OPC UA Client Driver

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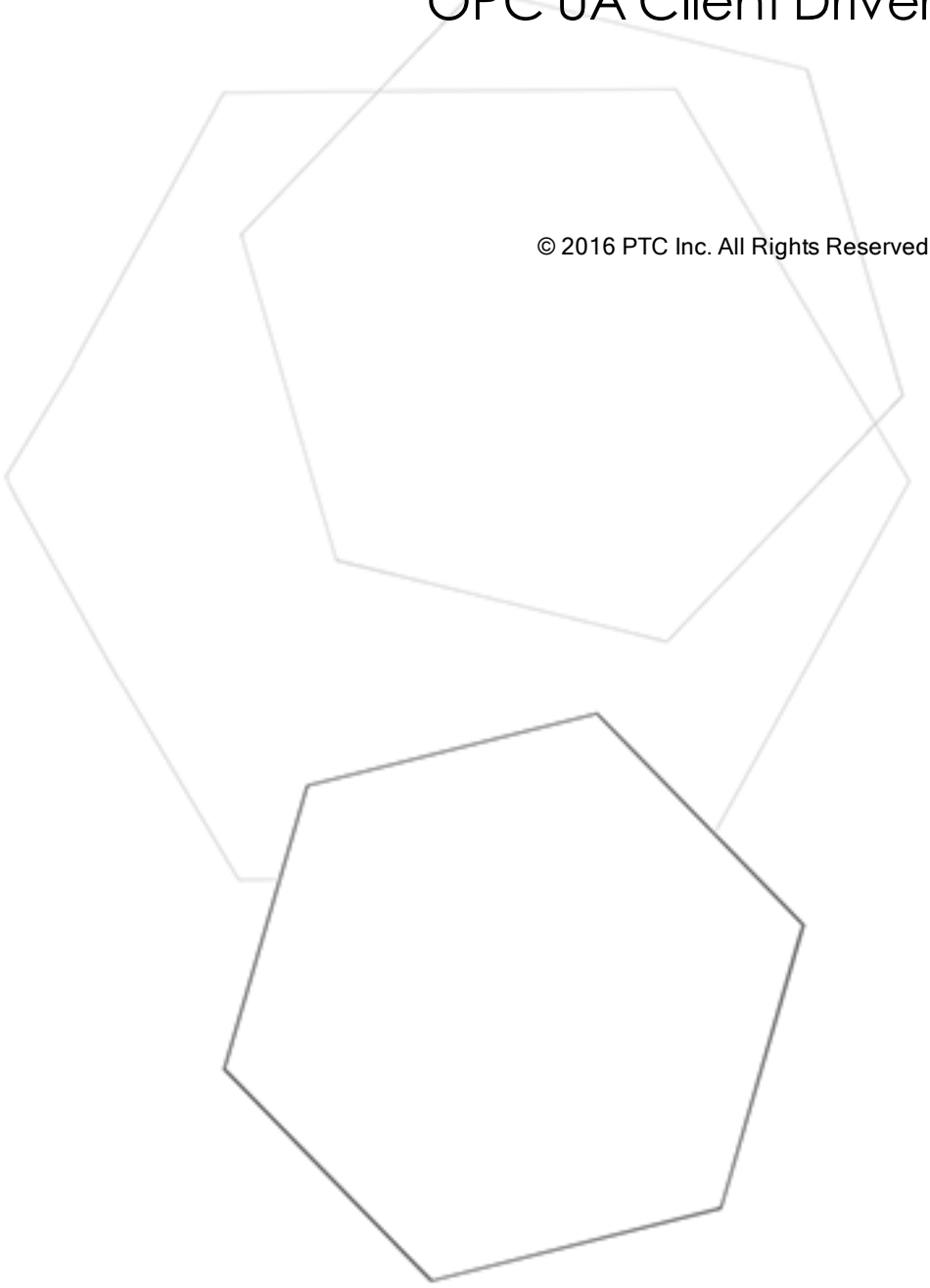

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OPC UA Client Driver

Help version 1.043

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Overview

The OPC UA Client Driver acts as a tunneling solution between servers, connecting two OPC servers on the same network, through VPNs, or over the internet. It supports OPC Unified Architecture (UA) specification, a technology that expands upon OPC Data Access. OPC UA provides plug-and-play capabilities without DCOM configuration and also provides secure and reliable connections between OPC servers.

For more information on OPC UA, refer to the OPC UA Configuration Manager help file.

Profiles

OPC UA is a multi-part specification that defines a number of services and information models referred to as features. Features are grouped into Profiles, which are then used to describe the functionality supported by a UA server or client.

For a full list and a description of each OPC UA profile, refer to http://www.opcfoundation.org/profilereporting/index.htm.

Fully Supported OPC UA Profiles

- AddressSpace Lookup Client Facet
- Attribute Read Client Facet
- Attribute Write Client Facet
- Core Client Facet
- DataAccess Client Facet
- Discovery Client Facet
- UA-TCP UA-SC UA Binary
- SecurityPolicy - Basic128Rsa15
- SecurityPolicy - Basic256
- SecurityPolicy - None

Partially Supported OPC UA Profiles

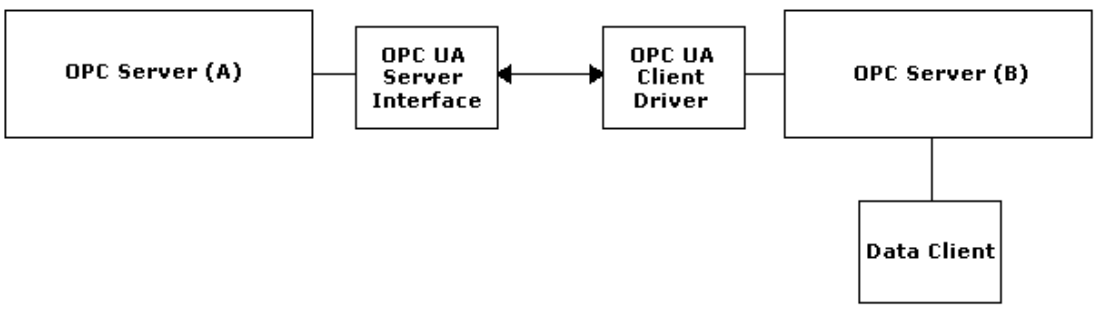
- Base Client Behavior Facet. This profile does not support 'Security Administrator - XML Schema'.
- DataChange Subscriber Client Facet. This profile does not support 'Monitor Client by Index'.

Tunneling

The OPC UA Client Driver creates a tunnel between two OPC servers. For example, imagine that there is an OPC Server A and OPC Server B. To create a tunnel, users would create an OPC UA Client Driver channel on OPC Server B and configure that channel to connect to the OPC UA server interface running on OPC Server A. Once a Data Client is connected to OPC Server B, a tunnel exists between the two OPC servers. Although the data client may not be able to receive data from OPC Server A on its own, it can receive the data with the help of the driver.

Note: The OPC UA Client Driver supports security through the use of certificates. When security is enabled, all information exchanged between the OPC server and driver is protected.

For more information, refer to Certificate Model.



Channel Setup

A channel represents a connection between the OPC UA Client Driver and an OPC UA server. Its properties are first set during channel creation and may be accessed later by clicking **Channel | Properties...**. The groups of properties are described in greater detail on each of the following pages.

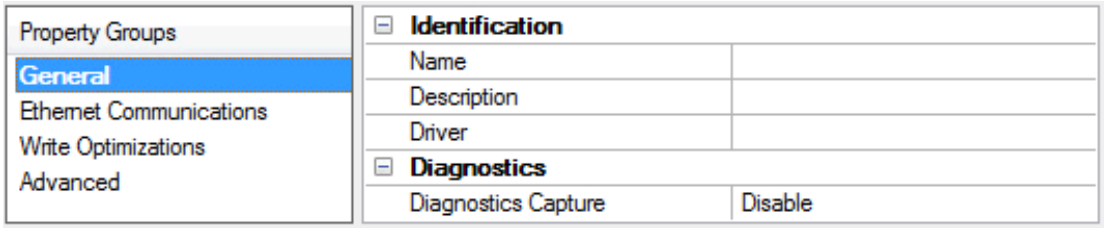
General
Write Optimization
Advanced
UA Server
UA Session
Authentication

Maximum Number of Channels

The maximum number of channels supported by this driver is 128.

Channel Properties - General

This server supports the use of simultaneous multiple communications drivers. Each protocol or driver used in a server project is called a channel. A server project may consist of many channels with the same communications driver or with unique communications drivers. A channel acts as the basic building block of an OPC link. This group is used to specify general channel properties, such as the identification attributes and operating mode.



Identification

Name: User-defined identity of this channel. In each server project, each channel name must be unique. Although names can be up to 256 characters, some client applications have a limited display window when browsing the OPC server's tag space. The channel name is part of the OPC browser information.
For information on reserved characters, refer to "How To... Properly Name a Channel, Device, Tag, and Tag Group" in the server help.

Description: User-defined information about this channel.
Many of these properties, including Description, have an associated system tag.

Driver: Selected protocol / driver for this channel. This property specifies the device driver that was selected during channel creation. It is a disabled setting in the channel properties.

Note: With the server's online full-time operation, these properties can be changed at any time. This includes changing the channel name to prevent clients from registering data with the server. If a client has already acquired an item from the server before the channel name is changed, the items are unaffected. If, after the channel name has been changed, the client application releases the item and attempts to re-acquire using the old channel name, the item is not accepted. With this in mind, changes to the properties should not be made once a large client application has been developed. Utilize the User Manager to prevent operators from changing properties and restrict access rights to server features.

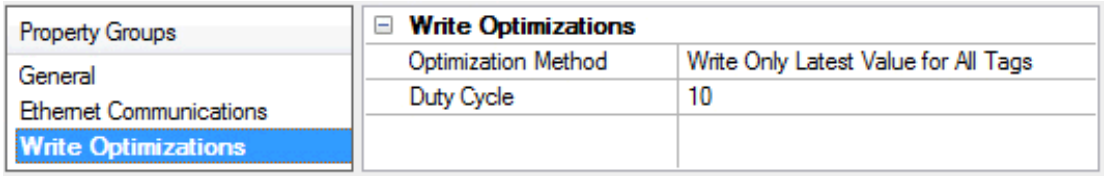
Diagnostics

Diagnostics Capture: When enabled, this option makes the channel's diagnostic information available to OPC applications. Because the server's diagnostic features require a minimal amount of overhead processing, it is recommended that they be utilized when needed and disabled when not. The default is disabled.

For more information, refer to "Communication Diagnostics" in the server help.
Not all drivers support diagnostics. To determine whether diagnostics are available for a particular driver, open the driver information and locate the "Supports device level diagnostics" statement.

Channel Properties - Write Optimizations

As with any OPC server, writing data to the device may be the application's most important aspect. The server intends to ensure that the data written from the client application gets to the device on time. Given this goal, the server provides optimization properties that can be used to meet specific needs or improve application responsiveness.



Write Optimizations

Optimization Method: controls how write data is passed to the underlying communications driver. The options are:

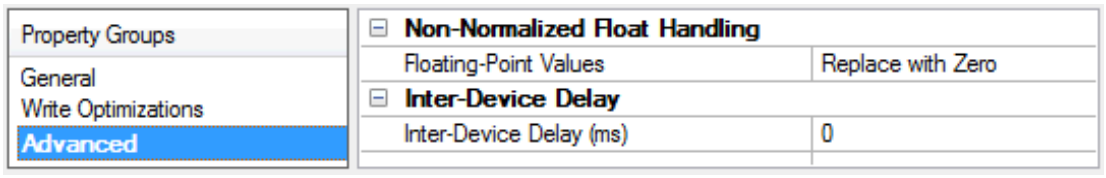
- **Write All Values for All Tags**: This option forces the server to attempt to write every value to the controller. In this mode, the server continues to gather write requests and add them to the server's internal write queue. The server processes the write queue and attempts to empty it by writing data to the device as quickly as possible. This mode ensures that everything written from the client applications is sent to the target device. This mode should be selected if the write operation order or the write item's content must uniquely be seen at the target device.
- **Write Only Latest Value for Non-Boolean Tags**: Many consecutive writes to the same value can accumulate in the write queue due to the time required to actually send the data to the device. If the server updates a write value that has already been placed in the write queue, far fewer writes are needed to reach the same final output value. In this way, no extra writes accumulate in the server's queue. When the user stops moving the slide switch, the value in the device is at the correct value at virtually the same time. As the mode states, any value that is not a Boolean value is updated in the server's internal write queue and sent to the device at the next possible opportunity. This can greatly improve the application performance.
  Note: This option does not attempt to optimize writes to Boolean values. It allows users to optimize the operation of HMI data without causing problems with Boolean operations, such as a momentary push button.
- **Write Only Latest Value for All Tags**: This option takes the theory behind the second optimization mode and applies it to all tags. It is especially useful if the application only needs to send the latest value to the device. This mode optimizes all writes by updating the tags currently in the write queue before they are sent. This is the default mode.

Duty Cycle: is used to control the ratio of write to read operations. The ratio is always based on one read for every one to ten writes. The duty cycle is set to ten by default, meaning that ten writes occur for each read operation. Although the application is performing a large number of continuous writes, it must be ensured that read data is still given time to process. A setting of one results in one read operation for every write operation. If there are no write operations to perform, reads are processed continuously. This allows optimization for applications with continuous writes versus a more balanced back and forth data flow.

Note: It is recommended that the application be characterized for compatibility with the write optimization enhancements before being used in a production environment.

Channel Properties - Advanced

This group is used to specify advanced channel properties. Not all drivers support all properties; so the Advanced group does not appear for those devices.



Non-Normalized Float Handling: Non-normalized float handling allows users to specify how a driver handles non-normalized IEEE-754 floating point data. A non-normalized value is defined as Infinity, Not-a-Number (NaN), or as a Denormalized Number. The default is Replace with Zero. Drivers that have native float handling may default to Unmodified. Descriptions of the options are as follows:

- **Replace with Zero**: This option allows a driver to replace non-normalized IEEE-754 floating point values with zero before being transferred to clients.
- **Unmodified**: This option allows a driver to transfer IEEE-754 denormalized, normalized, non-number, and infinity values to clients without any conversion or changes.

Note: This property is disabled if the driver does not support floating point values or if it only supports the option that is displayed. According to the channel's float normalization setting, only real-time driver tags (such as values and arrays) are subject to float normalization. For example, EFM data is not affected by this setting.lin

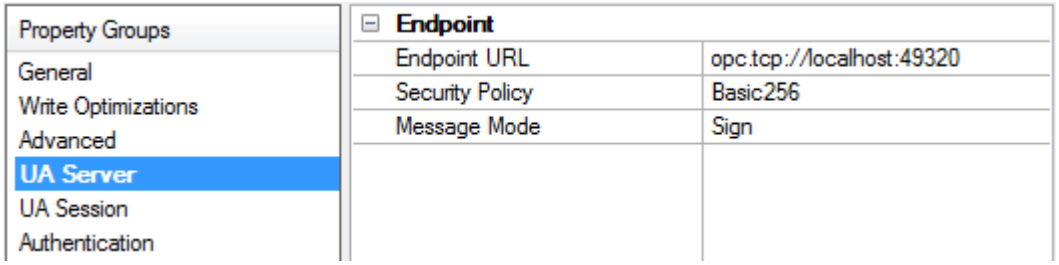
For more information on the floating point values, refer to "How To ... Work with Non-Normalized Floating Point Values" in the server help.

Inter-Device Delay: Specify the amount of time the communications channel waits to send new requests to the next device after data is received from the current device on the same channel. Zero (0) disables the delay.

Note: This property is not available for all drivers, models, and dependent settings.

UA Server

The UA Server properties specify the UA server endpoint to which the OPC UA Client Driver connects. OPC UA servers can have one or more UA endpoints, each of which is hosted on a different port or contains a different set of security options.



Endpoint URL: This property specifies the endpoint's URL. Each endpoint has a unique URL. To locate a URL, click **...** to invoke the OPC UA Server Browser. The browser returns the selected endpoint's URL, Security Policy, and Message Mode.
Note: It is not possible to browse for OPC UA Endpoints when connecting across the internet or multiple domains. For remote connections, the endpoint must be entered manually. To do so, users need the endpoint type ("opc.tcp"), the endpoint host name (IP address, URL, or DSN), and the endpoint's port number.

Security Policy: This property specifies the endpoint's security policy. There are three options: **Basic128Rsa15**, **Basic256**, and **None**. The default is Basic256. When the other options are chosen, the connection requires that the OPC UA Client Driver and the UA Server swap certificates. For more information, refer to Certificate Model.

Message Mode: This property specifies the mode of encryption to use when messages between the driver and server are sent. There are three options: **None**, **Sign**, and **SignAndEncrypt**. The default is Sign. Descriptions of the options are as follows:

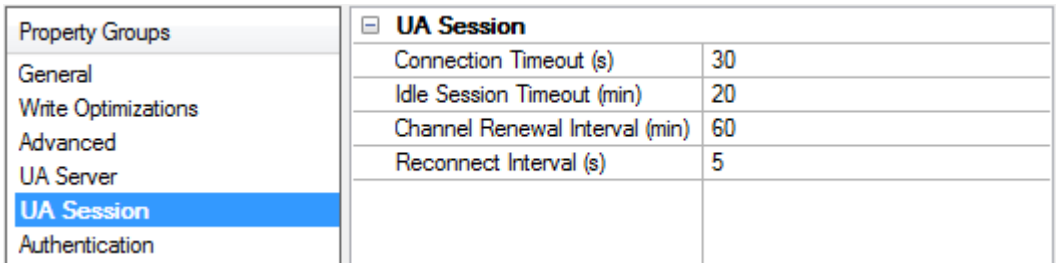
- **None**: This mode is the least secure, but is also the fastest.
- **Sign**: This mode is more secure but can slow down communications. When used, a checksum is added to the end of the message to ensure that the contents arrive clear and unaltered.

- **SignAndEncrypt**: This mode is more secure but can slow down communications. When used, a checksum that has been encrypted using the encryption method selected in Security Policy is added to the end of the message to ensure that the contents arrive clear and unaltered.

Note: UA endpoints support pairs of security policies and message modes. For example, a server might support a security policy None and a message mode of None in order to form a 'None, None' pair. Likewise, an endpoint might support a 'Basic128Rsa15, SignAndEncrypt' pair. When configuring the Security Policy and Message Mode, make sure that the UA endpoint supports the pair.

UA Session

The UA Session group is used to configure connection timeouts and retry intervals settings.



Connection Timeout: Specifies the maximum amount of time that the channel waits to successfully connect after making a connect call. A shorter timeout makes the application more responsive; a longer timeout gives the channel a better chance of connecting. The valid range is 1 to 30. The default is 30 seconds.

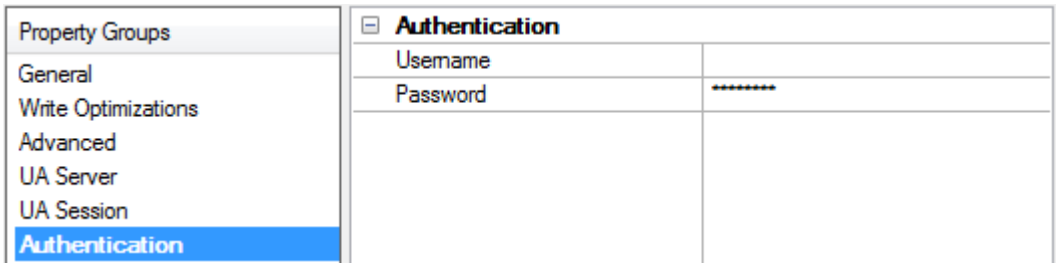
Idle Session Timeout: Specifies the maximum number of minutes a session remains open without activity. If the client fails to issue a request within this interval, the server automatically terminates the connection. The valid range is 1 to 20. The default is 20 minutes.

Channel Renewal Interval: Specifies the time period between channel renewals in minutes. The driver automatically renews the security of the channel after 75% of this time expires. Decreasing this time makes the channel / connection more secure, but it may also slow the transfer of information. The valid range is 10 to 60. The default is 60 minutes.

Reconnect Interval: Specifies the rate at which the channel attempts to reconnect if it either fails to connect or becomes disconnected. The valid range is 5 to 600. The default is 5 seconds.

Authentication

OPC UA supports user authentication for increased security. The Authentication properties set a valid **Username** and **Password**, which are required for certain OPC UA endpoints.



Device Setup

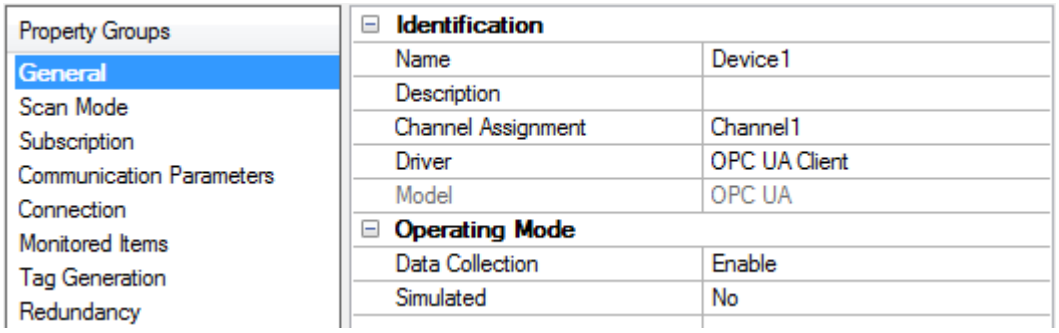
A device is equivalent to an OPC UA subscription: it subscribes to specified OPC UA items/tags and receives data. Its properties are first set during the Device Wizard and may be accessed later by clicking **Device | Properties...**. For more information on a specific property group, select a link from the list below.

General - Operating Mode
General - Identity
Scan Mode
Subscription
Communications Parameters
Connection
Monitored Items
Tag Generation
Redundancy

Maximum Number of Devices

The maximum number of devices supported by this driver is 256 per channel.

Device Properties - Operating Mode



Data Collection: This property controls the device's active state. Although device communications are enabled by default, this property can be used to disable a physical device. Communications are not attempted when a device is disabled. From a client standpoint, the data is marked as invalid and write operations are not accepted. This property can be changed at any time through this property or the device system tags.

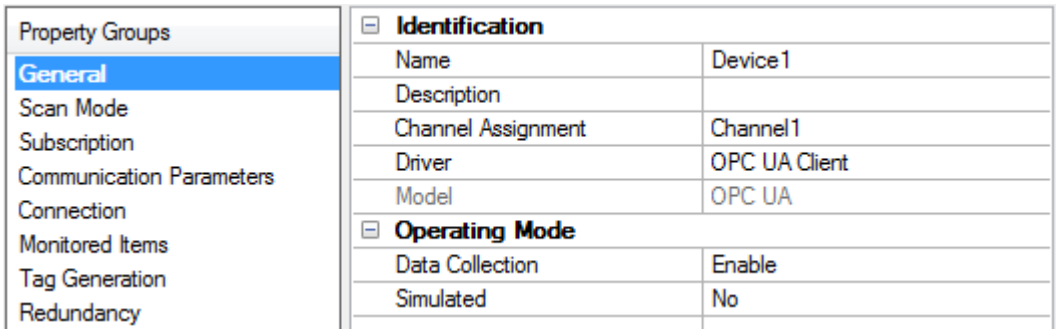
Simulated: This option places the device into Simulation Mode. In this mode, the driver does not attempt to communicate with the physical device, but the server continues to return valid OPC data. Simulated stops physical communications with the device, but allows OPC data to be returned to the OPC client as valid data. While in Simulation Mode, the server treats all device data as reflective: whatever is written to the simulated device is read back and each OPC item is treated individually. The item's memory map is based on the group Update Rate. The data is not saved if the server removes the item (such as when the server is reinitialized). The default is No.

Notes:

1. This System tag (_Simulated) is read only and cannot be written to for runtime protection. The System tag allows this property to be monitored from the client.
2. In Simulation mode, the item's memory map is based on client update rate(s) (Group Update Rate for OPC clients or Scan Rate for native and DDE interfaces). This means that two clients that reference the same item with different update rates return different data.

Simulation Mode is for test and simulation purposes only. It should never be used in a production environment.

Device Properties - Identification



Name: User-defined identity of this device.

Description: User-defined information about this device.

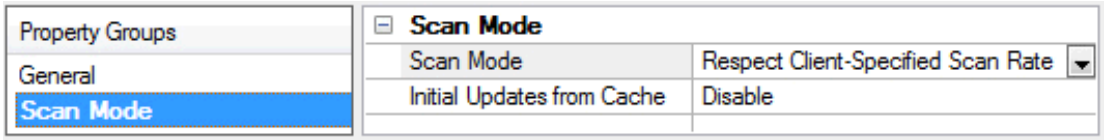
Channel Assignment: User-defined name of the channel to which this device currently belongs.

Driver: Selected protocol driver for this device.

Model: The specific version of the device.

Device Properties - Scan Mode

The Scan Mode specifies the subscribed-client requested scan rate for tags that require device communications. Synchronous and asynchronous device reads and writes are processed as soon as possible; unaffected by the Scan Mode properties.



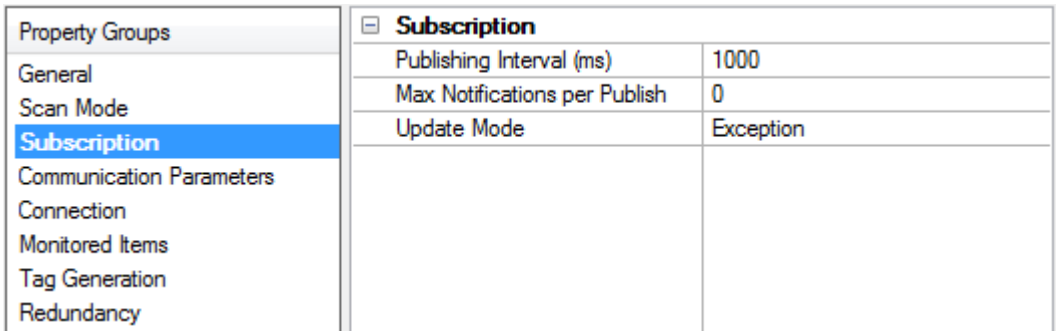
Scan Mode: specifies how tags in the device are scanned for updates sent to subscribed clients. Descriptions of the options are:

- **Respect Client-Specified Scan Rate**: This mode uses the scan rate requested by the client.
- **Request Data No Faster than Scan Rate**: This mode specifies the maximum scan rate to be used. The valid range is 10 to 99999990 milliseconds. The default is 1000 milliseconds.
  Note: When the server has an active client and items for the device and the scan rate value is increased, the changes take effect immediately. When the scan rate value is decreased, the changes do not take effect until all client applications have been disconnected.
- **Request All Data at Scan Rate**: This mode forces tags to be scanned at the specified rate for subscribed clients. The valid range is 10 to 99999990 milliseconds. The default is 1000 milliseconds.
- **Do Not Scan, Demand Poll Only**: This mode does not periodically poll tags that belong to the device nor perform a read to get an item's initial value once it becomes active. It is the client's responsibility to poll for updates, either by writing to the _DemandPoll tag or by issuing explicit device reads for individual items. *For more information, refer to "Device Demand Poll" in server help.*
- **Respect Tag-Specified Scan Rate**: This mode forces static tags to be scanned at the rate specified in their static configuration tag properties. Dynamic tags are scanned at the client-specified scan rate.

Initial Updates from Cache: When enabled, this option allows the server to provide the first updates for newly activated tag references from stored (cached) data. Cache updates can only be provided when the new item reference shares the same address, scan rate, data type, client access, and scaling properties. A device read is used for the initial update for the first client reference only. The default is disabled; any time a client activates a tag reference the server attempts to read the initial value from the device.

Subscription

The Subscription group is used to configure data updates to be received for monitored items.



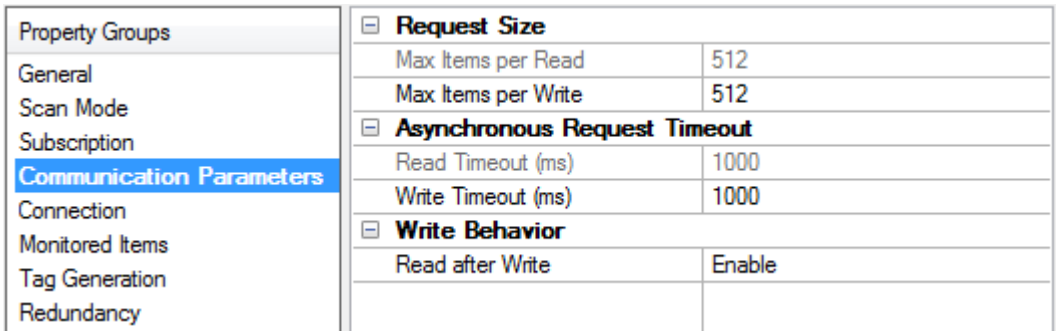
Publishing Interval: Specify the rate, in milliseconds, at which tags are updated by the driver. If the value is not supported by the OPC UA server, the value is negotiated during the connection. The valid range is 100 to 60000. The default is 1000 milliseconds.

Max. Notifications Per Publish: Specify the maximum number of notifications that the server sends to the driver in a single publish response. If the value is too low, the server may drop tag updates if it cannot send them fast enough. A value of 0 means there is no limit. The valid range is 0 to 9,999,999,999. The default is 0.

Update Mode: Select way the subscription is updated. There are two options: **Exception** and **Poll**. In Exception Mode, a subscription tag is updated at the publishing interval if the data changes. In Poll Mode, an asynchronous read is performed on all subscription tags at the rate of the publishing interval. The default is Exception.

Communications Parameters

The Communications Parameters configure the subscription's read/write properties.



Request Size

Max. Items per Read: Specify the maximum number of items per read call to the server. This property is only enabled when the subscription is in Polled mode. Since reads are more efficient when grouped together, this value should be kept as high as possible to decrease read times. The valid range is 1 to 512. The default is 512.

Max. Items per Write: Specify the maximum number of items per write call to the server. Since writes are more efficient when grouped together, this value should be kept as high as possible to decrease write times. The valid range is 1 to 512. The default is 512.

Asynchronous Request Timeout

Read Timeout: Specify the time the server waits for each read call (in milliseconds). Shorter timeouts may cause reads to timeout. Longer timeouts may cause the driver to be less responsive if communication is interrupted. The valid range is 100 to 30000. The default is 1000.

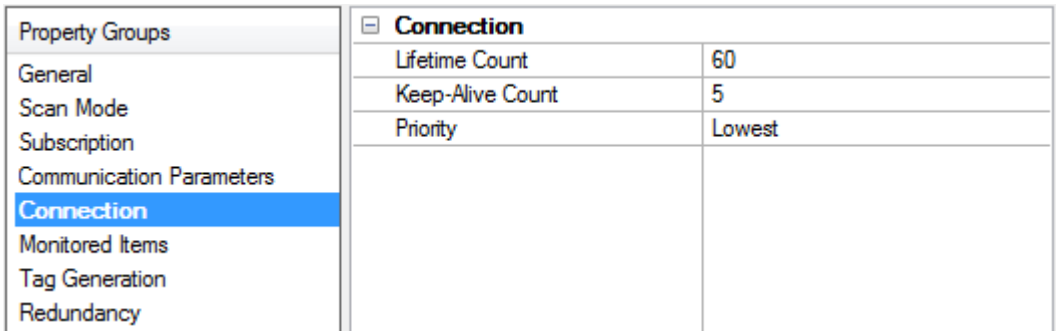
Write Timeout: Specify the time the server waits for each write call (in milliseconds). Shorter timeouts may cause writes to timeout. Longer timeouts may cause the driver to be less responsive if communication is interrupted. The valid range is 100 to 30000. The default is 1000.

Write Behavior

Read after Write: Choose Enable to force an explicit read after a write command (to confirm the new value). Choose Disable to update after the next publish or poll response. The default is Enable.

Connection

The Connection group configures subscription timeout and keep-alive properties.



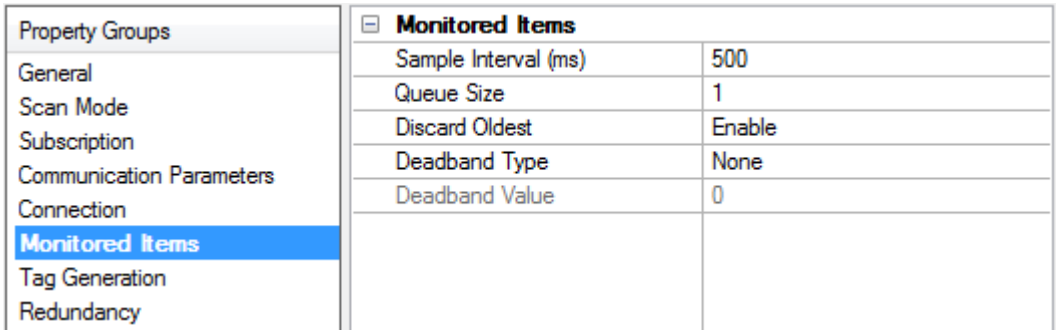
Lifetime Count: Specify how many times the publishing interval can expire without the OPC UA Client Driver sending data updates or keep alive messages before the server deletes the subscription. The larger the lifetime count, the longer the subscription remains running if communication is interrupted. The valid range is 3 to 300. The default is 60.

Keep-Alive Count: Specify the number of publishing intervals that must expire before a keep-alive message is sent. The valid range is 1 to 10. The default is 5.
Note: Smaller Keep-Alive Counts increase the amount of communication during periods when little data is transferred between the OPC UA Client Driver and UA server. Larger Keep-Alive Counts decrease the amount of communication during these periods but also make the driver less responsive when the connection is interrupted.

Priority: Select the relative priority of the subscription. When more than one subscription needs to send notifications, the OPC UA Server sends data from the subscription with the highest priority first. Applications that do not require special priority should be set to the lowest priority possible. The default is lowest.

Monitored Items

Subscriptions contain monitored items, also called tags. The Monitored Items group is used to configure how fast tags are updated as well as how tag updates are handled by the OPC UA server.



Sample Interval: Specify the fastest rate at which the monitored items are updated. A value of -1 defaults the interval to the subscription's Publishing Interval. A value of zero indicates that the OPC UA Server should use the fastest practical rate. The valid range is -1 to 50000. The default is 500 milliseconds, which is half of the default Publishing Interval.

Caution: If data is changing faster than the Publishing Interval, the Sample Interval must be set to half the Publishing Interval. This ensures data updates at the Publishing Interval. For example, if the Publishing Interval is 10000 ms and data is changing every 100 ms, the Sample Interval must be at least 5000 ms. This ensures data updates every 10000 ms.

Queue Size: Specify the number of data updates that the OPC UA Server queues for the subscription. A value of 1 disables queuing. Values greater than 1 enable queuing. The valid range is 1 to 100. The default is 1.

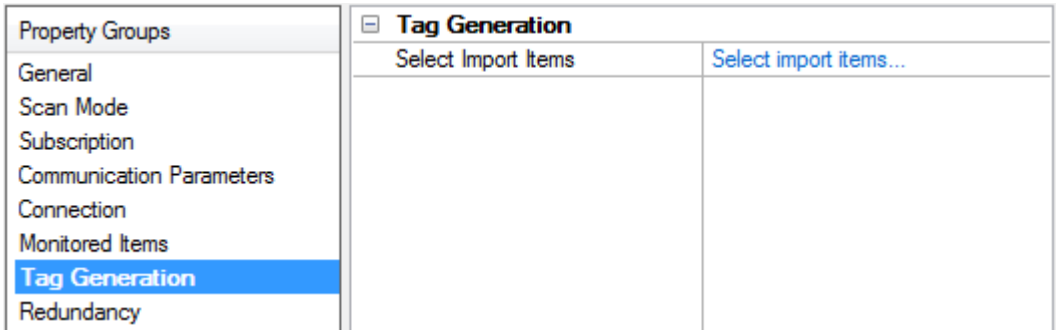
Discard Oldest: Specify the discard policy of the queue. When enabled, the oldest notification in the queue is discarded and is not sent to the driver. When disabled, the newest notification is discarded and not sent to the driver. The default is enabled.
Note: Notifications are only discarded if the queue fills up before the Publishing Interval expires.

Deadband Type: Specify the type of deadband filter to be applied to data changes. There are three options: **None**, **Percent**, and **Absolute**. **None** disabled deadband. **Percent** sends data updates only if the change is larger than a percentage of the maximum range for the tag. **Absolute** sends data updates if the change is greater than a specified value. The valid range is 0 to 9,999,999,999. The default is **None**.

Deadband Value: Specify the value of the deadband. If the Deadband Type is set to Percent, this value is a percentage (such as, 10=10%). If the Deadband Type is set to Absolute, this value is the exact value. The valid range is 0 to 9,999,999,999. The default is 0.

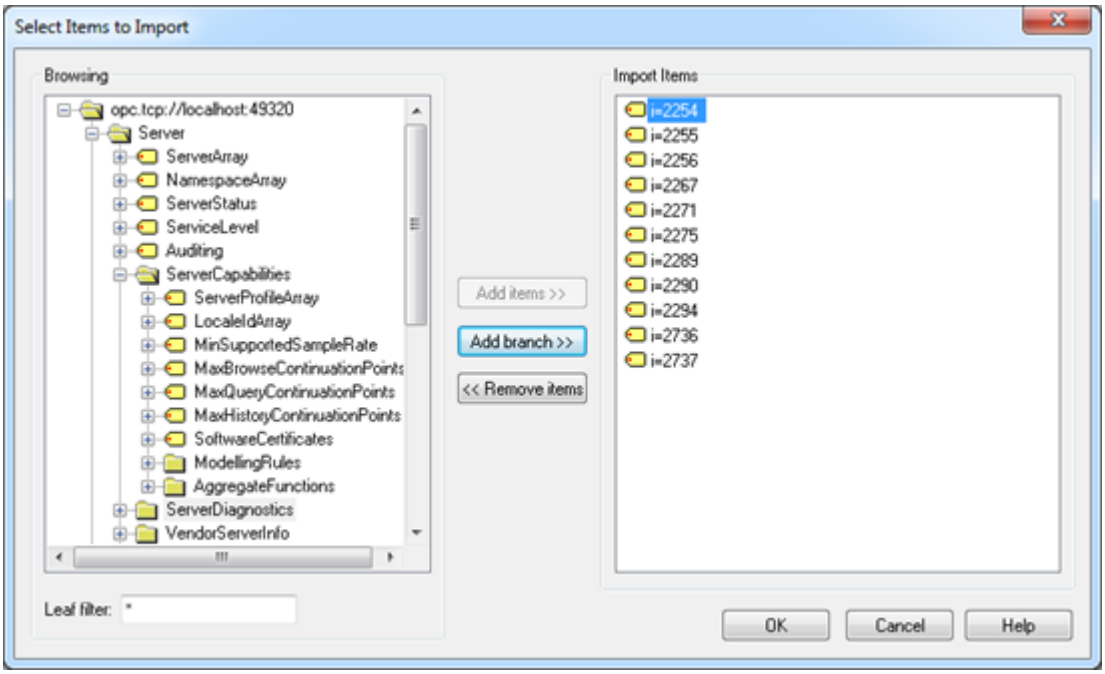
Tag Generation

Import launches a browser through which tags may be imported from the OPC UA Server. Click **Select import items...** to launch the tag browser.



Tag Browser

The OPC UA Tag Browser is used to browse the OPC UA Server that is connected to the parent channel.



Browsing: Provides a tree that represents the OPC UA Server's hierarchy. It includes all OPC UA Server tags and tag groups.

Leaf Filter: Limits the items shown in the Browsing tree to only those that match the filter. For more information on syntax, refer to the table below.

Characters in Pattern	Matches in String
?	Any single character
*	Zero or more characters
#	Any single digit (0-9)
[charlist]	Any single character in charlist
[!charlist]	Any single character not in charlist

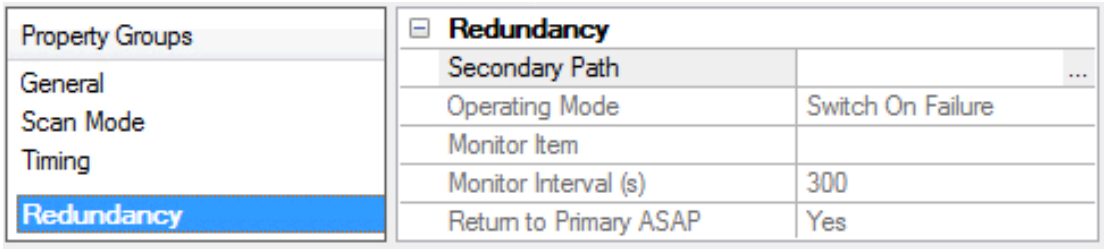
Add Items: Adds the items selected in the Browsing tree to the Import Items list.

Add Branch: Adds all items under the selected branch in the Browsing tree to the Import Items list.

Remove Items: Removes the items selected from the Items list.

Import Items: A list of all the items imported by the device.

Device Properties - Redundancy

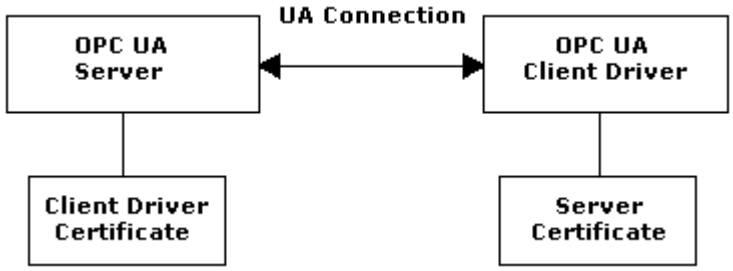


Redundancy is available with the Media-Level Redundancy Plug-in.

Consult the website, a sales representative, or the user manual for more information.

Certificate Model

Certificates are used for any channel whose security policy is set to Basic128Rsa15 or Basic256 to secure connections between the OPC UA Client Driver and OPC UA Servers. To establish a secure UA connection, the OPC UA Client Driver needs access to the OPC UA server certificate. Likewise, the OPC UA server needs access to the OPC UA Client Driver certificate. Their relationship is as displayed in the image below.



Note: The certificate swap must occur before the connection is made. The OPC UA Configuration Manager is a tool used to make certificate swaps between clients and servers easy. For more information on this tool and how to perform swaps, refer to the OPC UA Configuration Manager help file in the Runtime's **Help** | **Contents** menu.

Data Types Description

Data Type	Description
Boolean	Single bit
Byte	Unsigned 8-bit value bit 0 is the low bit bit 7 is the high bit
Char	Signed 8-bit value bit 0 is the low bit bit 6 is the high bit bit 7 is the sign bit
Date	Date YYYY-MM-DDTHH:MM:SS.MMM
Double	64-bit floating point value
DWord	Unsigned 32-bit value bit 0 is the low bit bit 31 is the high bit
Float	32-bit floating point value. The driver interprets two consecutive 16 bit registers as a floating point value by making the second register the high word and the first register the low word.
Long	Signed 32-bit value bit 0 is the low bit bit 30 is the high bit bit 31 is the sign bit
LongLong	Signed 64-bit value bit 0 is the low bit bit 62 is the high bit bit 63 is the sign bit
QWord	Unsigned 64-bit value bit 0 is the low bit bit 63 is the high bit
Word	Unsigned 16-bit value bit 0 is the low bit bit 15 is the high bit
Short	Signed 16-bit value bit 0 is the low bit bit 14 is the high bit bit 15 is the sign bit
String	Zero terminated character array

Address Descriptions

OPC UA Client Driver addresses have the following syntax: *ns=<namespace index>;<type>=<value>*. For more information, refer to the table below.

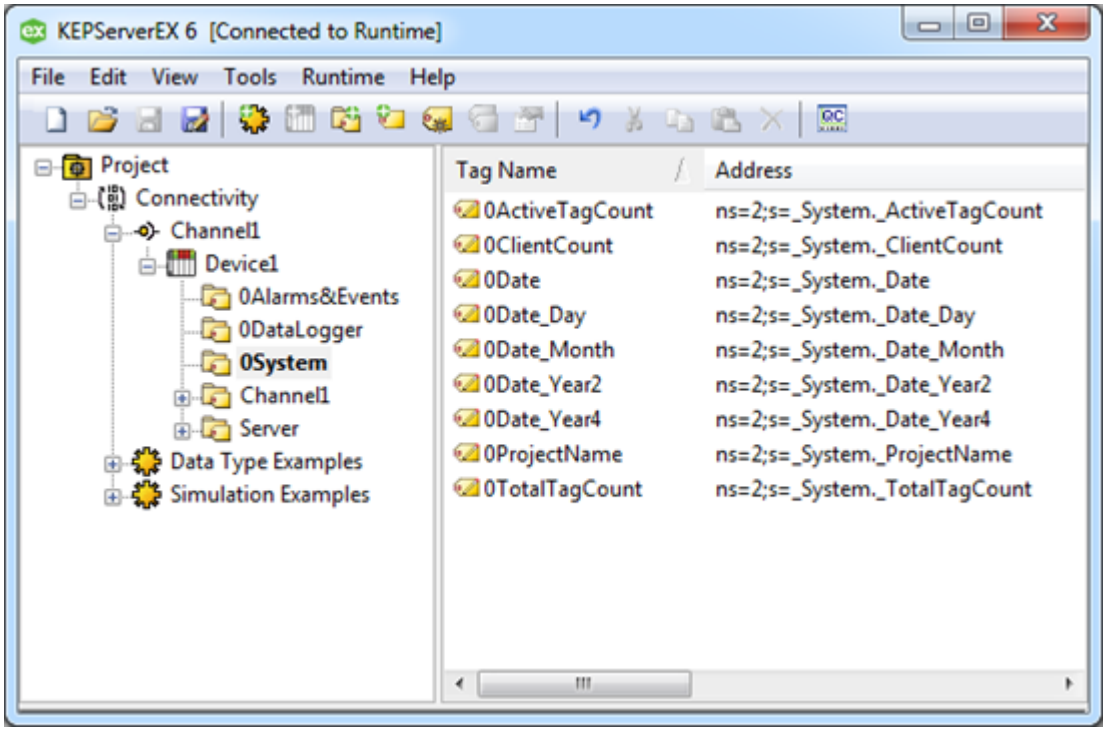
Note: Arrays are supported for all data types.

Field	Description
Namespace Index	The index of the OPC UA Server namespace in which the address resides. If the index is 0, the entire *ns==<namespace index>;* clause is omitted.
Type	The type of address. OPC UA supports the following four address types: i: A numeric address represented with 32-bit unsigned integer s: A string address containing characters that can be encoded using UTF-8 g: A GUID address in the format of {XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX} b: An opaque address (such as a byte string)
Value	The address that is formatted as a string. This address may be numeric, string, GUID, or opaque.

Examples

Address Type	Namespace	Example
Numeric	2	ns=2;i=13
String	3	ns=3;s=Channel1.Device1.Tag1
GUID	0	g={C496578A-0DFE-4B8F-870A-745238C6AEAE}
Opaque	2	ns=2;b=M/RbKBsRVkePCePcx24oRA==

Note: For more examples of OPC UA addresses, refer to the image below.



Error Descriptions

The following event log messages, message boxes, and explanations may be generated. Click on the link for a list.

Event Log Messages
Message Boxes
Explanations

Event Log Messages

The following information concerns messages posted to the Event Log pane in the main user interface. Consult the server help on filtering and sorting the Event Log detail view. Server help contains many common messages, so should also be searched. Generally, the type of message (informational, warning) and troubleshooting information is provided whenever possible.

Channel failed to connect.

Error Type:
Error

Possible Cause:
The connection to the OPC UA server failed.

Possible Solution:
Review the explanation given.

See Also:
Explanations

Channel failed to connect. |

Error Type:
Error

Possible Cause:
The connection to the OPC UA server failed.

Possible Solution:
Review the explanation given.

See Also:
Explanations

Channel failed to connect. | Status description = '<status>', Status code = <code>.

Error Type:
Error

Possible Cause:
The connection to the OPC UA server failed.

Possible Solution:
Review the explanation given.

See Also:
Explanations

Channel failed to connect. Use the OPC UA Configuration Manager to ensure the client certificate is valid.

Error Type:
Error

Possible Cause:

1. The OPC UA Driver certificate is missing or invalid.
2. The OPC UA server certificate is not available.

Possible Solution:

Use the OPC UA Configuration Manager to verify that the OPC UA Client Driver certificate is valid and swap certificates with the OPC UA server.

Channel failed to connect. Use the OPC UA Configuration Manager to ensure the client certificate is valid. |

Error Type:

Error

Possible Cause:

1. The OPC UA Driver certificate is missing or invalid.
2. The OPC UA server certificate is not available.

Possible Solution:

Use the OPC UA Configuration Manager to verify that the OPC UA Client Driver certificate is valid and swap certificates with the OPC UA server.

Channel failed to connect. Please use the OPC UA Configuration Manager to ensure the client certificate is valid. | Status description = '<status>', Status code = <code>.

Error Type:

Error

Possible Cause:

1. The OPC UA Driver certificate is missing or invalid.
2. The OPC UA server certificate is not available.

Possible Solution:

Use the OPC UA Configuration Manager to verify that the OPC UA Client Driver certificate is valid and swap certificates with the OPC UA server.

Add item failed on device. | Tag address = '<address>',

Error Type:

Error

Possible Cause:

1. The item is invalid.
2. The OPC UA server is not running.
3. The device call timeout is too short.

Possible Solution:

1. Verify the OPC UA server is running and responsive.
2. Increase the device call timeout.
3. Verify the item is valid for the OPC UA server.

See Also:
Explanations

Add item failed on device. | Tag address = '<address>', Status description = '<status>', Status code = <code>.

Error Type:
Error

Possible Cause:
1. The item is invalid.
2. The OPC UA server is not running.
3. The device call timeout is too short.

Possible Solution:
1. Verify the OPC UA server is running and responsive.
2. Increase the device call timeout.
3. Verify the item is valid for the OPC UA server.

See Also:
Explanations

Remove item failed on device. | Tag address = '<address>',

Error Type:
Error

Possible Cause:
1. The OPC UA server is down.
2. The device's call timeout is too short to complete the removal.

Possible Solution:
1. Verify that the OPC UA server is running and responsive.
2. Increase the device's call timeout.
3. Review the explanation.

See Also:
Explanations

Remove item failed on device. | Tag address = '<address>', Status description = '<status>', Status code = <code>.

Error Type:
Error

Possible Cause:
1. The OPC UA server is down.
2. The device's call timeout is too short to complete the removal.

Possible Solution:
1. Verify that the OPC UA server is running and responsive.
2. Increase the device's call timeout.
3. Review the explanation.

See Also:
Explanations

Failed to remove items on device. |

Error Type:
Error

Possible Cause:
1. The OPC UA server is down.
2. The device's call timeout is too short to complete the removal.

Possible Solution:
1. Verify that the OPC UA server is running and responsive.
2. Increase the device's call timeout.
3. Review the explanation.

See Also:
Explanations

Failed to remove items on device. | Status description = '<status>', Status code = <code>.

Error Type:
Error

Possible Cause:
1. The OPC UA server is down.
2. The device's call timeout is too short to complete the removal.

Possible Solution:

1. Verify that the OPC UA server is running and responsive.
2. Increase the device's call timeout.
3. Review the explanation.

See Also:
Explanations

Failed to browse endpoints.

Error Type:
Error

Failed to browse tags.

Error Type:
Error

Channel rejected the server certificate. Use the OPC UA Configuration Manager to add the certificate to the trusted servers list. | Server = '<name>'.

Error Type:
Error

Reconnecting server due to shutdown notification.

Error Type:
Warning

Possible Cause:
The OPC UA server is not running. The channel failed to add a subscription for the device. No tags will be updated for the subscription.

Possible Solution:
1. Verify the OPC UA server is running.
2. Review the explanation.

See Also:
Explanations

Invalid session ID encountered. Attempting to reconnect...

Error Type:
Warning

Failed to add subscription for device. |

Error Type:
Warning

Possible Cause:
The OPC UA server is not running.

Possible Solution:
Verify the OPC UA server is running.

Failed to add subscription for device. | Status description = '<status>', Status code = <code>.

Error Type:
Warning

Possible Cause:
The OPC UA server is not running. The channel failed to add a subscription for the device. No tags will be updated for the subscription.

Possible Solution:

1. Verify the OPC UA server is running.
2. Review the explanation.

See Also:
Explanations

Reconnecting server due to connection loss.

Error Type:
Warning

Async write failed. | Tag address = '<address>', Callback item error = <code>.

Error Type:
Warning

Possible Cause:

1. The device call timeout is too short.
2. The server became unresponsive during the write.

Possible Solution:

1. Verify the OPC UA server is running and responsive.
2. Increase the device call timeout.

Tag was not imported. The item failed validation. | Tag name = '<name>'.

Error Type:
Warning

Possible Cause:

1. The driver failed to read the tag attributes.
2. The driver could not import the tags due to an unsupported data type or invalid data type mapping in the server.

Possible Solution:

1. Verify that the tag is valid on the OPC UA server to which it is being connected.
2. In Project Properties for OPC UA, locate and disable address hints.

3. Verify that the tag data types and mappings are valid on the OPC UA server (Project Properties | OPC UA).

Note:
Some tags cannot be resolved when using a tunneling architecture.

Unknown data type for tag. Using default. | Tag name = '<name>'.

Error Type:
Warning

Possible Cause:

1. The target server did not return a data type.
2. The data type entered is not supported by the driver.

Possible Solution:

1. The server determines the data type once a client is connected.
2. Enter a data type that is supported by the driver.

Read request timeout on device.

Error Type:
Warning

Possible Cause:

1. The device is in polled mode and the OPC UA server has become unresponsive.
2. The device call timeout is too short.

Possible Solution:

1. Verify the OPC UA server is running and responsive.
2. Increase the device call timeout.

Write request timeout on device.

Error Type:
Warning

Possible Cause:

1. The OPC UA server is unresponsive.
2. The device call timeout is too short.

Possible Solution:

1. Verify the OPC UA server is running and responsive.
2. Increase the device call timeout.

Note:

1. Writes in a transaction may succeed or fail after a timeout.
2. The driver stopped waiting for the write request to complete. The write might succeed or fail, but the driver stopped reporting the result.

Item is write only. | Item ID = '<ID>'.

Error Type:
Warning

Possible Cause:
An item imported manually or through the OPC UA Tag Browser is write only.

Possible Solution:
Remove the item from the device if it is not needed.

The authentication information for channel was cleared because a password was provided with no username.

Error Type:
Warning

Possible Cause:
An XML project contains a channel that has an authentication password, but no user name.

Possible Solution:

1. Edit the XML file to add a user name to accompany the password.
2. Configure the password and user name in the channel Properties and save the project as XML.

The Publishing Interval for device has been set by the server. | New interval = <number> (milliseconds), Requested interval = <number> (milliseconds).

Error Type:
Warning

Possible Cause:
The device Publishing Interval is not supported by the server.

Possible Solution:
Change the Publishing Interval to one supported by the UA server.

The lifetime count for device has been set by the server. | New count = <number>, Requested count = <number>.

Error Type:
Warning

Possible Cause:

1. The device's lifetime count is not supported by the server.
2. The lifetime count may have conflicted with the minimum timeout interval.

Note:

The lifetime count controls the number of subscription publish intervals that can expire before the server deletes the subscription. To prevent subscriptions from being deleted unnecessarily, some servers enforce a minimum lifetime count to ensure that the timeout interval (publish interval * lifetime count) is reasonable. This error may occur when connecting to the server (if the timeout interval is less than 30 seconds). If so, the server adjusts the lifetime count so the timeout interval is exactly 30 seconds.

The maximum keep-alive count for device has been set by the server. | New count = <number>, Requested count = <number>.

Error Type:
Warning

Possible Cause:
The device maximum keep-alive is not supported by the server.

Possible Solution:
Change the maximum keep-alive to one supported by the UA server.

The session timeout for channel has been set by the server. | New timeout = <number> (milliseconds), Requested timeout = <number> (milliseconds).

Error Type:
Warning

Possible Cause:
The channel session timeout is not supported by the server.

Possible Solution:
Change the session timeout to one supported by the UA server.

The renewal period for channel has been set by the server. | New period = <number> (milliseconds), Requested period = <number> (milliseconds).

Error Type:
Warning

Possible Cause:
The channel renewal time is not supported by the server.

Possible Solution:
Change the renewal time to one supported by the UA server.

Deadband was not applied to item. The item does not support deadband. | Item ID = '<ID>'.

Error Type:
Warning

Possible Cause:
Although deadband has been enabled for the device, it is not supported by a device tag.

Possible Solution:

1. Disable deadband for the device.
2. Remove the item from the device.

Note:

Not all UA server tags support deadband.

The driver's certificate expired. Use the OPC UA Configuration Manager to reissue the certificate.

Error Type:
Warning

Error encountered processing tags for import. No tags will be imported.

Error Type:
Warning

There is no exact match for the configured endpoint URL in the UA server. Attempting to connect using the configured URL. Channel endpoint URL = <address>, server endpoint description URL = <address>.

Error Type:
Warning

Possible Cause:

1. The channel has been configured to use a endpoint URL that is not one of the endpoints returned in a GetEndpoints response.
2. The client is attempting to connect with a hostname or IP address that doesn't match the server's configured endpoint.
3. The client is connecting through a router or firewall that forwards traffic to the UA server using a different IP address, hostname, or port.

Possible Solution:
Use an endpoint URL that matches the endpoint configured in the UA server when an exact match is required.

Message Boxes

The following messages may be generated. Click on the link for a description of the message.

Error encountered during import item browse. Server <server> may have stopped running.
Items on this page may not be changed while the driver is processing tags.
The Lifetime Count must be a minimum of three times the Max. Keep Alive Count (Lifetime Count = <count>).
Please enter a username.

Error encountered during import item browse. Server <server> may have stopped running.

Error Type:
Message Box

Possible Cause:
The OPC UA Server disconnected while the OPC UA Client Driver was browsing for tags.

Solution:
Make sure that the OPC UA Server is running and available.

Items on this page may not be changed while the driver is processing tags.

Error Type:
Message Box

Possible Cause:
An attempt was made to change a channel or device configuration while clients were connected and receiving data. The edits made to the channel or device failed.

Solution:
Disconnect all data clients from the OPC Server before making any edits.

The Lifetime Count must be a minimum of three times the Max. Keep Alive Count (Lifetime Count = <count>).

Error Type:
Message Box

Possible Cause:
The entered lifetime count in the Keep Alive property is not at least three times the maximum keep-alive count. The edits made to the Keep Alive settings on the device failed.

Solution:
Enter a lifetime count that is at least three times the maximum keep alive count.

Please enter a username.

Error Type:
Message Box

Possible Cause:
A password was entered without a user name on the channel's Authentication page.

Solution:
Enter a user name along with the password.

Explanations

Some error messages include additional information under an explanation field. Click on the link for a description of the explanation.

Cannot connect to the server.
The client certificate has expired. Please use the OPC UA Configuration manager to create a new certificate.
The client certificate is invalid. Please use the OPC UA Configuration Manager to update the client certificate.
The server certificate is revoked. Please use the OPC UA Configuration manager to update the certificate.
The server certificate is untrusted. Please use the OPC UA Configuration Manager to add the certificate to the client's trusted store.
Timeout trying to perform the operation.

Cannot connect to the server.

Possible Cause:
The OPC UA Server is down or unreachable.

Result:

The connection failed.

Solution:
Make sure that the OPC UA Server is running and is available via the machine running the OPC UA Client Driver.

The client certificate has expired. Please use the OPC UA Configuration manager to create a new certificate.

Possible Cause:
The OPC UA Client certificate has expired.

Solution:
Create a new OPC UA Client Driver certificate using the OPC UA Configuration Manager.

The client certificate is invalid. Please use the OPC UA Configuration Manager to update the client certificate.

Possible Cause:
The OPC UA Client certificate is missing or invalid.

Solution:
Create a new OPC UA Client Driver certificate using the OPC UA Configuration Manager.

The server certificate is revoked. Please use the OPC UA Configuration Manager to update the certificate.

Possible Cause:
The OPC UA Client Driverr has revoked the OPC UA server certificate, causing the connection to fail.

Solution:

1. Use the OPC UA Configuration Manager to swap certificates between the OPC UA Client Driver and the OPC UA server.
2. Remove the OPC UA server certificate from the driver's revoked list.

The server certificate is untrusted. Please use the OPC UA Configuration Manager to add the certificate to the client's trusted store.

Possible Cause:
The OPC UA Server certificate is not trusted by the client driver, which caused the connection to fail.

Solution:
Use the OPC UA Configuration Manager to swap certificates between the OPC UA Client Driver and the OPC UA server.

Timeout trying to perform the operation.

Possible Cause:

1. The call timeout settings are too short.
2. The OPC UA Server is unresponsive.

Solution:

1. Make sure that the OPC UA Server is running and responsive.
2. Increase the channel and device call timeouts.

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The Publishing Interval for device has been set by the server. | New interval = <number> (milliseconds), Requested interval = <number> (milliseconds). 30
The renewal period for channel has been set by the server. | New period = <number> (milliseconds), Requested period = <number> (milliseconds). 31
The server certificate is revoked. Please use the OPC UA Configuration Manager to update the certificate. 34
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