiveMQ<br>• Configure Redis |
| 6 | On the APM server, Install OT Connect Conductor Service on page 26. | This step is required.<br><br>**Note:** The Conductor does not require any additional configuration. |

| Step | Task | Notes |
|------|------|-------|
| 7 | On the APM server, start or restart the OT Connect Conductor Service. | This step is required.<br><br>You may review the log files for this service at `C:\ProgramData\Meridium\Logs.` |
| 8 | In APM, Assign Security Users to one or more of the Security Groups and Roles. | This step is required. |
| 9 | In APM, Create an OT Source to the OPC-compliant system from which you want to retrieve data. | This step is required. |
| 10 | In APM, Check Source Connection on page 10 to verify the status of the configured OT Source. | This step is required.<br><br>The status includes Connection Status to all the required components for the OT Source Connection Status.<br><br>If the status returns with errors, follow <OT Connect Troubleshooting Guide> for help. |
| 11 | In APM, Manually trigger a Tag Synchronization on page 11 for the OT Source. | This step is required.<br><br>You can monitor the status of the Source Tag Synchronization Connection Status. |
| 12 | In APM, Visualize a Trend Chart on page 14 for a desired Source Tag. | This step is optional. |
| 13 | Complete desired content commissioning as necessary to manage the Source Tags imported into APM. For example, create Health Indicators through the OT AHI Connector page, or attach Source Tags to Policy Instances through Policy Designer. For more information, refer to the respective documentation. | This step is optional. |

# Upgrade from PDI to OT Connect

**About This Task**

The initial release of OT Connect is in APM Version 4.4.0. Although OT Connect is a new module, there are a number of customers who were using the Process Data Integration module in an older version of APM. As these customers upgrade to APM Version 4.4.0, they will want to upgrade their existing OPC Tags and any Health Indicators or Policies that utilize those tags.

OT Connect includes the OT Connect Upgrade Utility, a console application that can be used to migrate content that previously relied upon Process Data Integration.

During the database upgrade to APM Version 4.4.0, the content of the OPC Systems will be migrated to OT Sources, and OPC Tags will be migrated to Source Tags, if they are in use by Health Indicators or Policy Instances. After the database upgrade, and before using Health, Policy or OT Connect, you must run this utility. This utility performs the following:

1. Updates the OT Source Ids
2. Updates the Source Tag Ids

3. Creates Content Map records for every Health Indicator that is linked to an OPC Tag and upgrades those Health Indicators
4. Upgrades Policies that use the OPC Tag node to use the OT Connect Tag node
5. Creates Content Map records for all Policy Instances that reference OPC Tags in OPC Tag nodes and upgrades those Policy Instances.

**Note:**

- Policies that use obsolete fields from the OPC Tag node will be upgraded automatically, however these Policies may no longer function as expected and will be deactivated. You can open such upgraded Policies in Policy Designer to review the obsolete field usage and reconfigure the Policies.
- Policies that reference OPC Tag records in Entity nodes or Policy Instances that reference OPC Tag records in Point Value nodes are NOT upgraded automatically.
- The upgrade process identifies any Policies and Policy Instances that cannot be upgraded automatically and adds a warning to the log. Please contact GE Vernova Support for advice on modifying any such Policies or Policy Instances to work with the OT Connect module.

**Results**

| Step | Task | Notes |
|------|------|-------|
| 1 | In APM, ensure that your new APM OT Connect license has been applied. | This step is required.<br><br>Apply and verify licenses in Operations Manager > Activate Licenses.<br><br>**Note:** Your new license must show that APM OT Connect is ACTIVE. And if upgrading from PDI, the OPC Interfaces must also show as ACTIVE. |
| 2 | On the APM Server, invoke the `OTConnectUpgradeUtility.exe` executable from the Windows Command Prompt. | This step is required.<br><br>Locate the OTConnectUpgradeUtility.exe in `C:\Program Files\Meridium\OTConnect\Upgrade`.<br><br>Execute the following command, replacing <datasource_id> with the name of the APM Datasource that you wish to connect to and upgrade. Please note that there is a space after datasource.<br><br>`.\OTConnectUpgradeUtility.exe datasource:<datasource_id>` |

| Step | Task | Notes |
|---|---|---|
| 3 | On the APM Server, review the upgrade log and ensure that no errors were logged during the upgrade process. | This step is required.<br><br>Locate `OTConnectUpgradeUtility_APM_<date>.log` in `C:\ProgramData\Meridium\Logs`.<br><br>You may also need to look into the following two log entries:<br><br>`Upgrading 312 Health Indicators.`<br><br>`312 Health Indicators were upgraded.`<br><br>If those two numbers do not match in your log, then some errors have occurred that have prevented the upgrade utility from successfully completing all of the required tasks.<br><br>**Note:** After resolving any issues reported in the log, re-run the Utility.<br><br>Warnings will be added to the log in the following circumstances:<br><br>• A Policy uses an obsolete field in an OPC Tag node. The policy will be inactivated.<br>• A Policy uses an Entity node configured to reference the OPC Tag family. The policy will be inactivated.<br>• A Policy Instance references an OPC Tag record in a Point Value node.<br>• A Policy Instance references a record (not limited to OPC Tag records) which is not found in the APM Database. Usually this means that the referenced record was deleted after the Policy Instance was last saved. The invalid reference will be removed.<br><br>You may need to redesign the Policy or reconfigure the Policy Instance to work with the OT Connect module, after the upgrade is completed. Consult GE Vernova Support for advice. |
| 4 | Migrate additional datasources. | Repeat steps 2 and 3 for each datasource that you want to migrate. |
| 5 | Once the log has been reviewed and no errors have occurred, the Upgrade is complete. | You are now ready to Deploy OT Connect for the First Time on page 18. |

# Chapter

# 5

## Install and Configure OT Connect Services

**Topics:**

# Install OT Connect Adapter Service

## Install OT Connect Adapter Service

**Before You Begin**

The OT Connect Adapter requires third party drivers to launch certain Protocol Adapters.

**OPC Classic DA and HDA**

You must perform the following steps to install the 64-bit OPC Core Components on the OT Connect Process Data server:

1. On the machine that will serve as the OT Connect Process Data Server, access the APM distribution package, and then navigate to the `\V4.6.0.0_3rd_Party_Software\OPC Core Components` folder.
2. Ensure that all the OPC servers or clients on the Process Data server are stopped to avoid conflicts with common libraries used by both 32-bit and 64-bit OPC Core Components.
3. Double-click on OPC Core Components Redistributable (x64) 3.00.108.msi.
4. Select **I Agree** to accept the license.
5. Select **Next** on the following windows to accept the default selections, and install the software.
6. Close the installer.

**About This Task**

This topic provides detailed instructions on installing the OT Connect Adapter Service using the OT Connect installer.

**Procedure**

1. On the system that will serve as the OT Connect Process Data Server, access the APM distribution package, and then navigate to the `\Setup\OTConnect` folder.
2. Double-click on the `Setup.exe` file.

   **Note:** If an OT Connect Adapter Service is already installed on this server, the **Existing Installed Instances Detected** screen appears.
3. Select **Next** to accept and Install a new instance of this application.
   The **Welcome** screen appears.
4. Select **Next**.
   The **License Agreement** screen appears.
5. Read the License Agreement and, if you agree, select the **I accept the terms of the license agreement** check box, and then select **Next**.
6. The **Instance Name** window appears.

   **Note:** The Instance Name is only used by the operating system to distinguish multiple adapters installed on the same OT Connect Process Data Server.
7. Enter a unique name related to the OT Source you want to connect this OT Connect Adapter Service to.

   **Note:** The instance name is not linked to the OT Source Name in any way. Rather, it is the unique-per-service ID that is used to give each adapter a unique name:

   • Folder

- Windows Service
- Add/Remove programs entry

It is recommended that the name given should be related to the server indicated in order to make troubleshooting easier.

8. Select **Next**.
9. Select **Install**.
   The **Setup Status** window appears, displaying a progress bar that shows the progress of the installation process. After the progress bar reaches the end, a message appears, indicating that your server is being configured. After your server is configured, the **Installation is Complete** window appears.
10. Select **Finish**.
    The installation is complete.

# Configure OT Connect Adapter Service

## Configure OT Connect Adapter Service

### About This Task

To use OT Connect Adapters, you must configure each OT Connect Adapter Service by modifying the `appsettings.json` configuration file on the OT Connect Process Data Server.

You can make the modifications by opening the file in an application that can modify JSON text (for example, Notepad). The following instructions provide details on making all required modifications at one time using the text editor.

**Note:** This configuration file defines several endpoints on the APM Server with URLs and ports that must be accessible from the OT Connect Process Data Server. Ensure that your firewalls are configured to allow this access.

### Procedure

1. On the OT Connect Process Data Server, open the `<Install_Location>/appsettings.json` file.
2. Modify the configuration sections as described in the following table:

| Within this section... | Make this change | Notes |
|---|---|---|
| Adapter | Replace `TenantId` with the name of the APM database to which you want to connect. | None |
| OtSource | Replace `Name` with a descriptive identifier for this Process Historian Source. | This Name must eventually match that of an OT Source system defined in the APM Database chosen above. |
| | Under `FolderFilters`, add a list of folders on the OPC server that you want to ignore when retrieving tags from the OPC server.<br><br>For example:<br><pre>"OtSource":<br>{<br>"Name": "Source<br>T1002",<br>"FolderFilters":<br>[<br>    "%OSI",<br>    "%OSI_MCN"<br>]<br>}</pre> | If you upgrade an OPC server, and if folders from the older version are retained, the OPC DA Adapter and OPC HDA Adapter traverse the folders in the OPC server. This can result in errors. To avoid this issue, specify the folders that you want to ignore when retrieving data from the OPC server. |
| QueueOptions | Set `ActiveMqHost` with the fully qualified network address of the server that hosts the ActiveMQ Message Bus. | Typically, the Host of the ActiveMQ Message Bus is the APM Server. |
| | Set `ActiveMqPort` with the appropriate port of the ActiveMQ host. | The default port is 61616. |
| | Set `Username` with the user Id of an authorized user of the ActiveMQ instance on the MqHost. | |
| | Set `Password` with the encrypted secret of the desired user Id of the ActiveMQ instance on the MqHost. | |
| CacheOptions | Replace `Host` with the fully qualified network address of the server that hosts the Redis cache instance. | Typically, the Host of the Redis cache instance is the APM Server. |
| | Set `Port` to the defined port of the Redis cache instance. | The default port is 6379. |
| | Set Password to the Password of the Redis cache instance, if any. | By default, the password is blank. |

The following content is an example of an `appsettings.json` file.

```
{
  "Adapter": {
    "TenantId": "V4040000_QA",
    "OtSource": {
      "Name": "Source T1002"
      "FolderFilters":
      [
       "%OSI",
       "%OSI_MCN"
      ]
```

```
      }
    },
    "Logging": [
      {
        "Pattern": "*",
        "LoggingLevel": "Info",
        "LoggingMode": "All"
      }
    ],
    "MessageBus": {
      "QueueOptions": {
        "ActiveMqHost": "appserver",
        "ActiveMqPort": 61616,
        "Username": "admin",
        "Password": "admin"
      },
      "CacheOptions": {
        "Host": "appserver",
        "Port": 6379,
        "SyncTimeout": 15000,
        "Password": "admin"
      }
    }
  }
}
```

# Install OT Connect Conductor Service

## Install OT Connect Conductor Service

**About This Task**

This topic provides detailed instructions on installing the OT Connect Conductor Service using the APM Server and Add-ons installer.

**Note:** Re-installing the OT Connect Conductor Service will reset its appsettings.json to the default settings.

**Procedure**

1. On the APM Server, access the APM distribution package, and then navigate to the `\\Setup \Meridium APM Server and Add-ons` folder.
2. Double-click on the `Setup.exe` file.
   The **Welcome** window appears.
3. Select **Next**.
   The **License Agreement** window appears.
4. Read the License Agreement and, if you agree, select the **I accept the terms of the license agreement** check box, and then select **Next**.
   The **Select Installation Location** screen appears.
5. Select **Next** to accept the default location.
   The **Select the features you want to install** window appears.
6. Select the **OT Connect Conductor Service** option.

   **Note:** While additional options are available for selection, these options are not meant to be installed on the APM Server at this time. These instructions assume that you want to install only the OT Connect Conductor Service.

7. Select **Next**.
8. Select **Install**.
   The **Setup Status** window appears, displaying a progress bar that shows the progress of the installation process. After the progress bar reaches the end, a message appears, indicating that your server is being configured. After your server is configured, the **Installation is Complete** window appears.
9. Select **Finish**.
   The installation is complete.

   **Note:** The OT Connect Conductor does not require additional configuration. It depends on the common settings in MeridiumAppSettings.xml and Datasources.

# Chapter

# 6

## References

**Topics:**

# OT Connect System Architecture

## OT Connect System Architecture

The following image shows how these machines should be incorporated into the basic APM system architecture:
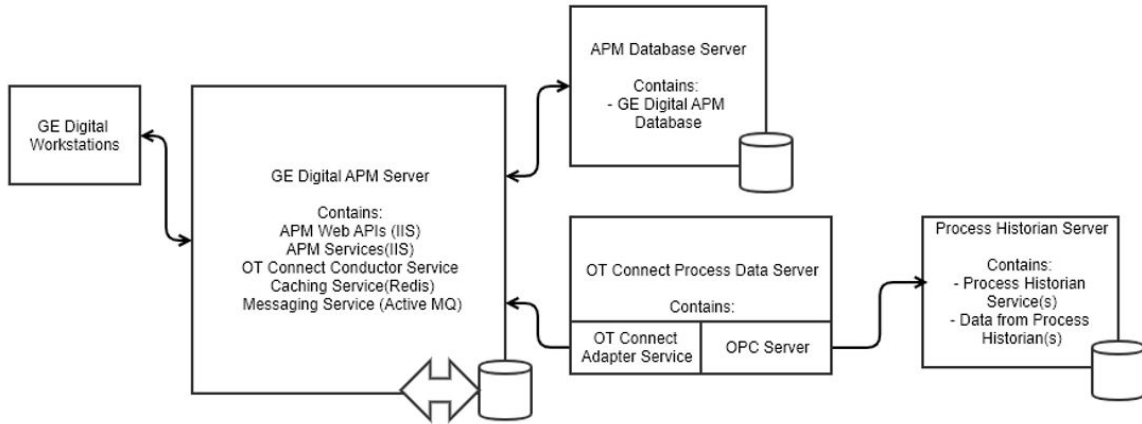


The Conductor requires access to the APM Datasource(s), so it should be installed on the APM Server with the other services.

Each OT Connect Adapter Service can connect a single Process Historian or OPC Server to a single APM Datasource, so your solution may require multiple OT Connect Adapter Services, installed on the same or different servers.

**Important:** Do not configure more than one Adapter with the same OT Source Name.

The OT Connect Adapter Service does not require any inbound connections, only outbound connections to the Message Broker and Cache services, allowing the OT Connect Process Data Server to be deployed within a DMZ or OT Network without compromising security.

**Required Server Ports**

To ensure successful communications between APM and OT Connect, make sure the listed ports are open.

| Feature | Firewall Port | From | To |
|---|---|---|---|
| Tag and Subscription Synchronization | Configurable; 1433 for a default SQL Server.<br><br>Additional ports as required by the chosen Authentication scheme | OT Connect Conductor | APM Database |
| Tag and Subscription Synchronization | Configurable; 6379 by default | OT Connect Conductor | Redis Server |
| Tag and Subscription Synchronization | Configurable; 61616 by default | OT Connect Conductor | ActiveMQ Server |

| Feature | Firewall Port | From | To |
|---|---|---|---|
| All connectivity for that OT Source | Configurable; 6379 by default | OT Connect Adapter | Redis Server |
| All connectivity for that OT Source | Configurable; 61616 by default | OT Connect Adapter | ActiveMQ Server |

**Note:** For the network requirements for each protocol, refer to Working with Protocol Adapters.

# Data Model

## Data Model

The following image represents the Data Model for OT Connect.
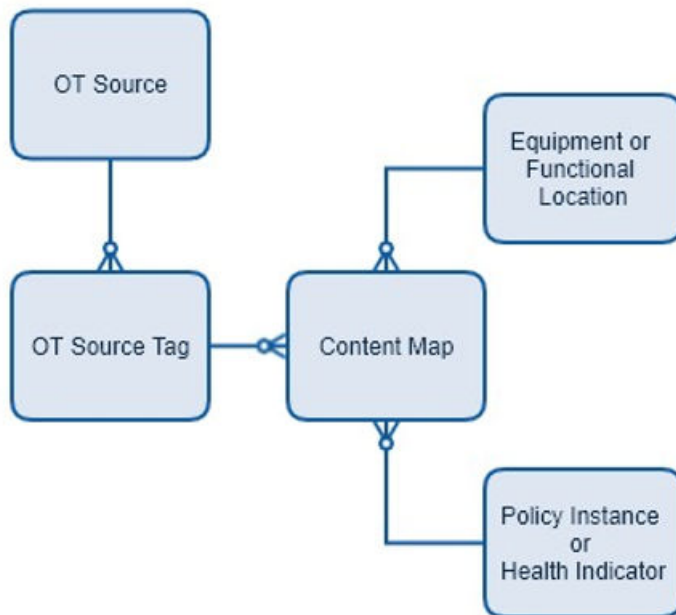


**OT Source: Source of Tags and Tag Value from the Edge**

The following table provides a list and description of the fields that exist in the OT Source family and are available on the baseline OT Source datasheet. The information in the table reflects the baseline state and behavior of these fields. If your implementation has been customized, these fields may behave differently, and fields in addition to those listed here may be available.

This family is enabled for site filtering, which means that records in this family can be assigned to a specific site and will then only be accessible to users who are assigned to the same site and have the appropriate license and family privileges. For more information, refer to the Site Filtering section of the documentation.

| Field Caption/ID | Data Type | Description | Behavior and Usage |
|---|---|---|---|
| MI_OTSRC_ID_C | Character | Unique Identifier | None |
| MI_OTSRC_CONN_DEF_T | Text | Connection Configuration | Reserved for future use |
| MI_OTSRC_TYPE_C | Type | Text | This field is a selection from a predefined list. Options include OPC HDA and Simulation |
| MI_OTSRC_NAME_C | Character | Name | None |
| MI_OTSRC_LAST_UPDT_D | Date | Last Update Time | None |
| MI_OTSRC_LAST_SYNC_D | Date | Last Sync Time | None |
| MI_OTSRC_SYNC_RATE_N | Numeric | Minutes between Tag Synchronizations | None |
| MI_OTSRC_CAPABILITY_N | Numeric | Capability | Bit Flags |
| MI_OTSRC_SYNC_DEF_T | Text | Synchronization Configuration | JSON |
| MI_OTSRC_SUB_RATE_N | Numeric | Default Subscription Rate | None |

**Source Tag: Tag definition from Source on the Edge**

The following table provides a list and description of the fields that exist in the Source Tag family and are available on the baseline Source Tag datasheet. The information in the table reflects the baseline state and behavior of these fields. If your implementation has been customized, these fields may behave differently, and fields in addition to those listed here may be available.

This family is enabled for site filtering, which means that records in this family can be assigned to a specific site and will then only be accessible to users who are assigned to the same site and have the appropriate license and family privileges. For more information, refer to the Site Filtering section of the documentation.

| Field Caption/ID | Data Type | Description | Behavior and Usage |
|---|---|---|---|
| MI_SRCTAG_ID_C | Character | Unique Identifier | None |
| MI_SRCTAG_NAME_C | Character | Name | Unique name in Process Historian |
| MI_SRCTAG_DESC_C | Character | Description | |
| MI_SRCTAG_ITEM_C | Character | - | Reserved for future use |
| MI_SRCTAG_COMMENTS_T | Text | Comments | |
| MI_SRCTAG_UOM_C | Character | UoM | Reserved for future use |
| MI_SRCTAG_RAW_UOM_C | Character | Raw UoM | UoM string reported by Process historian |
| MI_SRCTAG_EXT_PROPS_T | Text | Extended Properties | |
| MI_SRCTAG_DELETED_B | Boolean | This Tag was deleted from the OT Source | |

| Field Caption/ID | Data Type | Description | Behavior and Usage |
|---|---|---|---|
| MI_SRCTAG_DATA_TYPE_C | Character | Data Type | This field is a selection from a predefined list. Options include Boolean, Integer, Decimal, String, Timespan, DateTime |
| MI_SRCTAG_HS_OTSRC_FK_N | Numeric | OT Source Entity Key | Foreign Key to OT Source Records family |
| MI_SRCTAG_MIGR_FMLY_KEY_C | Character | Migrated Tag Family Key | Used for upgrade from MI_TAG based families (OPC Tag, GE Tag, AMS Tag) |
| MI_SRCTAG_MIGR_ENTY_KEY_C | Character | Migrated Tag Entity Key | Used for upgrade from MI_TAG based families (OPC Tag, GE Tag, AMS Tag) |

**Content Map: The relationships between content and sources**

The following table provides a list and description of the fields that exist in the Content Map family and are available on the baseline Content Map datasheet. The information in the table reflects the baseline state and behavior of these fields. If your implementation has been customized, these fields may behave differently, and fields in addition to those listed here may be available.

| Field Caption/ID | Data Type | Description | Behavior and Usage |
|---|---|---|---|
| MI_CONTMAP_ID_C | Character | Unique Identifier | None |
| MI_CONTMAP_TMPLT_NAME_C | Character | - | Reserved for future use |
| MI_CONTMAP_UOM_C | Character | UoM | Reserved for future use |
| MI_CONTMAP_LMT_DEFS_T | Text | Limit Definitions | JSON |
| MI_CONTMAP_TRIGGER_B | Boolean | - | Reserved for future use |
| MI_CONTMAP_REQ_CAP_N | Numeric | OT Source Capabilities Required by this Content | Bit flags |
| MI_CONTMAP_EQUIP_FK_N | Numeric | Equipment Key | Foreign Key to Equipment Record |
| MI_CONTMAP_FLOC_FK_N | Numeric | Functional Location Key | Foreign Key to Functional Location Record |
| MI_CONTMAP_SRCTAG_FK_N | Numeric | Source Tag Key | Foreign key to Source Tag record |

# Security Groups and Roles

## Security Groups and Roles

The following table lists the baseline Security Groups available for users within this module, as well as the baseline Roles to which those Security Groups are assigned.

**Important:** Assigning a Security User to a Role grants that user the privileges associated with all of the Security Groups that are assigned to that Role. To avoid granting a Security User unintended privileges, before assigning a Security User to a Role, be sure to review all the privileges associated with the Security Groups assigned to that Role. Also, be aware that additional Roles, as well as Security Groups assigned to existing Roles, can be added via Security Manager.

| Security Group | Roles |
|---|---|
| MI OT Connect Administrator | MI OT Connect Admin<br>MI Health Admin |
| MI OT Connect Viewer | MI Health User<br>MI Health Power<br>MI OT Connect User |
| MI Content Template User | MI Health Admin<br>MI OT Connect Admin |
| MI Content Template Viewer | MI Health User<br>MI Health Power<br>MI OT Connect User |

The baseline family-level privileges that exist for these Security Groups are summarized in the following table.

| Family | MI OT Connect Administrator | MI OT Connect Viewer |
|---|---|---|
| OT Source | View, Update, Insert, Delete | View |
| Source Tag | View, Update, Insert, Delete | View |

| Family | MI Content Template User | MI Content Template Viewer |
|---|---|---|
| Content Map | VIEW, INSERT, UPDATE, DELETE | View |

# Site Filtering

## Site Filtering

The OT Source family uses the APM Site Filter Control. When an OT Source record is created, it is assigned as Global. If the record is not reassigned to a specific site, then the user will always see the global record. For more information, refer to the Site Filtering section of the documentation.

**Note:** Only a Super User can modify the site assigned to an OT Source record. A user can modify the site assignment to a newly created connection record. However, once the user saves the system, it is no longer modifiable by a non-super user.

The OT Source is used to facilitate the transfer of records from your Process Historian server into APM. Specifically, Source Tags are transferred into APM. The records that are associated with the data source are assigned to Global when they are initially transferred into APM.

The content Maps are foundational records that are used to map Source Tags to Equipment, Functional Locations, Health Indicators, and/or Policy Instances. The content Maps will inherit the site of the asset within the record.

# Working with Connection Status

## Working with Connection Status

An OT Source depends on multiple services in order to support its full functionality, and the Connection Status display is intended to allow you to quickly identify any loss of connectivity with your OT Sources.

In order to support subscriptions and Reading requests, the OT Connect Adapter Service must be running and must be able to do the following:

- Connect to Redis.
- Connect to ActiveMQ.
- Connect its Protocol Adapter to the configured Process Historian or OPC Server.

In order to acquire configuration from APM on startup, or support Source Tag Synchronization, the OT Connect Conductor Service must also be running.

The top of the Connection Status page block shows the supported Capabilities and the status of each of these required components

## Connection Status

**Source Capabilities**
All

✔ Message Bus

✔ Protocol Adapter
Connected successfully at 3/9/2020 4:13:46 PM

✔ Conductor

**Note:** Redis is used to cache the status report, so the entire report will become Stale if the OT Connect Adapter Service is unable to connect to Redis.

Components can show the following three icons:

| Icon | Description |
|------|-------------|
| ✔ | Available and connected. |
| ⚠ | Status is stale, but had no issues in the last report. |
| ⊘ | An issue was found when the status was last reported. |

The bottom of the page shows the following information:

- The status of Tag and Subscription synchronization jobs.
- How recently Status has been reported.
- The last time Source Tags were updated by Tag Synchronization.

Tag Sync                                    Started at 2020-03-12T14:26:35.101
Succeeded                                   Ended at 2020-03-12T14:29:07.538

Health Subscription Sync                    Started at 2020-03-12T14:26:47.247
Succeeded                                   Ended at 2020-03-12T14:26:49.558

Policy Subscription Sync                    Started at 2020-03-12T14:26:44.210
Succeeded                                   Ended at 2020-03-12T14:26:46.421

Minutes since last Status Report            Source Tags last updated at
0                                           2020-03-12T14:29:06.507

# About Importing and Synchronizing Tags

## About Importing and Synchronizing Tags

After you schedule or trigger OT Connect Tag Synchronization, tags from the configured process historian are imported automatically into the APM database as Source Tag records. These Source Tag records are synchronized regularly with the OPC Server or historian at a defined frequency. The first time that the synchronization occurs, a Source Tag record is created in the APM database for each tag in the process historian based on defined filtering criteria.

Each subsequent time that the synchronization occurs, Source Tag records are created, modified, or flagged as removed, based on changes in the process historian as compared to the existing Source Tag data in the APM Database.

**Note:** Importing the Source Tags alone will not enable functionality. Source Tags must have content defined by either a Policy Instance or a Health Indicator, along with an optional asset (Equipment or Functional Location) before they can be used in the APM workflows.

Source Tag records are created, modified, or flagged as removed as follows:

- If a new tag was added to the process historian, a corresponding Source Tag record is created in the APM database.
- For a previously imported Source Tag, if certain attributes were changed in the process historian, the corresponding Source Tag record is updated automatically. If a previously imported tag no longer exists in the process historian, the Source Tag record is marked as Deleted from Source, and is no longer displayed in the UI or used in subscriptions, but the record will remain in APM database. The content that is already linked to the tag will fail when it attempts to get data for the tag.
- If the tag is restored in the process historian, the next scheduled synchronization will set the Deleted from Source field on the Source Tag record to false, it will return to the UI and subscriptions, and any pre-existing content will function again.

# Working with Configuration Files

## Working with Configuration Files

### Conductor

Like other APM Services on the App Server, most of the configuration should be done through MeridiumAppSettings.xml to ensure that all the services share a common configuration.

In this release, the only exception is Logging, which is best configured via the appsettings.json file in C:\Program Files\Meridium\OTConnect\Conductor.

### Adapter

As Adapters are typically installed on an OT Connect Process Data Server without other APM services, they do not require the MeridiumAppSettings.xml file. However, if that file is present, any settings in it will be used by all installed Adapters by default.

**Note:** It is recommended that Adapters are installed on a server that does not include the `C:\ProgramData\Meridium` directory, so that their configuration and logging can be kept isolated, simplifying troubleshooting of an individual OT Source and Adapter.

Typically all the settings will be configured within C:\Program Files\Meridium\OTConnect\Adapter \<SourceName>, including Logging.

An OT Connect Adapter Service needs to connect to ActiveMQ and Redis, and identify itself to APM:

**Table 1: Adapter**

| Field | Description | Default | Example | Required? |
|---|---|---|---|---|
| TenantId | Datasource Id | - | V4060000_QA | Yes |
| OtSource.Name | Name of the Source; must be unique across the tenant and exactly match the OT Source Name configured in APM. | - | Source T1002 | Yes |
| OtSource.FolderFilters | List of folders on the Historian that should not be searched for tags. | - | %OSI | No |
| OtSource.HDAReadings DateRangeInDays | Number of days that the Historian should go back in time to gather readings. | 1461 | 900 | No |
| OtSource.ReadingAcces sType | Indicates how the adapter should get reading data from the Historian, using aggregates or raw data. | Aggregate | Raw | No |
| OtSource.AggregationTy pe | Aggregation that should be used. i.e. (Average, Minimum, Maximum, Last. | Last | Average | No |
| OtSource.MaxReadingR awValues | Number of readings that should be considered when calculating the aggregate for raw readings. | 10000 | 10 | No |

**Table 2: MessageBus.QueueOptions**

| Field | Description | Default | Example | Required? |
|---|---|---|---|---|
| ActiveMqHost | IP or hostname of ActiveMQ broker | - | Myappserver | Yes |
| ActiveMqPort | Port the ActiveMQ broker is listening on | - | 61616 | Yes |
| Username | Username for ActiveMQ | - | Admin | Yes |
| Password | Password for ActiveMQ user | - | P@55w0rd | Yes |

| Field | Description | Default | Example | Required? |
|---|---|---|---|---|
| FailoverHosts | Array of ActiveMqHosts to use for failover in a clustered environment | - | ["myappserver1", "myappserver2"] | No |
| MqSslSettings.UseSsl | Use SSL to secure the connection to ActiveMQ | false | true | No |

**Table 3: MessageBus.CacheOptions**

| Field | Description | Default | Example | Required? |
|---|---|---|---|---|
| Host | IP or hostname of the Redis server | localhost | myappserver | Yes |
| Port | Port the Redis server is listening on | 6379 | 6379 | No |
| Password | Password for Redis | - | P@55w0rd | No |
| ConnectionTimeout | Timeout when opening a connection | 3000 | 3000 | No |
| SyncTimeout[WS1] | Timeout for Redis operations- when working with large data, it's recommended to increase this value | 500 | 15000 | No |
| Ssl | Use SSL to secure the connection to Redis | false | true | No |

**Example**

```
"Adapter": {
    "TenantId": "V4060000_QA",
    "OtSource": {
      "Name": "Source T1002",
      "HDAReadingsDateRangeInDays": 900,
      "ReadingAccessType": "Raw",
      "AggregationType": "Average",
      "MaxReadingRawValues": 10,
      "FolderFilters": [
      "%OSI",
      "%OSI_MCN"
      ]
    }
  },
 "MessageBus": {
    "QueueOptions": {
      "ActiveMqHost": "App Server hostname or IP",
      "ActiveMqPort": 61616,
      "Username": "admin",
      "Password": "admin"
    },
    "CacheOptions": {
      "Host": "App Server hostname or IP",
      "SyncTimeout": 15000
```

```
        }
    }
```

# Working with Logging

## Working with Logging

By default, APM OT Connect services will log all WARN level messages to a logfile corresponding to that service.

If you need more detailed or targeted logs, you can add any number of blocks to the Logging array in appsettings.json.

**Table 4: Logging**

| Field | Description | Default | Example | Required? |
|-------|-------------|---------|---------|-----------|
| Pattern | Wildcard pattern corresponding to the subcomponent being troubleshot | * | APM.Messagbus.* | No |
| LoggingLevel | Standard logging level to capture in the target log | Warn | Debug | No |
| LoggingMode | Log in human-readable Text, machine readable Json, or All(in separate files) | All | Text | No |

**Example**

```
"Logging": [
    {
        "Pattern": "*",
        "LoggingLevel": "Debug",
        "LoggingMode": "All"

    }
]
```

# Working with the OT Source Capability Utility

## Working with the OT Source Capability Utility

The OT Source Capability Utility provides the option of interrogating a Process Historian or OPC Server to ensure it is available and determine which Capabilities it can support.

The OT Source Capability Utility is run from the command line, using the same executable as the OT Connect Adapter Service, but different configuration options. It will ignore all MessageBus and APM settings, and will not attempt to make any connection to APM.

1. Open `C:\Program Files\Meridium\Services\OTConnect\Adapters\{name}\appsettings.json` in a text editor, and configure it to connect to the process historian or OPC server you wish to investigate.

2. Open a Command Prompt, and invoke `C:\Program Files\Meridium\Services\OTConnect\Adapters\{name}\APM.OTConnect.Adapter.exe check`.

   **Note:** If you are connecting to an OPC-HDA server, you must ensure that the command prompt is running in the same user as that of the OPC-HDA server.

3. Review the report

```
2020-03-12 14:47:22.8892|WARN|APM.OTConnect.BusinessLogic.Adapter.Checker|{
   "SupportedCapabilities": "LastReading, StartToEndReadings, SubscribeReadings",
   "Details": {
     "ForTestTag": "\\\\ROADEVICEVM5\\MINUTE.Simulation00001",
     "TagMetadata": {
       "Name": "\\\\ROADEVICEVM5\\MINUTE.Simulation00001",
       "DataType": "String",
       "Description": "random string",
       "RawUoM": null
     },
     "LastReading": {
       "Value": "ABCDE",
       "DateTime": "2020-03-12T18:47:21Z",
       "IsGoodQuality": true
     },
     "ReadingsStartEndCount": 1783,
     "ReadingsBeforeEndCount": 0
   },
   "DoesNotSupport": "BeforeEndReadings"
}
```

This report shows that we have successfully connected to the configured OPC-HDA server, and received both metadata and Readings for the provided TestTag.

This server supports all available OPC-HDA Capabilities.

Another use case for the OT Source Capability Utility is to run it without providing ProtocolConnection, in order to discover what ProgIds are available. Some of the examples are listed below:

**Found Local Historical Data Access 1.XX Servers:**

**Proficy.Historian.HDA**

**OSI.HDA.1**

**OT Source Capability Utility configuration**

All the settings to run the Adapter in Capability Utility mode are contained within the Adapter block.

Note that, as the Utility does not connect to APM, only the fields below are used. Any other fields will be ignored.

**Table 5: Adapter**

| Field | Description | Default | Example | Required? |
|---|---|---|---|---|
| OtSource.Type | Type of the ProtocolAdapter to test with. | - | OpcHda | Yes |
| OtSource. ProtocolConnection | ProtocolAdapter specific configuration | - | "ProgId": "Proficy.Historian.HDA" | Yes |
| TestTag | Exact name of a Tag in the Process Historian to test against | - | SERVERNAME.Simulatio n00001 | No |

For example,

```
{
  "Adapter": {
    "OtSource": {
      "Type": "OpcHda",
      "ProtocolConnection": {
        "ProgId": "Proficy.Historian.HDA"
      }
    },
    "TestTag": "FIFTEENMIN.Simulation00001"
  }
}
```

# Working with Protocol Adapters

## About the Protocol Adapters

The APM OT Connect Adapter Service can support several different Protocol Adapter modules, depending on the configuration of the corresponding OT Source. These Protocol Adapters are used to connect to a specific Process Historian or a server that complies with an OPC specification.

The OT Connect Adapter Service will configure and start the Protocol Adapter matching the Type and Protocol Connection parameters configured on the OT Source on the following:

- Service Start
- When the OT Source is reconfigured

### Capabilities

Different Protocol Adapters, and even in some cases different implementations or versions of a Process Historian or OPC Server can support a variety of different capabilities when querying or subscribing to data.

The supported capabilities are listed on the table below:

| Name | Supported action |
|---|---|
| LastReading | Query the OT Source for the last good Reading for a Tag. |
| StartToEndReadings | Query the OT Source for all Readings between a Start and End time. |
| SubscribeReadings | Establish a subscription to new Readings for a Tag, which can be used to update Health Indicators or trigger Policy Instances unsolicited. |
| BeforeEndReadings | Query the OT Source for a specified number of readings before an End time. |
| SubscribeReadings | Subscribe to a Tag for updated Readings with a new Timestamp or Value. |

The Capabilities of an OT Source are reported as part of the Connection Status.

# Simulation

The Simulation Protocol Adapter is provided for testing and exploration. Rather than connecting to an actual process historian, it provides simulated tag metadata and Readings for all Capabilities.

*ProtocolConnection*

The Simulation Protocol Adapter is not configurable.

# OPC-HDA

The OPC-HDA Protocol Adapter can connect to an OPC Classic HDA 1.20 server.

**Important:** The OPC-HDA Protocol Adapter does not support remote connections. The OPC-HDA server must be installed on the same server, preferably running under the same user account as the Adapter Service.

Vendors have implemented different elements of the specification, so it is important to review the Connection Status or **OT Source Capability Utility** report to understand what Capabilities are available from the server you want to integrate with APM.

A fully supported OPC server can provide the following:

- LastReading
- SubscribeReadings
- GetStartEndReadings

*ProtocolConnection*

The OPC-HDA ProtocolAdapter requires the **ProgId** to be configured.

If the correct ProgId is not provided, the ProtocolAdapter will log an exception report on all available OPC-HDA ProgIds on the server on startup.

Optionally, the **BatchSize** can be configured to support OPC-HDA servers with an unusually low or high limit to the number of records that can be returned for a single request.

**Note:** Decrease this setting if you observe E_MAXEXCEEDED OPC Errors when viewing the trend charts or when running the OT Source Capability Utility. The default value is used as 10,000, if the **BatchSize** is set to 0.

# OSI PI

The OSI PI protocol adapter can connect to PI Server 2010 and later, using the Asset Framework (AF) protocol. This allows OT Connect to support PI without an intervening OPC server. OSI PI protocol adapter requires the PI AF Client to be installed on the OT Connect Process Data server. The AF protocol offers improved security, performance, and reliability. Therefore, it is recommended to use this adapter to connect to the OSI PI servers.

The OSI PI protocol adapter offers the following Capabilities:

- LastReading
- SubscribeReadings
- GetStartEndReadings
- GetBeforeEndReadings

### Configure the OSI PI Protocol Adapter

1. Install PI AF Client. For information on installing the PI AF client, refer to the OSIsoft documentation.
2. Configure the OT Source.

**Table 6: Connection Details**

| Host Name | Hostname or the FQDN of the target server. The host name must exactly match with the name that is configured in the System Explorer. |
|---|---|
| User Name | Windows user configured with a PI mapping. |
| Password | Windows password. |

# Proficy Historian

The Proficy Historian Protocol Adapter can connect to Proficy Historian 4.0 and later through the Client Access API. This allows OT Connect to support the Proficy Historian without an intervening OPC server. It requires the Client Access Assemblies to be installed on the OT Connect Process Data server.

It is recommended to use this adapter to connect to the Proficy Historian servers whenever possible, as the Client Access API offers improved security, performance, and reliability.

The Proficy Historian Protocol Adapter offers the following Capabilities:

- LastReading
- SubscribeReadings
- GetStartEndReadings
- GetBeforeEndReadings

**Note:** Health Indicators, Triggered Policies, and Last Reading are only supported on Proficy Historian through the Proficy Historian Protocol adapter. These capabilities are not available through OPC.

### Configure the Proficy Historian Protocol Adapter

1. Install the Historian Client Tools by selecting the Client Access Assemblies. For information on installing the Historian Client Tools, refer to the Proficy Historian documentation. Other features are not required and the Historian Data Archiver can be on another server.
2. Configure the OT Source.

**Table 7: Connection Details**

| Host Name | Hostname or FQDN of the target server. The host name must match exactly with the name that was provided when installing the target historian. |
|---|---|
| User Name | Windows user with iH Readers membership on the Process Historian server. |
| Password | Windows password. |

# OPC-DA

The OPC-DA Protocol Adapter can connect to OPC Classic DA 3.0 servers

**Important:** The OPC-DA Protocol Adapter does not support remote connections. The OPC-DA server must be installed on the same server, preferably running under the same user account as the Adapter Service.

**Note:**

While some OPC-DA 2.0 – 2.05a servers are forward compatible, and the OT Connect OPC-DA ProtocolAdapter can work with them, this varies between vendors, and is not guaranteed.

Only OPC 3.0 servers are officially supported by OT Connect.

The OSI Pi OPC-DA Server is an example of a 2.05a server that is not compatible with OT Connect.

Vendors have implemented different elements of the specification. So, it is important to review the Connection Status or **OT Source Capability Utility** report to understand what Capabilities are available from the server that you want to integrate with APM.

For OPC-DA, the most common limitation is properties, such as Description or RawUom not being available for Tag Sync, which will complete with only the Tag Name and DataType.

An OPC-DA server can provide the following capabilities:

*   LastReading
*   SubscribeReadings

*ProtocolConnection*

The OPC-DA ProtocolAdapter requires the **ProgId** to be configured.

If the correct ProgId is not provided, the ProtocolAdapter will log an exception report on all available OPC-DA ProgIds on the server on startup.

# Chapter

# 7

**Glossary**

**Topics:**

# Glossary

| Term | Definition |
| --- | --- |
| APM OT Connect Conductor | Service to manage Adapters & execute Source Tag and Subscription Syncs |
| APM OT Connect Adapter | Adapter translates supported Client protocols to the OT Connect Redis/ActiveMQ based transports |
| Protocol Adapter | The Component within the APM OT Connect Adapter that allows it to communicate with a specific OT protocol, such as OPC-HDA Classic |
| Process Historian | Specialized databases used for recording real-time process data, such as temperature or pressure.<br><br>EX: OSI Pi, Honeywell PHD, Proficy Historian |
| OPC Server | OPC Classic service allowing standards-based access to a Process Historian |
| OT Connect Process Data Server | A Windows Server with both OPC Server(s) and APM OT Connect OT Connect Adapter Service(s) are installed, allowing APM to communicate with on or more Process Historians |
| OT Source | An APM Record representing a Process Historian |
| Source Tag | Tag from a Process Historian |
| Content Map | Relationship between Source Tag and (consumer and/or asset), with properties. modeled as an Entity Family |
| Reading | Time series style point of data for a tag (timestamp, value, quality) |