SNMP Driver Help

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SNMP Driver Help

Help version 1.064

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Overview

The SNMP Driver provides an easy and reliable way to connect managed and unmanaged Ethernet network devices to OPC Client applications, including HMI, SCADA, Historian, MES, ERP and countless custom applications. It is intended to work with all devices supporting the SNMP protocol (versions 1, 2c, and 3).

Channel Setup

Communication Serialization

The SNMP Driver supports Communication Serialization, which specifies whether data transmissions should be limited to one channel at a time. For more information, refer to "Channel Properties - Advanced" in the server help file.

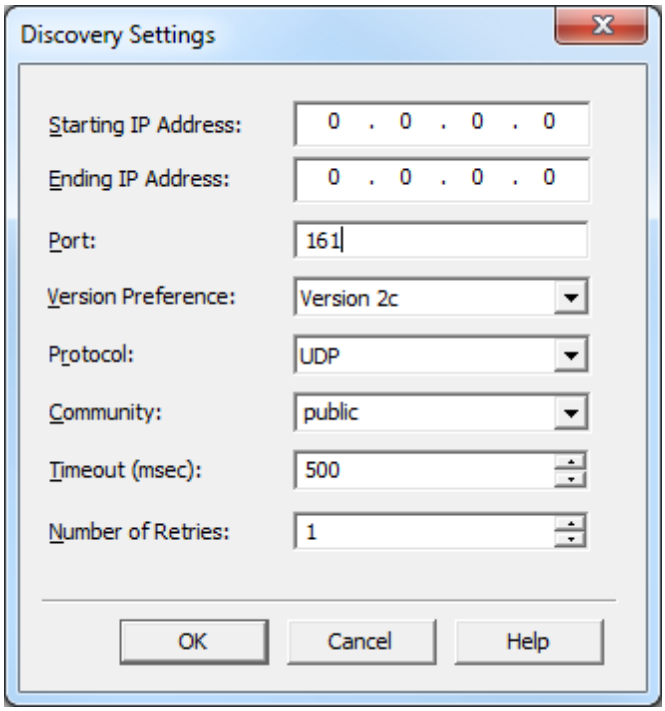
Device Discovery

This channel-level dialog is used to specify parameters for locating devices on the network. Once devices are found, they may be added to the channel. The maximum number of devices that can be discovered at once is 65535.

Note: An SNMP channel that is part of a virtual network will have control over communications for the duration of the Device Discovery process. For more information, refer to "Channel Properties - Advanced" in the server help documentation.

Discovery Settings

This dialog is used to specify the discovery parameters.



Descriptions of the parameters are as follows:

- **Starting IP Address:** This parameter specifies the starting IP address. The default setting is 0.0.0.0.
- **Ending IP Address:** This parameter specifies the ending IP address. The default setting is 0.0.0.0.
- **Port:** This parameter specifies the port number. The valid range is 1 to 65535. The default setting is 161.
- **Version Preference:** This parameter specifies the SNMP protocol version to use first during Device Discovery.

  Note: If the specified version is not found, the other SNMP versions will be used in subsequent discovery attempts.
- **Protocol:** This parameter specifies the protocol. Options include UDP or TCP. The default setting is UDP.
- **Community:** This parameter specifies the community name, which can be defined by the user and depends entirely on the configuration of the remote device. Common options include "public" or "private". The default setting is "public".
- **Timeout (msec):** This parameter specifies the time that the driver will wait for a connection to be made with a device, as well as the time that the driver will wait on a response from the device before giving up and going on to the next request. The default setting is 500 milliseconds.

- **Number of Retries:** This parameter specifies the number of times the driver will retry a message before giving up and going on to the next message. The default setting is 1.

See Also: **Communication Parameters**

Device Setup

Supported Devices

The SNMP Driver is designed to work with any SNMP Agent (typically in a device) that supports the Simple Network Management Protocol (SNMP) versions 1, 2c, and 3. The driver works with a broad range of SNMP managed devices, such as the following:

Alarm Management RTUs
Device Servers
Environment Monitoring Equipment for Server Rooms
Managed Industrial Ethernet Switches
Net-SNMP Software Version: 5.4.1
Printers
Routers
Uninterruptible Power Supplies (UPS)
Unix-based Servers
Windows-based PCs and Servers

Maximum Number of Channels and Devices

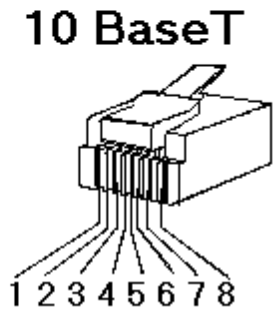
The maximum number of channels is 256. The maximum number of devices supported per channel is 100.

See Also: **Communication Parameters** and **Auto-Demotion and SNMP**.

Cable Diagrams

Patch Cable (Straight Through)

TD + 1	OR/WHT	OR/WHT	1	TD +
TD - 2	OR	OR	2	TD -
RD + 3	GRN/WHT	GRN/WHT	3	RD +
4	BLU	BLU	4	
5	BLU/WHT	BLU/WHT	5	
RD - 6	GRN	GRN	6	RD -
7	BRN/WHT	BRN/WHT	7	
8	BRN	BRN	8	
RJ45			RJ45	



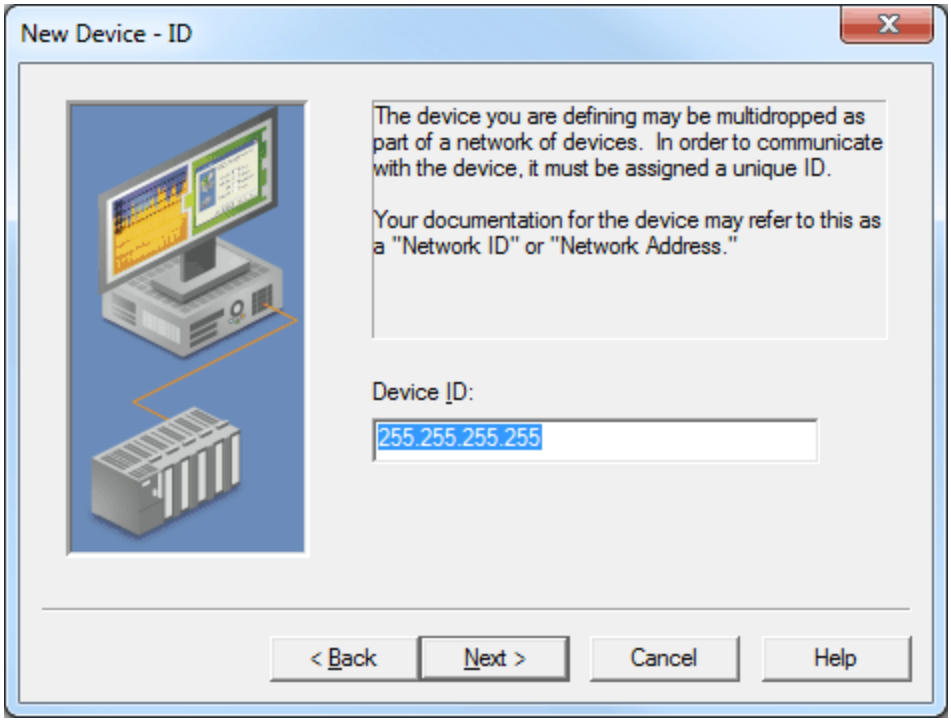
Crossover Cable

TD + 1	OR/WHT	GRN/WHT	1	TD +
TD - 2	OR	GRN	2	TD -
RD + 3	GRN/WHT	OR/WHT	3	RD +
4	BLU	BLU	4	
5	BLU/WHT	BLU/WHT	5	
RD - 6	GRN	OR	6	RD -
7	BRN/WHT	BRN/WHT	7	
8	BRN	BRN	8	
RJ45			RJ45	

Device ID Selection

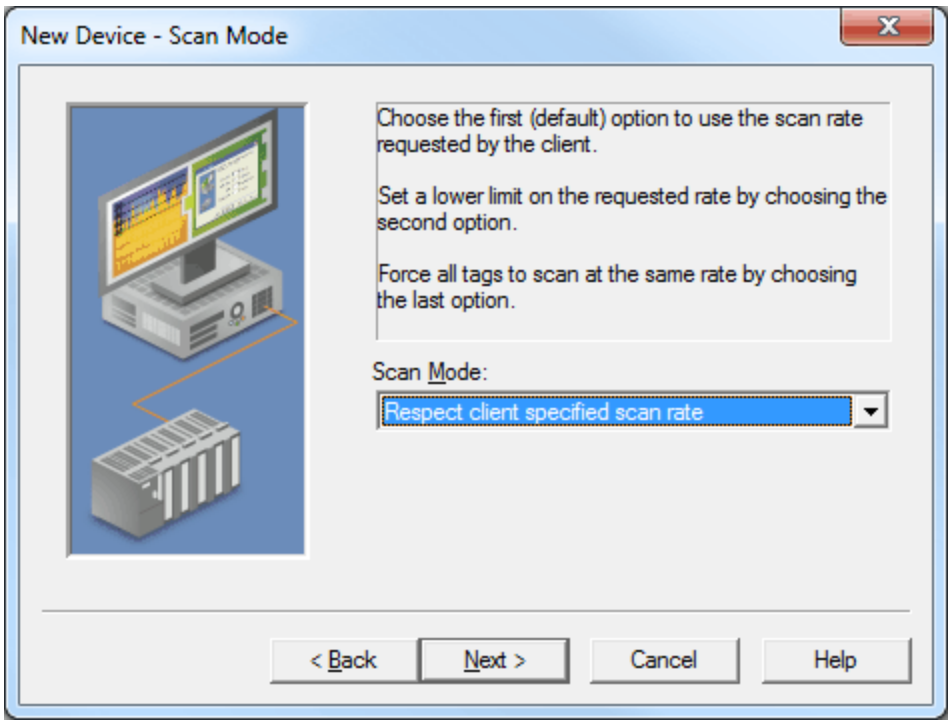
Device ID

This parameter specifies an IP address or resolvable domain name that will be used for the Device ID. Names will be resolved when the SNMP Driver first connects to the device. If the name resolution fails, the SNMP session will fail to initialize.



Scan Mode

This parameter specifies the device's scan mode.

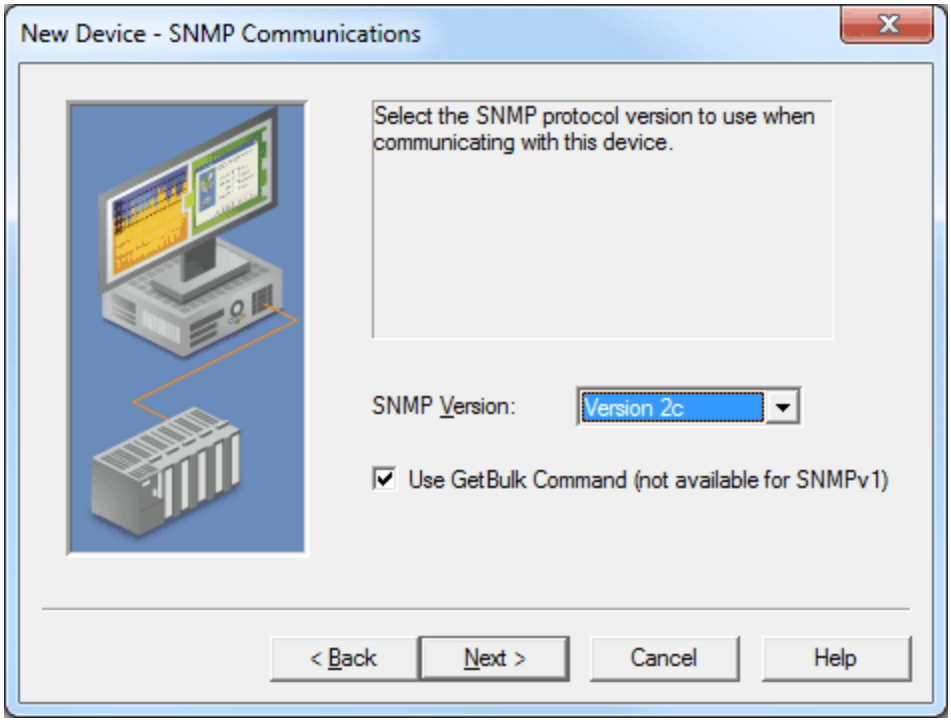


Descriptions of the options are as follows:

- **Respect client specified scan rate:** This mode uses the scan rate that is requested by the client. This is the default scan mode.
- **Request data no faster than *x*:** This mode specifies the maximum scan rate that will be used. The default setting is 1000 milliseconds.
- **Request all data at *x*:** This mode forces all tags to be scanned at the specified rate. The default setting is 1000 milliseconds.

Communication Parameters

SNMP Version



Descriptions of the parameters are as follows:

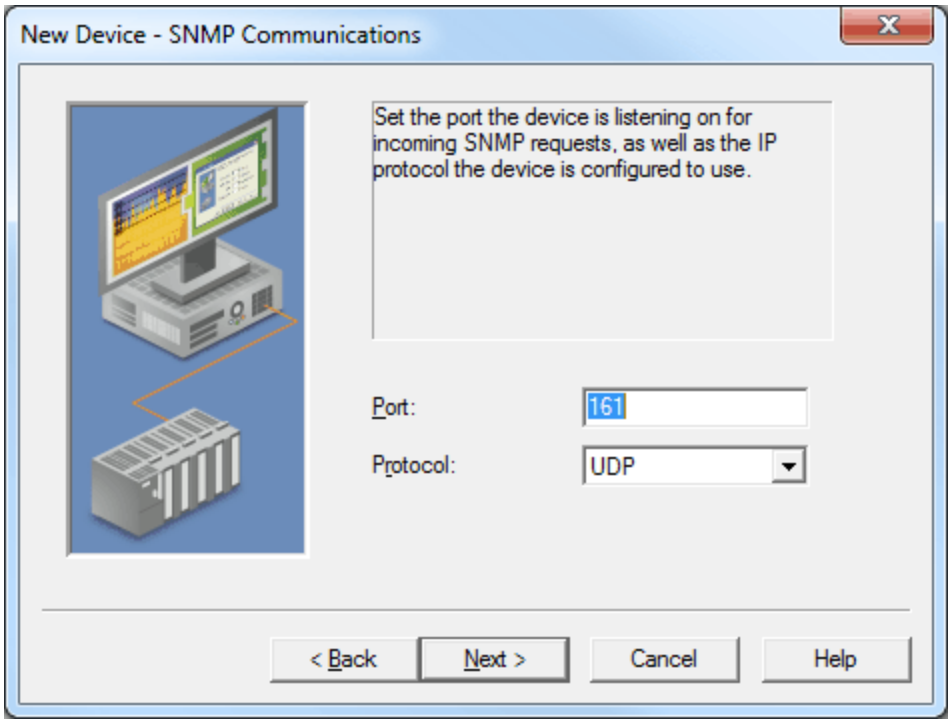
- **SNMP Version:** This parameter specifies the version that will be used by the remote device. Options include Version 1, Version 2c, and Version 3. The default setting is Version 2c.
- **Use GetBulk Command:** This command applies to OID addresses ending with the *[1-n]* table offset notation. When checked, the SNMP GetBulk command will obtain table data from the device (Agent MIB) by packaging multiple Get-Next commands in a single request to the Agent. The GetBulk command is more efficient than individual Get-Next commands.

  Note: The GetBulk command is not supported in the SNMP Version 1 specification. The driver will use individual Get-Next commands to retrieve table data from Version 1 Agents. For more information, refer to the table below.

Agent Version	Table Data	SNMP Command	# Requests Sent to Agent
1	.1.3.6.1.4.1.30144.1.1.2[1] .1.3.6.1.4.1.30144.1.1.2[2] .1.3.6.1.4.1.30144.1.1.2[3] .1.3.6.1.4.1.30144.1.1.2[4]	SNMP Get-Next	4
2c/3	.1.3.6.1.4.1.30144.1.1.2[1] .1.3.6.1.4.1.30144.1.1.2[2] .1.3.6.1.4.1.30144.1.1.2[3] .1.3.6.1.4.1.30144.1.1.2[4]	SNMP GetBulk	1
2c/3	.1.3.6.1.4.1.30144.1.1.2[1] .1.3.6.1.4.1.30144.1.1.2[2] .1.3.6.1.4.1.30144.1.1.2[3] .1.3.6.1.4.1.30144.1.1.2[4] .1.3.6.1.4.1.30144.1.1.3[1] .1.3.6.1.4.1.30144.1.1.3[2] .1.3.6.1.4.1.30144.1.1.3[3] .1.3.6.1.4.1.30144.1.1.3[4]	SNMP GetBulk	2

Port and Protocol

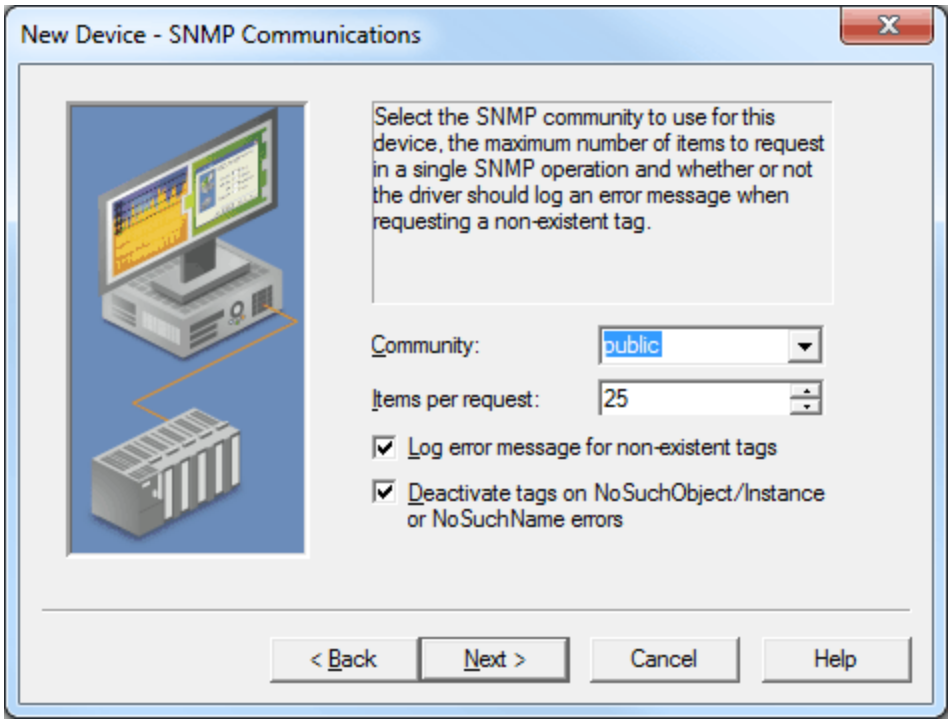
These parameters are used when communicating to the remote device.



Descriptions of the parameters are as follows:

- **Port:** This parameter specifies the port. The valid range is 1 to 65535. The default setting is 161.
- **Protocol:** This parameter specifies the protocol. Options include UDP and TCP. The default setting is UDP.

SNMP Community



Descriptions of the parameters are as follows:

- **Community:** This parameter is used when accessing the remote SNMP device. The community name can be defined by the user and depends entirely on the configuration of the remote device. Common options include "public" and "private". The "public" community is usually used for reading data, whereas the "private" community is used for writing data to an Agent. For information on determining the correct community name, refer to the device's help documentation. This field is limited by the driver to 256 characters.
- **Items per request:** This parameter controls how many SNMP data items will be bundled together in each read request. For Agents or devices supporting SNMP v1, this may need to be set to a value as low as 1. SNMP version 2c devices can typically handle the maximum items per request. The valid range is 1 to 25. The default setting is 25.
- **Log error message for non-existent tags:** An SNMP Agent or device is dynamic and may change during operation. When checked, this parameter has the OPC server display an error notice when a specified OID address does not exist on the target device. When unchecked, the messages will be suppressed. The default setting is checked.
- **Deactivate tags on NoSuchObject/Instance or NoSuchName errors:** When checked, this parameter will deactivate tags on NoSuchObject, NoSuchInstance, or NoSuchName errors. The default setting is checked.

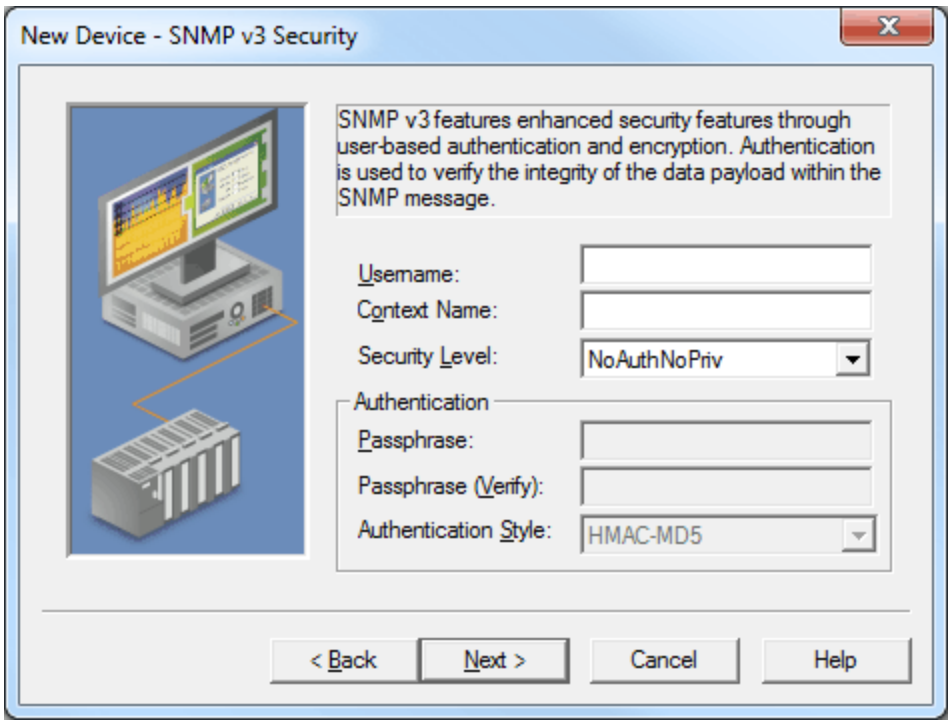
  Note: This behavior is not always desirable. For example, a device may provide a NoSuchObject error for one condition but provide valid data for another. This parameter applies to normal SNMP OID polling and polling that occurs for Network Analyst tags. If there are many tags for SNMP OIDs that continuously result in NoSuchName errors, disabling this setting may significantly affect the SNMP Driver's performance.

SNMP Scan Floor

The SNMP Scan Floor parameter is now specified in the Scan Mode tab located in Device Properties. For more information, refer to **Scan Mode**.

SNMP v3 Security

The SNMP v3 Security settings are only available when Version 3 is selected as the SNMP version in SNMP Communications. For more information on available versions, refer to **Communication Parameters**.



Descriptions of the parameters are as follows:

- **Username:** This parameter specifies the username that will be associated with the authorization and privacy keys. It is blank by default.

Note: If a device sending SNMP version 3 traps uses a different username, a second device with the user credentials for the trap receiver can be used to receive the traps. This means that each device in the server can only be associated with one set of user credentials. Users can have multiple devices with the same credentials; however, one set of credentials has no effect on another because user credentials are tied to the device.

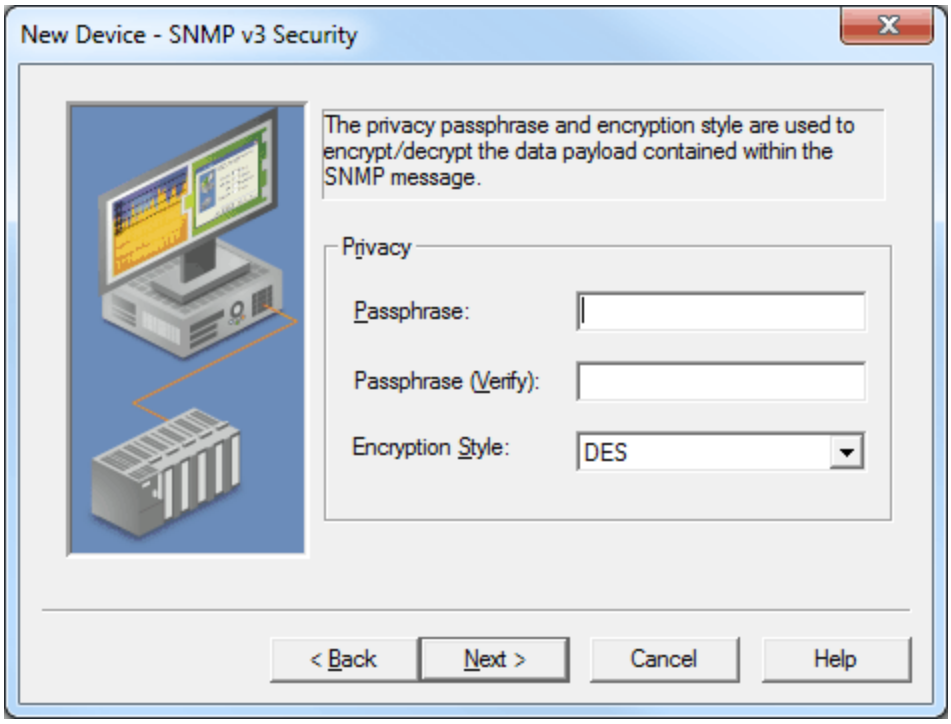
- **Context Name:** This parameter specifies a contextual name for the SNMP message request. It is blank by default.
- **Security Level:** This parameter specifies the security level. Options include NoAuthNoPriv, AuthNoPriv, and AuthPriv. The default setting is NoAuthNoPriv. Descriptions of the options are as follows:

  - **NoAuthNoPriv:** This level includes neither authentication nor encryption.
  - **AuthNoPriv:** This level includes authentication, but not encryption.
  - **AuthPriv:** This level includes both authentication and encryption.

  Note: When the Security Level is set to AuthNoPriv or AuthPriv, the following parameters will be available for configuration.

  - **Passphrase:** This parameter generates a localized key that is used to authenticate the SNMP data frames.
  - **Passphrase (Verify):** This parameter is used to verify the previously entered passphrase.
  - **Authentication Style:** This parameter specifies the style of authentication. Options include HMAC-MD5 and HMAC-SHA1. The default setting is MHMAC-MD5.

SNMP v3 Privacy

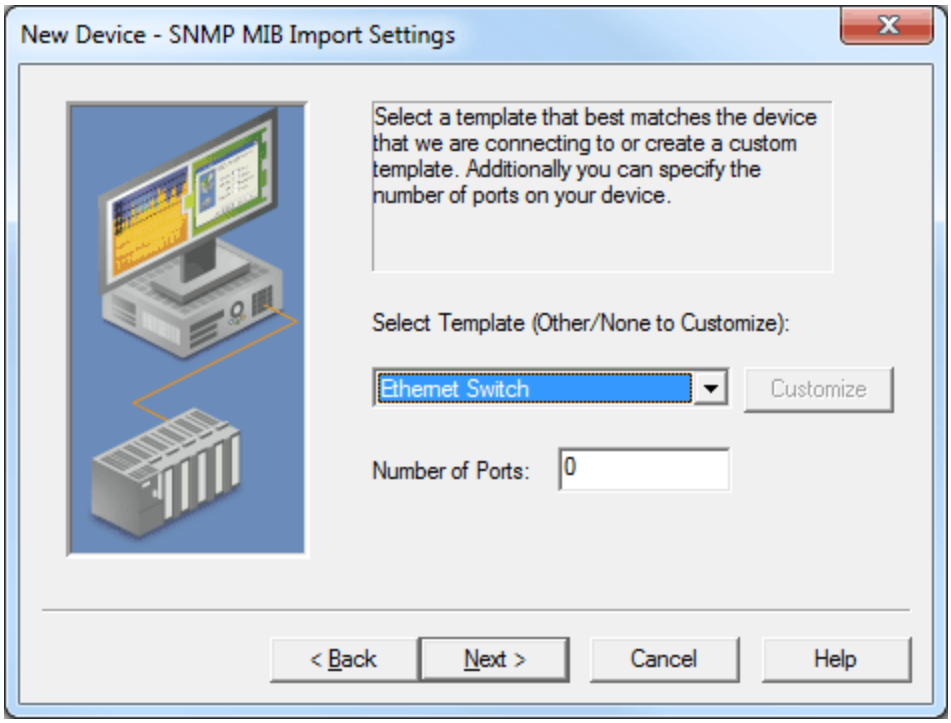


Descriptions of the parameters are as follows:

- **Passphrase:** This parameter generates a localized key that is used to encrypt/decrypt the data in an SNMP frame.
- **Passphrase (Verify):** This parameter is used to verify the previously entered passphrase.
- **Encryption Style:** This parameter specifies the style of encryption. Options include DES, AES 128, AES 192, and AES 256. The default setting is DES.

  Note: AES 192 and AES 256 are non-standard extensions of the SNMP User Security Model (USM) and are not supported by all SNMP v3 Agents. For more information on the key expansion algorithms for AES 192 and AES 256, refer to the SNMP v3 Working Group's Internet-Draft **Extension to the User-Based Security Model (USM) to Support Triple-DES EDE in "Outside" CBC Mode**.

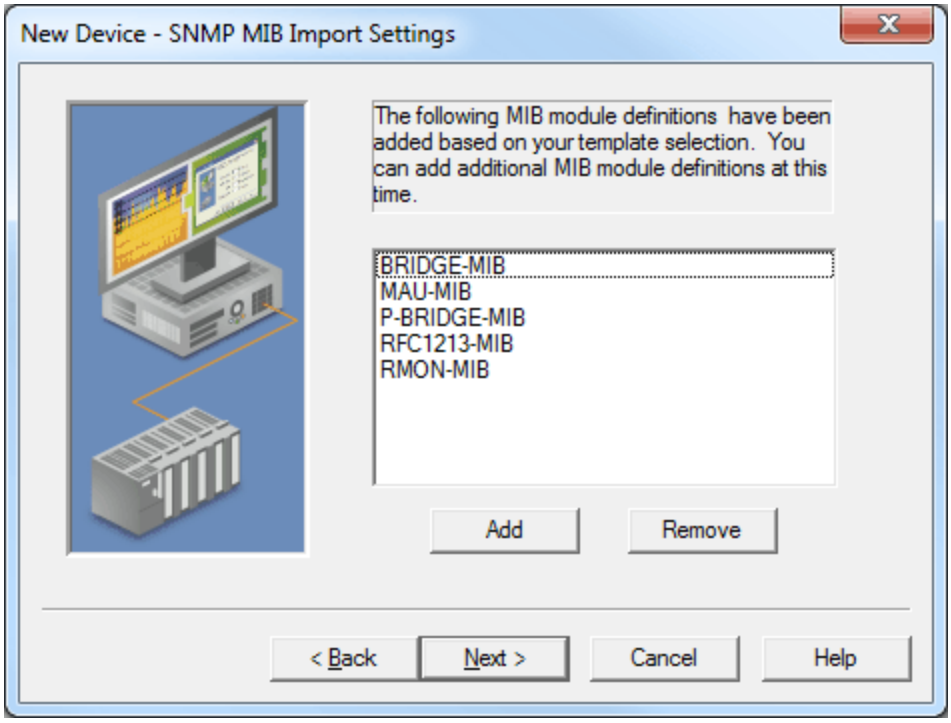
MIB Import Settings



Descriptions of the parameters are as follows:

- **Select Template (Other/None to Customize):** This parameter specifies the template that will guide the automatic creation of tags for the new device. Options include Ethernet Switch, Single-phase UPS, Three-phase UPS, Other Device, and None. Other Device will create a generic set of tags for a multi-port SNMP-enabled device. None has no associated preset tag set.
- **Number of Ports:** All templates (except for UPS) must enter the number of Ethernet ports on the device. Tags will be generated for each port present. The valid range is 0 to 2147483647. The default setting is 0.

Additional MIB Modules

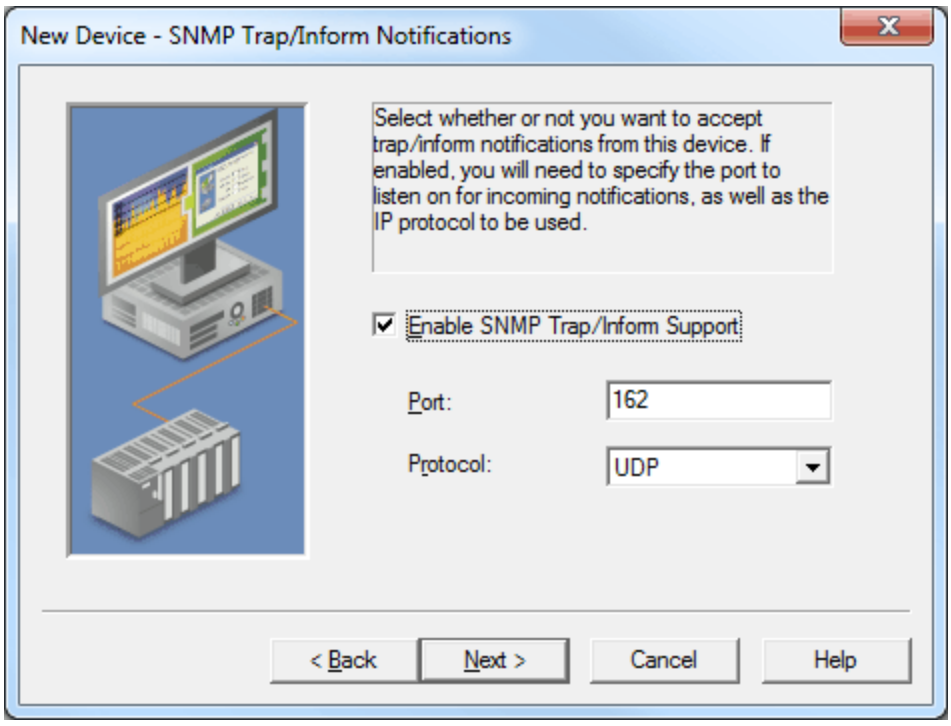


This dialog displays the MIB modules associated with the chosen template. Other MIB modules can be added at this point. For more information, refer to **About MIB Modules**.

SNMP Trap/Inform Notifications

SNMP managed devices can be configured to send unsolicited messages (known as traps, informs, or notifications) to host systems or managers.

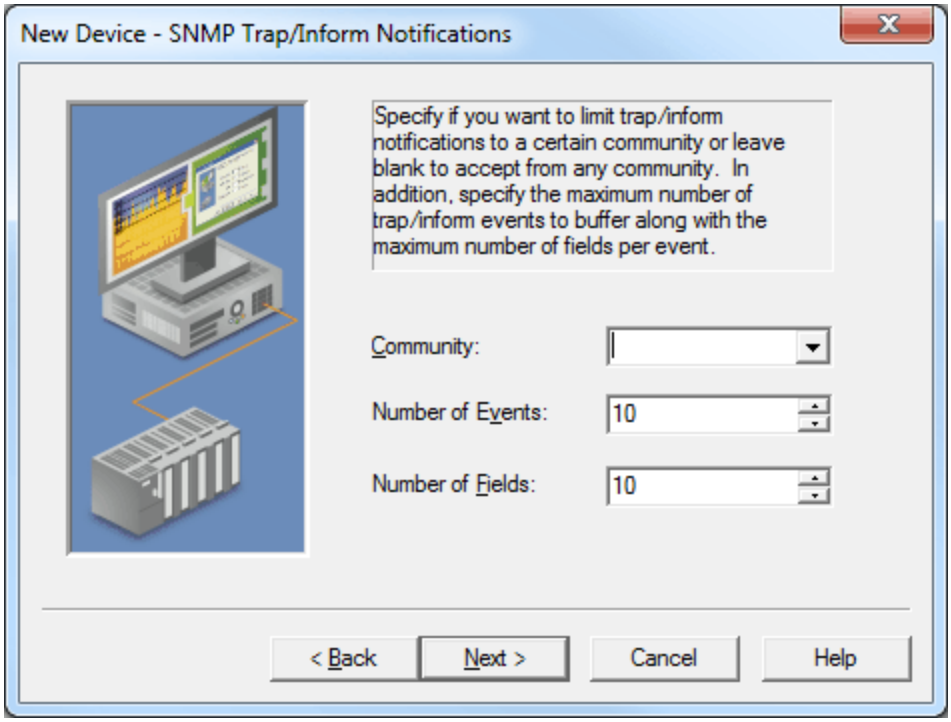
Note: The SNMP Driver supports Trap-PDU (SNMPv1 only), SNMPV2-Trap-PDU (SNMPv2c/v3 only), and the Inform-Request-PDU (SNMPv2c/v3 only).



Descriptions of the parameters are as follows:

- **Enable SNMP Trap/Inform Support:** When checked, the SNMP Driver will be able to receive traps sent from SNMP managed devices or systems. The default setting is checked.

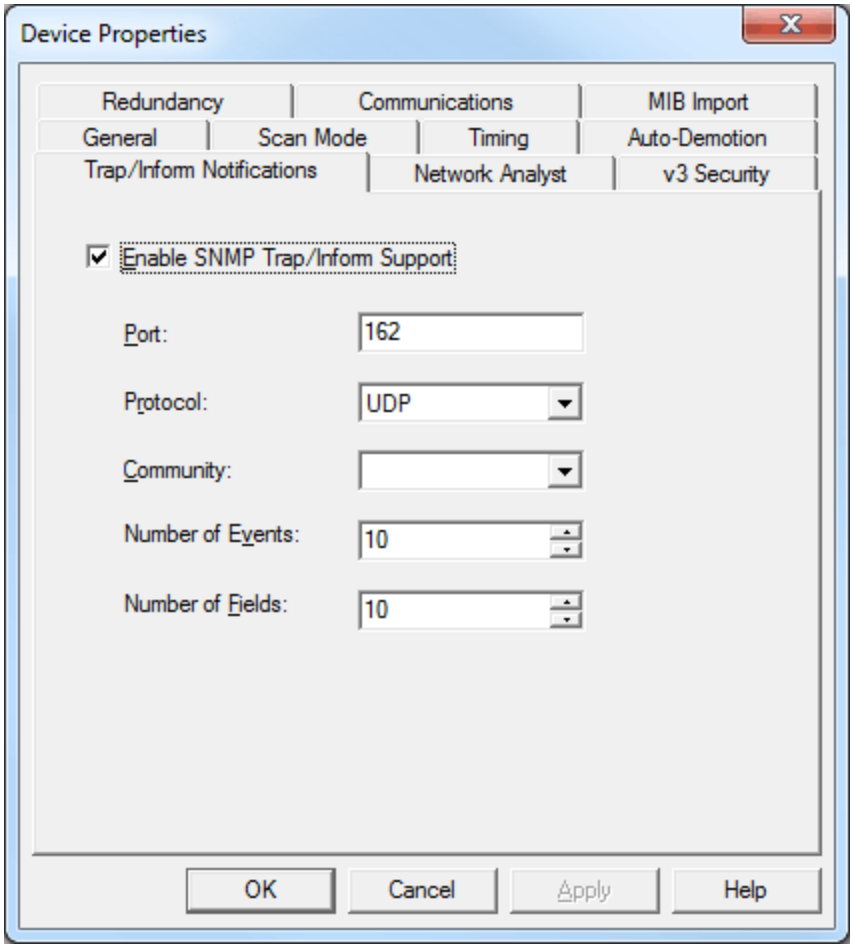
  Note: Trap support cannot be enabled when the SNMP channel is part of a virtual network. For more information on communication serialization, refer to the server help file.
- **Port:** This parameter specifies the port on which the device will listen for notifications. The valid range is 1 to 65535. The default setting is 162, which is the most commonly used port for sending and receiving traps.
- **Protocol:** The protocol may be UDP or TCP. The default setting is UDP.



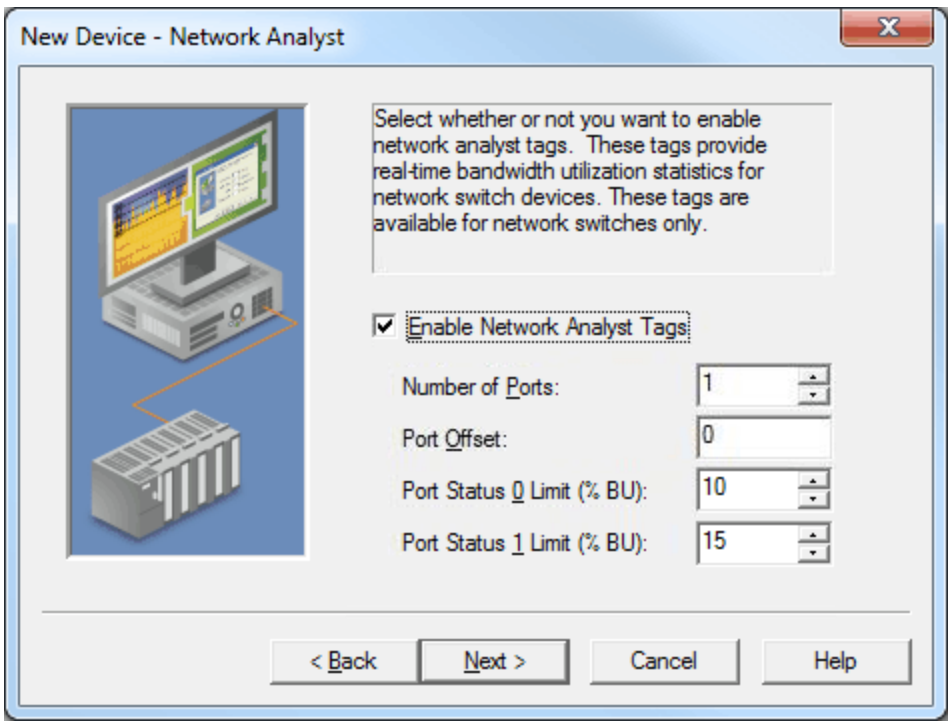
Descriptions of the parameters are as follows:

- **Community:** This is an optional setting. If a community name is entered, the SNMP Driver will only accept trap messages addressed to that community. In addition, traps will only be accepted from the IP address configured in the OPC server device. Leaving this field blank will allow trap messages to be received that are addressed to any community (or none at all). The community is limited to 256 characters.

  Note: For SNMP version 3, the specified username and passphrase for normal communications will be used to authenticate, encrypt, and validate the SNMP message. Messages for a different user will be ignored.
- **Number of Events:** Trap messages are provided to client applications via an event queue in the driver. The queue is a FIFO stack that displays several trap messages that were received last. This parameter specifies the amount of trap messages to retain in the queue. The driver allows between 1 and 100 events to be collected. The default setting is 10.
- **Number of Fields:** Each trap message may carry additional variables, which are then parsed into a number of individual tag fields. The default setting is 10. It is recommended that users choose the maximum number in order to allow extra fields for the server-generated timestamp and a generic trap description (which is only for SNMP version 1). The driver allows between 1 and 20 fields. For more information on trap message addressing, refer to **Trap Events Queue** and **Trap Tags**.

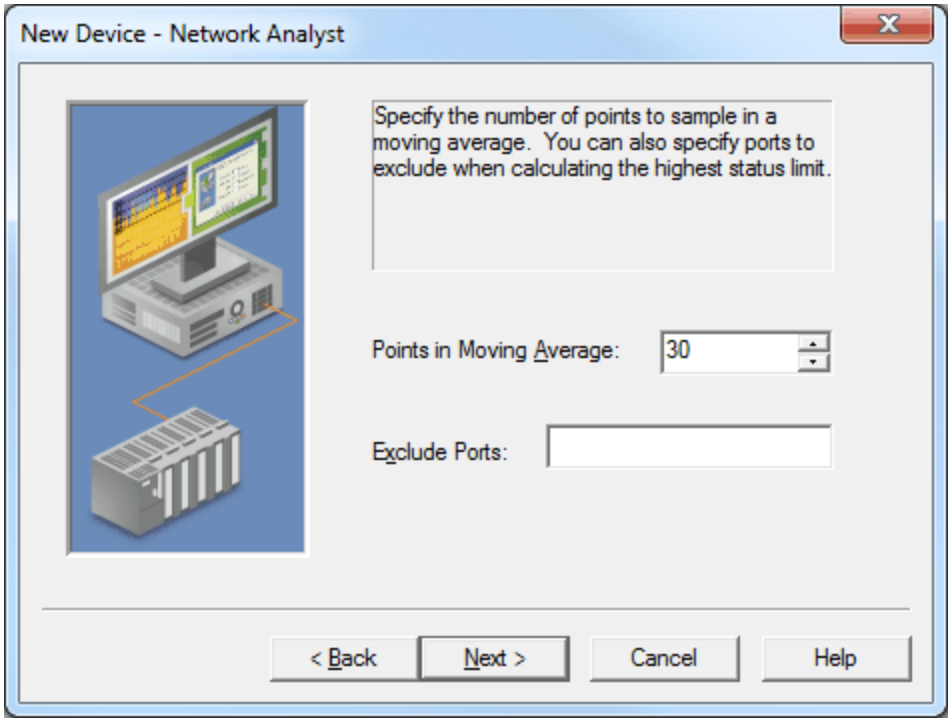


Network Analyst Tags



Descriptions of the parameters are as follows:

- **Enable Network Analyst Tags:** When enabled, network analyst tags are made available with the Ethernet Switch and Other Device profiles. For more information, refer to **About Network Analyst Tags**.
- **Number of Ports:** This parameter specifies the number of ports for the switch device. This is separate from the port number setting in Profile Selection. The valid range is 1 to 99.
- **Port Offset:** This parameter specifies the offset that will be added to the Network Analyst port when polling the special OIDs. The valid range is 0 to 65436. The default setting is 0.
- **Port Status 0 limit** and **Port Status 1 limit:** These parameters specify the threshold settings for each switch port's buStat tags. The buStat tags are a three-state indicator of the rough class of utilization for incoming bandwidth. When the buPctIn for a port rises above the Port Status 0 limit, that buStat tag will change from 0 to 1. Similarly, when the buPctIn rises above the Port Status 1 limit, the buStat tag will change from 1 to 2. The valid range is 0 to 100. The Port Status 0 limit should not be greater than Port Status 1 limit.



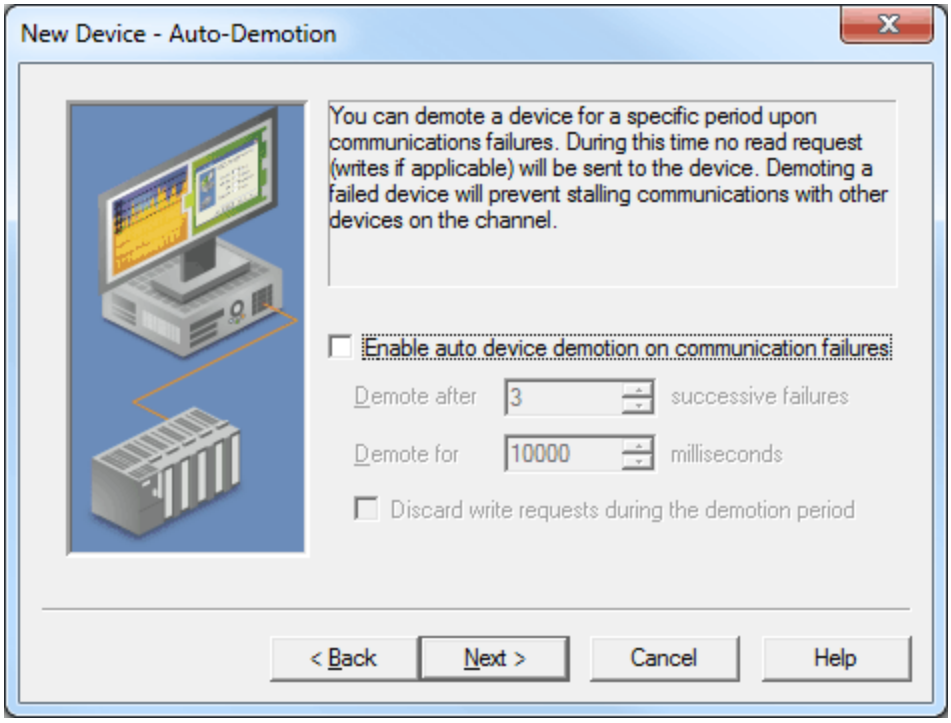
Descriptions of the parameters are as follows:

- **Points in Moving Average:** This parameter specifies how many sample values will be used when calculating the buPctIn and buPctOut values. The data points' average is taken in order to smooth the Ethernet traffic's inherently erratic behavior. The number of points in the moving average can be from 1 to 200. The default setting is 30.
- **Exclude Ports:** This parameter allows the switchBUStat tag to ignore some ports when calculating the highest buStat value. This is a list (1, 3, 6, 8) that can also contain ranges (1, 3-7, 9-11).

See Also: **About Network Analyst Tags**

Auto-Demotion and SNMP

Because of the way the SNMP Driver processes OPC tags, a non-responsive device with many tags may impede communications with other devices on the same channel. This is due to the timeout period being used on each successive query to the non-responsive device. Auto-Demotion is recommended for each device when communication may be unreliable.


New Device - Auto-Demotion
You can demote a device for a specific period upon communications failures. During this time no read request (writes if applicable) will be sent to the device. Demoting a failed device will prevent stalling communications with other devices on the channel.
Enable auto device demotion on communication failures
Demote after
3
successive failures
Demote for
10000
milliseconds
Discard write requests during the demotion period
< Back
Next >
Cancel
Help

Data Types Description

The SNMP Driver supports the following data types.

Data Type	Description
Boolean	Single bit
DWord	Unsigned 32 bit value bit 0 is the low bit bit 31 is the high bit
DWord Example	The driver interprets two consecutive registers as a single precision value.
Long	Signed 32 bit value bit 0 is the low bit bit 30 is the high bit bit 31 is the sign bit
Long Example	The driver interprets two consecutive registers as a single precision value.
String	ASCII text string
Float	32 bit floating point value bit 0 is the low bit bit 31 is the high bit
Float Example	The driver interprets two consecutive registers as a single precision value.
Double	64 bit floating point value bit 0 is the low bit bit 63 is the high bit
Double Example	The driver interprets four consecutive registers as a double precision value.

Each tag used in the driver has a fixed data type when there is MIB information for the address. Therefore, it is recommended that the driver be allowed to use the default data type for the point.

In a few cases, SNMP-centric data types do not exist in standard OPC. These items should be mapped or correlated to a valid OPC data type in order to be read. Extensive testing has been performed to assure that SNMP-centric data types can be served to and written from correctly with OPC client applications.

SNMP Centric	OPC Data Type
Integer32	Long
UInteger32	DWord
Counter64	NS*
Octet String	String
Bits	NS**
Object Identifier	String
Sequence	NS***
IPAddress	DWord
Counter32	DWord
Guage32	DWord
Timeticks	DWord
Opaque	NS****
Trap/Notification	String

*This is a 64 bit integer.
**Bit string.
***A sequence is a list of data. Complex data is currently not supported in OPC.
****Opaque data is a memory BLOB.

Note: There is no corresponding data type in OPC to handle these data types.

Address Descriptions

Addresses in the SNMP Driver are specified by the Object Identifier (OID) followed by an instance number. The OID can be defined in one of several forms and as follows:

Object Identifier	Description
SNMPv2-MIB::sysDescr.0	(Module::Object notation)
.1.3.6.1.2.1.1.1.0	(Numeric notation)
.iso.org.dod.internet.mgmt.mib-2.system.sysDescr.0	(Verbose notation)

Note: For more information about address structure, refer to **About SNMP Addresses**.

Table Offsets

To address an SNMP Table, specify the OID of the table head followed by the table offset (in brackets).

IF-MIB::tcpConnState[1]

Note: All SNMP table offsets begin at 1. Tags addressed to table offsets beyond the end of the table will be reported with bad quality until the table grows to that offset or beyond.

Historical Data

Each SNMP address has one or more historical data options available. Historical values are generated by the SNMP Driver, not the remote Agent or device.

See Also: **Previous Value**, **Delta Time**, and **Moving Average**.

String Data

Strings that contain non-printable characters will be displayed as hexadecimal by default. Any character outside the ASCII range of 0x20 to 0x7E is considered non-printable. To keep strings from being converted to hexadecimal, add "(EncExtAsc)" to the end of the address description (without the quotation marks).

Unsolicited Data

SNMP-enabled devices may be configured to send unsolicited messages, called traps (or notifications). For more information, refer to **Trap Events Queue** and **Trap Tags**.

Scan Rate Floor

The scan rate can be set in milliseconds for each SNMP device. The _ScanRateFloor Tag will display the setting's current value. When it is set greater than zero, the SNMP Driver will not allow tags to be scanned faster than specified. The device can also be set to lock the scan rate at this value, prohibiting any change by the OPC client. The _ScanRateFloorLock Tag will show the lock option's status. The tags are Read Only.

Note: Setting this feature to zero will disable it.

About SNMP Addresses

The Simple Network Management Protocol accesses information in a Management Information Base (MIB). The MIB is a tree structure whose origin is at the top, which is a node labeled ".1" or ".iso." Although many discussions of SNMP refer to MIBs as a plural, there is only one. The plural references actually refer to MIB modules, which describe portions of the MIB tree.

The SNMP address is known as an Object Identifier (OID) and consists of a series of elements that describes its location in the MIB tree. The elements are separated by a character referred to as dots ('.'). Most addresses of interest will begin with *.iso.org.dod.internet.mgmt* (or .1.3.6.1.2). From that point, the address extends into particular modules that describe related sets of information. For example, consider the IF-MIB module: it contains a variety of objects' definitions that access data about the network interfaces of the remote device. These include Port Status, traffic counters, and so forth.

The *Module::Object* syntax of SNMP addresses means that "IF-MIB::" can be written instead of ".iso.org.dod.internet.mgmt.mib-2.interfaces" (or ".1.3.6.1.2.1.2.2"). Thus, the address "IF-MIB::ifOutOctets.1" refers to the number of octets (bytes) sent out of interface 1 on the target device. That form is easier to write than ".iso.org.dod.internet.mgmt.mib-2.interfaces.ifTable.ifEntry.ifOutOctets.1" or ".1.3.6.1.2.1.2.2.1.16.1". The SNMP Driver will accept all three of these address notations.

Enterprise or Private MIB Modules

Much of the SNMP address space is defined by Internet RFC standards. Individuals are not permitted to change or extend these module definitions. For that purpose, the SNMP standard provides an extension area of the address

space under ".iso.org.dod.internet.private.enterprises". The value following this base is known as a Private Enterprise Number (PEN) and every address below that point is defined by the PEN owner. Manufacturers that need to provide unique information not otherwise described in standard MIB modules will need to define them in their own Enterprise space and typically supply a MIB module definition with their equipment. The SNMP Driver uses these supplied MIB definitions to correctly access the unique information in remote device.

Instances

The OID "IF-MIB::ifOutOctets.1" above provides an example of SNMP instances. A managed switch will have a set of "IF-MIB::ifOutOctets" OIDs, one for each network interface. They will use a trailing digit (or digits) to index into the set of instances. Instances may be numbered beginning at 1 for groups that map to physical attributes, such as "IF-MIB::ifOutOctets.1," "IF-MIB::ifOutOctets.2," "IF-MIB::ifOutOctets.3" and so forth. The number of instances for a given OID is typically fixed. Other OIDs may have multiple instances, such as "SNMPv2-MIB::sysLocation". Although the first instance will be "SNMPv2-MIB::sysLocation.0," an agent may optionally provide "SNMPv2-MIB::sysLocation.1" and so on.

Note: Instances should not be confused with tables.

Tables

The SNMP address space is dynamic. The SNMP Agent on the remote device may add and remove OIDs as necessary. The most frequent occurrence of this is in SNMP Tables. An SNMP Table is a grouping of logically related data into conceptual rows. The rows are conceptual because the SNMP protocol does not have a facility to retrieve a full row at a time. Table access is accomplished by enumerating a table's columns. The SNMP Driver uses an array-like notation for table access, as in "RFC1213-MIB::tcpConnState[1]". That OID is part of the "tcpConnTable". Tables differ from instances in the following two ways:

1. Tables may grow or shrink during operation. An SNMP Driver tag that references a table column element will lose data quality if the table shrinks to less than the referenced element (offset).
2. The OIDs representing table column elements are not necessarily consecutive. The OIDs for individual column elements may not be predictable, and may change from moment to moment in the Agent or device.

Device Implementation RFC-Standard Modules

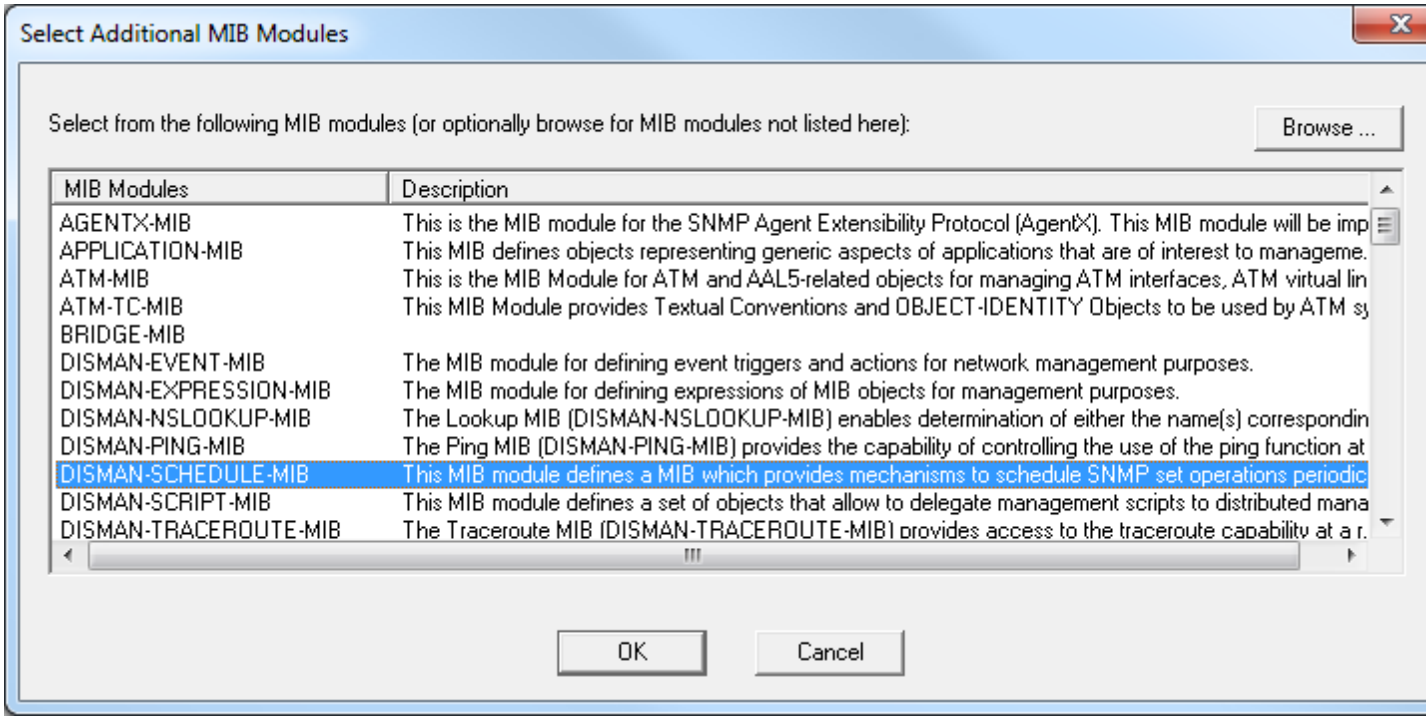
SNMP has defined a large and rich set of data that may or may not be implemented in SNMP-enabled devices. Although many device manufacturers implement the complete MIB module definition, others do not. If the SNMP Driver is able to poll some but not all of the OIDs defined in the server project, users should start by verifying what OIDs are fully supported in the remote device.

Community Credentials

There is also the question of the credentials used to connect to the SNMP device (the community name), and whether those credentials have permission to access certain data. The final authority for the presence and accessibility of an OID lies with the remote device. For more information, refer to the device's help documentation.

About MIB Modules

Much of the SNMP address space is defined by Internet RFC Standards. These standards break up the address space into modules, many of which are drawn from the RFC standards. Selecting a device template also selects a number of MIB modules to be referenced. Additional MIB modules may be associated with a device to support specialized capabilities. The SNMP Driver ships with a number of MIB modules pre-installed. To access these MIB definitions, click **Add** on the **SNMP MIB Import Settings** wizard page. Then, click **OK**.



Adding New MIB Modules

New MIB definitions, such as MIB modules supplied by a manufacturer, may be installed by clicking **Browse...** to import. Navigate to the MIB definition file and then click **Open**. The MIB definition will be checked for correctness and its description will be displayed if present. To accept the file for import, click **OK**. The module will be added to the current project and tags will be created for the objects that are defined.

Note 1: If the selected MIB module is already present in the repository, the relative dates of the two versions will be displayed. The user will be given the option to replace the module.

Note 2: If a MIB module contains errors, it cannot be imported. The import process automatically considers all MIB definition files in the same folder with the import candidate, and will bring in additional files if needed. Be sure that all MIB files associated with the device are present in the folder.

Note 3: Adding or importing a MIB module does not guarantee that new tags will be created. Some MIB modules (including those supplied by manufacturers) do not define any accessible objects.

About Network Analyst Tags

Ethernet switches carry traffic around networks. The SNMP Driver features a set of Network Analyst tags in order to easily keep track of a switch's capacity and utilization. These tags track the percentage of bandwidth in use on each switch's ports at any given time.

The buPctIn and buPctOut tags show the usage of each port in percent, averaged over a number of sample periods. The OPC client's scan rate is the sample period. For best results, the scan rate should be at least 1000 milliseconds. Longer periods are acceptable, whereas shorter periods may cause network congestion (because a number of SNMP data points must be read on each sample). The readings are averaged in order to smooth out the Ethernet traffic's inherently erratic behavior and make the values more useful for alarming.

The buStat tags utilize the threshold settings Port Status 0 limit and Port Status 1 limit in order to present a simple three-state "health" indicator. When a given port's buPctIn tag rises above the 0 limit, the buStat changes from 0 to 1. Likewise, when buStat rises above the 1 limit, buStat changes to 2. This provides a simple "traffic light" style, indicating the available capacity.

The switchBUStat tag assumes the highest value of the buStat tags, giving a single indication of the device's available capacity. The switchBUStat tag's behavior may be altered through the use of a list of ports to exclude. For example, a switch may have two ports that always run at or near capacity. By excluding these two ports, switchBUStat can indicate when the rest of the switch's capacity is nearing exhaustion without the known high-capacity activity causing false alerts.

Note: When enabled, the SNMP Driver will automatically create Network Analyst tags for a switch device.

Trap Tags

Trap tags are a notification mechanism for incoming trap messages, which may be generic or Enterprise-specific.

Version 1 Trap Tags

The syntax for a generic SNMP Version 1 trap tag is as follows:

TRAP_V1:.1.3.6.1.2.1.11:Gx

All V1 generic traps use this same OID. The ':Gx' field specifies the generic trap to which it is subscribed. Valid values for x are as follows:

coldStart: 0
warmStart: 1
linkDown: 2
linkUp: 3
authenticationFailure: 4
egpNeighborLoss: 5

For Enterprise-specific traps, the Enterprise OID is used in place of the generic OID in addition to a ':G6' field. Trap type 6 also requires a specific trap type, using the notation ':Sx' where x is the specific trap number. For example, an Enterprise-specific address may appear as follows:

TRAP_V1:.1.3.6.1.2.1.17:G6:S2

Note: For information on which Enterprise-specific traps may be sent, refer to the device manufacturer's help documentation.

To reset Boolean tags that transition to 1 on trap reception, users can write 0. To reset the notification tag for OPC clients who receive OnDataChange events for subsequent trap messages, users can write a 0 or a FALSE value.

Additionally, linkUp, linkDown and Enterprise traps may use the ':Px' field to specify which port will be monitored on the switch device. Enterprise traps must provide an "ifIndex" varbind for this to be useful. An incoming trap will populate both the port specific tag and the base tag. For example, a tag that monitors for linkDown on port 3 is as follows:

TRAP_V1:.1.3.6.1.2.1.11:G2:P3

Version 2c Trap Tags

The syntax for a generic SNMP Version 2C trap uses a set of OIDs in place of the ':Gx' field.

coldStart: .1.3.6.1.6.3.1.1.5.1
warmStart: .1.3.6.1.6.3.1.1.5.2
linkDown: .1.3.6.1.6.3.1.1.5.3
linkUp: .1.3.6.1.6.3.1.1.5.4
authenticationFailure: .1.3.6.1.6.3.1.1.5.5

Note: egpNeighborLoss generic traps are not implemented in SNMP Version 2C.

For example, a tag to monitor for linkDown on port 3 is as follows:

TRAP_V2C:.1.3.6.1.6.3.1.1.5.3:P3

Version 2C Enterprise-specific traps use the OID that the remote device places in the snmpTrapOID.0 varbind field. No specific trap field is used. Version 2C doesn't use the specific trap property. For information on which Enterprise-specific traps may be sent, refer to the device manufacturer's documentation.

SNMP Version 2c and Version 3 Informs

Some SNMPv2c and SNMPv3 devices may support Informs (confirmed traps). For convenience, all SNMP Version 2c Trap Tag definitions can be used for both traps and Inform-requests: this does not require that the SNMP Driver be configured to receive SNMP informs.

Additional Functionality

All trap tags may use a table-like syntax for accessing additional trap information. The virtual table fields are as follows:

[1] Local time stamp, generated on trap arrival (string).
[2] Enterprise OID (string).
[3] Generic trap type (int).
[4] Specific trap type (int, 0 unless the generic type is 6).
[5] SysUpTime (in timeticks, not a time stamp).
[6] Number of varbind items.
[7] First varbind OID (as string).
[8] First varbind value (as string).
[9]..[n] Successive varbinds.

All the virtual table tags are Read Only. Automatic Tag Generation provides a number of virtual table tags by default.

Note 1: Virtual table entry [5], sysUpTime, refers to the trap event's time-of-occurrence. This is expressed as the number of timeticks beginning when the remote SNMP agent started. It does not represent any specific wall/clock time.

Note 2: Although the older trap syntax (which is the OID to be monitored followed by a (T) modifier) is deprecated, it is still supported. The older syntax does not support the virtual table information.

Historical Data Attributes

Addresses may be accompanied by one of three modifiers in order to access historical attributes. Historical values are generated by the SNMP Driver (not the remote Agent or device) when valid historical modifiers append to an OID. For more information, select a link from the list below.

Previous Value (PV)
Delta Time (DT)
Moving Average (MA5)

Previous Value

The Previous Value historical attribute returns the value of the SNMP address from the previous read cycle. This is not the previous differing value. If the address data has not changed, the previous value will be the same as the current value.

(Module::Object notation)
RFC1213-MIB::ifOutOctets.1(PV)

(Numeric notation)
.1.3.6.1.2.1.2.2.1.16.1(PV)

(Verbose notation)
.iso.org.dod.internet.mgmt.mib-2.interfaces.ifTable.ifEntry.ifOutOctets.1(PV)

Delta Time

The Delta Time historical attribute returns the time difference between the current and previous read cycle, and is expressed in whole seconds for compatibility with legacy projects. Delta values of less than 1 second will report as 0.

(Module::Object notation)
RFC1213-MIB::ifOutOctets.1(DT)

(Numeric notation)
.1.3.6.1.2.1.2.2.1.16.1(DT)

(Verbose notation)
.iso.org.dod.internet.mgmt.mib-2.interfaces.ifTable.ifEntry.ifOutOctets.1(DT)

Moving Average

The Moving Average historical attribute returns the average of the last *n* readings, as specified in the address modifier. The modifier form is Max, where *x* is the number of points to use in calculating the moving average. Values for *x* may be anything larger than 1. If the *x* value is left out, the moving average calculation defaults to 5 points.

(Module::Object notation)
RFC1213-MIB::ifOutOctets.1(MA5)

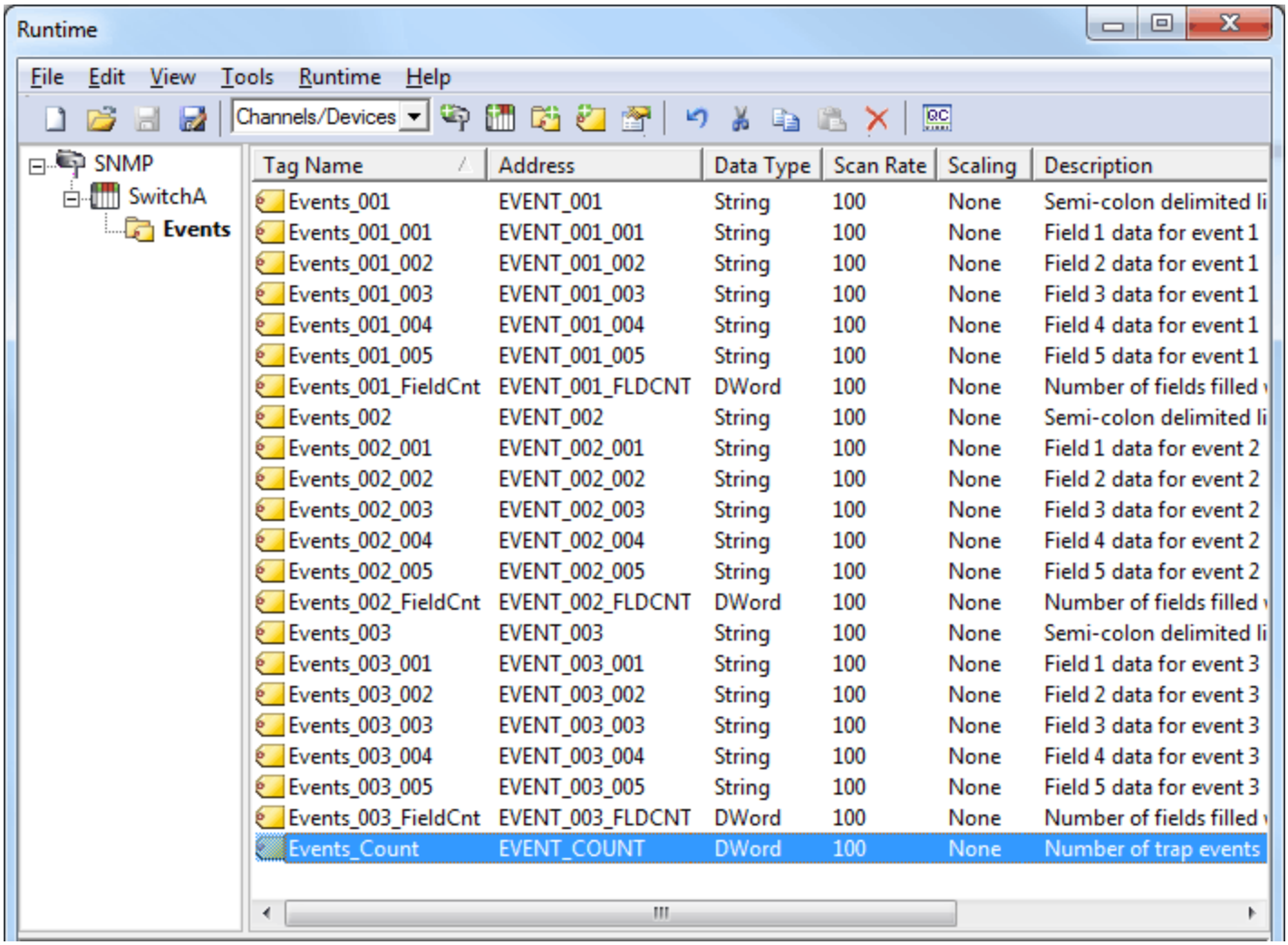
(Numeric notation)
.1.3.6.1.2.1.2.2.1.16.1(MA5)

(Verbose notation)
.iso.org.dod.internet.mgmt.mib-2.interfaces.ifTable.ifEntry.ifOutOctets.1(MA5)

Trap Events Queue

SNMP remote devices may be configured to send unsolicited messages back to the SNMP Driver. To configure traps, users must login to the device to check the SNMP settings and then enable the traps. This includes defining Host IP(s) to receive the trap notifications. Since configuration changes usually require warm or cold restart of the device, users should check related network dependencies before performing a restart. Description of the messages are as follows:

- **Receiving Trap Messages:** These messages are configured during SNMP Driver setup. They may also be referred to as Notification messages. For more information, refer to **Communications Parameters**.
- **Incoming Trap Messages:** These messages are placed into an Events queue. The most recent message is placed at position 1.



Tag Name	Address	Data Type	Scan Rate	Scaling	Description
Events_001	EVENT_001	String	100	None	Semi-colon delimited li
Events_001_001	EVENT_001_001	String	100	None	Field 1 data for event 1
Events_001_002	EVENT_001_002	String	100	None	Field 2 data for event 1
Events_001_003	EVENT_001_003	String	100	None	Field 3 data for event 1
Events_001_004	EVENT_001_004	String	100	None	Field 4 data for event 1
Events_001_005	EVENT_001_005	String	100	None	Field 5 data for event 1
Events_001_FieldCnt	EVENT_001_FLDCNT	DWord	100	None	Number of fields filled
Events_002	EVENT_002	String	100	None	Semi-colon delimited li
Events_002_001	EVENT_002_001	String	100	None	Field 1 data for event 2
Events_002_002	EVENT_002_002	String	100	None	Field 2 data for event 2
Events_002_003	EVENT_002_003	String	100	None	Field 3 data for event 2
Events_002_004	EVENT_002_004	String	100	None	Field 4 data for event 2
Events_002_005	EVENT_002_005	String	100	None	Field 5 data for event 2
Events_002_FieldCnt	EVENT_002_FLDCNT	DWord	100	None	Number of fields filled
Events_003	EVENT_003	String	100	None	Semi-colon delimited li
Events_003_001	EVENT_003_001	String	100	None	Field 1 data for event 3
Events_003_002	EVENT_003_002	String	100	None	Field 2 data for event 3
Events_003_003	EVENT_003_003	String	100	None	Field 3 data for event 3
Events_003_004	EVENT_003_004	String	100	None	Field 4 data for event 3
Events_003_005	EVENT_003_005	String	100	None	Field 5 data for event 3
Events_003_FieldCnt	EVENT_003_FLDCNT	DWord	100	None	Number of fields filled
Events_Count	EVENT_COUNT	DWord	100	None	Number of trap events

Trap messages may carry several variables or components of information. These variables are placed into the Event field tags. When a new trap is received, the entire message is placed into address EVENTS_001 as a semicolon-delimited string. Each component is broken into EVENTS_001_001, EVENTS_001_002, EVENTS_001_003 and so forth. The EVENTS_001_FLDCNT address contains the number of fields found in the trap message.

Some SNMPv2c and SNMPv3 devices support Inform-requests. Informs are a more reliable way for SNMP devices to send unsolicited messages to an SNMP manager. When the SNMP Driver receives an Inform, a response message containing the OIDs contained within the Inform is returned to the device. This provides a way for SNMP managers to verify the receipt of these unsolicited messages. For SNMPv3, this means that the SNMP device is required to authenticate and encrypt the Inform (which may require additional device configuration). For more information on SNMP Inform and/or SNMPv3 configuration, refer the device manufacturer's manual.

Note: The address EVENTS_COUNT increments with each incoming trap message. To reset the counter, users can write a new value. To reset the EVENTS_COUNT address from client applications, users can write a zero.

Auto Created Trap Tags

If traps are enabled, a set of trap tags will be created for the trap OIDs present in the device profile. For the Ethernet Switch and Other Device profiles, these will be coldStart, warmStart, linkUp and linkDown. A base tag is created for each of these, along with 20 table entries representing the first 20 rows of the virtual trap message table. For more information on table entries, refer to **Trap Tags**.

Note: Trap OIDs defined in any included MIB modules will also have a similar set of trap tags created.

Error Descriptions

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

Address Validation

Address '<address>' is out of range for the specified device or register
Data Type '<type>' is not valid for device address '<address>'
Device address '<address>' contains a syntax error
Device address '<address>' is read only
The remote device reports that the requested name <OID> does not exist on <Device Name>

Runtime Error Messages

'<channel name>.<device name>': unable to open a SNMP session to host '<host>' on port <port>, using protocol <protocol>
'<channel name>.<device name>': Unable to establish a trap listener on port <port>, using protocol <protocol>. No trap events will be received
Access to address'<address>' on '<channel name>.<device name>' is not permitted
Address '<address>' on '<channel name>.<device name>' is not writable
Address '<address>' on '<channel name>.<device name>' is unavailable
Device '<device name>' does not support the necessary information required to perform network analysis. Network Analyst tags will be disabled for this device
Device '<device name>' does not support the number of ports currently configured in this application. Network Analyst tags will be disabled for this device
Device '<device name>' is not responding
Device Discovery has exceeded <max devices> maximum allowed devices
High capacity counters for network analysis are not available for device <Device Name>. Attempting to use low capacity counters
The remote device reports that the requested name '<name>' does not exist on '<channel name>.<device name>'
The response message for the current transaction on '<channel name>.<device name>' would have been too large, and has been discarded by the remote device
Unable to bind trap socket on binding address '<address>', port '<port>' and protocol '<protocol>' for device '<device>'
Unable to bind trap socket on binding address <IP Address>, port <Port Number> and protocol <Protocol> for device <Device Name>
Unable to create communications thread on trap socket for binding address <IP Address>, port <Port Number> and protocol <Protocol> for device <Device Name>
Unable to create listener on trap socket for binding address <IP Address>, port <Port Number> and protocol <Protocol> for device <Device Name>
Unable to create trap socket on binding address <IP Address>, port <Port Number> and protocol <Protocol> for device <Device Name>
Unable to load authentication and privacy passphrases for device '<device name>'. Please specify an authentication and privacy passphrase in the SNMP v3 Security tab of Device Properties
Unable to load authentication passphrase for device '<device name>'. Please specify an authentication passphrase in the SNMP v3 Security tab of Device Properties
Unable to load username for device '<device name>'. Please specify a username in the SNMP v3 Security tab of Device Properties
Unable to resolve host address <IP Address> on device <Device Name> for trap processing
Unable to send transaction: <reason>

SNMP Agent Error Messages

Data for address '<address>' on '<channel name>.<device name>' has an inconsistent value
Data for address '<address>' on '<channel name>.<device name>' has the wrong encoding
Data for address '<address>' on '<channel name>.<device name>' has the wrong length
Data for address '<address>' on '<channel name>.<device name>' has the wrong value

XML Error Messages

Invalid XML document [Reason: The excluded port list is invalid for device <device name>]
Invalid XML document [Reason: Port Status 0 limit must be less than Port Status 1 limit for device <device name>]

Communications Error Messages

Unable to bind to adapter: '<Adapter Address>'. Connect failed. Winsock Err # n

Winsock initialization failed (OS Error = n)
Winsock shut down failed (OS Error = n)
Winsock V1.1 or higher must be installed to use the SNMP device driver

Authentication Error Messages

The authentication passphrase fields do not match. Please retype the passphrase identically in both fields
The privacy passphrase fields do not match. Please retype the passphrase identically in both fields

MIB Parser Error Messages

Cannot redefine macro name
Cannot redefine primitive type
Close IMPORTS statement with a ';'
Could not add object: '<object name>'; parent object: '<parent object name>' undefined
Could not find module: '<module name>' to import
Could not obtain MIB module information
DEFINITIONS must directly follow MIB module name
End one module definition before beginning another
Failed to open file: '<file path>'
Invalid assignment value
Invalid DESCRIPTION value
Invalid ENTERPRISE value
Invalid MAX-ACCESS value
Invalid module name
Invalid NOTIFICATION-TYPE clause
Invalid object assignment
Invalid OBJECT-IDENTITY clause
Invalid OBJECT-TYPE clause
Invalid OBJECTS value
Invalid octet or bit string
Invalid parent object name
Invalid STATUS value
Invalid SYNTAX value
Invalid TRAP-TYPE assignment
Invalid TRAP-TYPE clause
Open bracket not closed
Open parenthesis not closed
Sub-identifier out of range: 0 to 4294967295
Syntax Error
Undefined identifier: '<identifier name>'

Security Related Error Messages

'<channel name>.<device name>' reports a decryption error. Check the privacy passphrase
'<channel name>.<device name>' reports the authentication digest is incorrect. Check the authentication passphrase
'<channel name>.<device name>' reports the request was not within the time window
'<channel name>.<device name>' reports the specified security level is not supported
'<channel name>.<device name>' reports the specified user is unknown
'<channel name>.<device name>' responded to a request with a Report-PDU containing no valid data

Address Validation

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

Address Validation

Address '<address>' is out of range for the specified device or register
Data Type '<type>' is not valid for device address '<address>'
Device address '<address>' contains a syntax error
Device address '<address>' is read only
The remote device reports that the requested name <OID> does not exist on <Device Name>

Address '<address>' is out of range for the specified device or register

Error Type:
Warning

Possible Cause:
A tag address that has been specified dynamically references a location that is beyond the range of supported locations for the device.

Solution:
Verify the address is correct; if it is not, re-enter it in the client application.

Data Type '<type>' is not valid for device address '<address>'

Error Type:
Warning

Possible Cause:
A tag address that has been specified statically has been assigned an invalid data type.

Solution:
Modify the requested data type in the client application.

Device address '<address>' contains a syntax error

Error Type:
Warning

Possible Cause:
An invalid tag address has been specified in a dynamic request.

Solution:
Re-enter the address in the client application.

Device address '<address>' is read only

Error Type:
Warning

Possible Cause:
A tag address that has been specified statically has a requested access mode that is not compatible with what the device supports for that address.

Solution:
Change the access mode in the client application.

The remote device reports that the requested name <OID> does not exist on <device name>

Error Type:
Warning

Possible Cause:
An object in the project is not available in the physical device. It has been deactivated.

Solution:
1. Remove the object from the project.
2. It is possible that the process the object is referring to is disabled in the physical device. Make sure it is enabled. The error should not occur in the next request.

Runtime Error Messages

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

Runtime Error Messages

'<channel name>.<device name>': unable to open a SNMP session to host '<host>' on port <port>, using protocol <protocol>
'<channel name>.<device name>': Unable to establish a trap listener on port <port>, using protocol <protocol>. No trap events will be received
Access to address'<address>' on '<channel name>.<device name>' is not permitted
Address '<address>' on '<channel name>.<device name>' is not writable
Address '<address>' on '<channel name>.<device name>' is unavailable
Device '<device name>' does not support the necessary information required to perform network analysis. Network Analyst tags will be disabled for this device
Device '<device name>' does not support the number of ports currently configured in this application. Network Analyst tags will be disabled for this device
Device '<device name>' is not responding
Device Discovery has exceeded <max devices> maximum allowed devices
High capacity counters for network analysis are not available for device <Device Name>. Attempting to use low capacity counters
The remote device reports that the requested name '<name>' does not exist on '<channel name>.<device name>'
The response message for the current transaction on '<channel name>.<device name>' would have been too large, and has been discarded by the remote device
Unable to bind trap socket on binding address '<address>', port '<port>' and protocol '<protocol>' for device '<device>'
Unable to bind trap socket on binding address <IP Address>, port <Port Number> and protocol <Protocol> for device <Device Name>
Unable to create communications thread on trap socket for binding address <IP Address>, port <Port Number> and protocol <Protocol> for device <Device Name>
Unable to create listener on trap socket for binding address <IP Address>, port <Port Number> and protocol <Protocol> for device <Device Name>
Unable to create trap socket on binding address <IP Address>, port <Port Number> and protocol <Protocol> for device <Device Name>
Unable to load authentication and privacy passphrases for device '<device name>'. Please specify an authentication and privacy passphrase in the SNMP v3 Security tab of Device Properties
Unable to load authentication passphrase for device '<device name>'. Please specify an authentication passphrase in the SNMP v3 Security tab of Device Properties
Unable to load username for device '<device name>'. Please specify a username in the SNMP v3 Security tab of Device Properties
Unable to resolve host address <IP Address> on device <Device Name> for trap processing
Unable to send transaction: <reason>

'<channel name>.<device name>': unable to open a SNMP session to host '<host>' on port <port>, using protocol <protocol>

Error Type:
Warning

Possible Cause:
1. The Device ID contains a bad IP address or hostname.
2. The port specified is incorrect for the remote device.
3. The protocol specified is incorrect for the remote device.

Solution:
Check the Device Properties and ensure that the Device ID and Port and Protocol are correct.

See Also:
Device ID
Communication Parameters

'<channel name>.<device name>': Unable to establish a trap listener on port <port>, using protocol <protocol>. No trap events will be received

Error Type:
Warning

Possible Cause:
The specified port is unavailable for listening.

Solution:
1. Check for other applications listening for IP traffic on the chosen port.
2. Ensure that the Windows SNMP Trap Service is not running on the OPC server host machine.

Access to address '<address>' on '<channel name>.<device name>' is not permitted

Error Type:
Warning

Possible Cause:
The remote SNMP does not permit access to the requested SNMP OID.

Solution:
Verify that the community name is correct and permits access to the address.

See Also:
About SNMP Addresses
Communication Parameters

Address '<address>' on '<channel name>.<device name>' is not writable

Error Type:
Warning

Possible Cause:
The configured community name does not have write privileges for this address.

Solution:
Verify that the community name is correct and permits write access to the address.

See Also:
About SNMP Addresses
Communication Parameters

Address '<address>' on '<channel name>.<device name>' is unavailable

Error Type:
Warning

Possible Cause:
A tag address that has been specified dynamically references a location that is beyond the range of supported locations for the device.

Solution:
Verify the address is correct; if it is not, re-enter it in the client application.

Device '<device name>' does not support the necessary information required to perform network analysis. Network Analyst tags will be disabled for this device

Error Type:
Warning

Possible Cause:
Although Network Analyst functions were selected, the device does not support the OIDs required by this function.

Solution:
Disable the device's Network Analyst functions.

Device '<device name>' does not support the number of ports currently configured in this application. Network Analyst tags will be disabled for this device

Error Type:
Warning

Possible Cause:
The number of ports specified in the Network Analyst settings exceeds the number of ports available in the device.

Solution:
Verify the number of ports in the device. Then, edit the Network Analyst tab in Device Properties in order to regenerate the project tags with the correct number of ports specified.

Device '<device name>' is not responding

Error Type:
Serious

Possible Cause:
1. The Ethernet connection between the device and the Host PC is broken.
2. The named device may have been assigned an incorrect IP address.
3. The requested address is not available in the device.
4. The response from the device took longer to receive than the amount of time specified in the "Request Timeout" device setting.

Solution:
1. Verify the cabling between the PC and the device network.
2. Verify that the IP address given to the named device matches that of the actual device.
3. Verify that the device supports the requested address.
4. Increase the Request Timeout setting so that the entire response can be handled.

Device Discovery has exceeded <max devices> maximum allowed devices

Error Type:
Warning

Possible Cause:
The Device Discovery has exceeded the maximum number of allowed devices.

Solution:
Limit the discovery range and then try again.

High capacity counters for network analysis are not available for device <device name>. Attempting to use low capacity counters

Error Type:
Warning

Possible Cause:
The device does not support the 64 bit counters that the project is created with. The server is attempting to use low capacity 32 bit counters instead.

Solution:
1. Verify that the supplied MIB is correct.
2. Edit the MIB to reflect the correct counter type and then import again.

The remote device reports that the requested name '<name>' does not exist on '<channel name>.<device name>'

Error Type:
Warning

Possible Cause:

The remote SNMP Agent has not implemented the requested SNMP OID.

Solution:
Remove the tag referring to the address.

See Also:
About SNMP Addresses

The response message for the current transaction on '<channel name>.<device name>' would have been too large, and has been discarded by the remote device

Error Type:
Warning

Possible Cause:
The remote SNMP Agent was unable to fit the requested data into a single SNMP reply.

Solution:
Reduce the number of items per request. For older SNMP V1 Agents, this may need to be as low as 1.

See Also:
Communication Parameters

Unable to bind trap socket on binding address '<address>', port '<port>' and protocol '<protocol>' for device '<device>'

Error Type:
Fatal

Possible Cause:
More than one channel has been assigned the same IP address, with SNMP Trap Support enabled.

Solution:
1. The trap socket is only allowed to bind to one IP address: ensure that that IP address is the one assigned to the PC.
2. Ensure that SNMP Trap Support is not enabled on more than one channel using the same address.

Unable to bind trap socket on binding address <IP Address>, port <Port Number> and protocol <Protocol> for device <Device Name>

Error Type:
Warning

Possible Cause:
Unable to bind the trap socket to the specified network card.

Solution:
Some other application has already bound a socket to the binding address/port pair.

Unable to create communications thread on trap socket for binding address <IP Address>, port <Port Number> and protocol <Protocol> for device <Device Name>

Error Type:
Warning

Possible Cause:
A thread that handles unsolicited communications for the specified socket/port and protocol could not be created.

Solution:
1. Check the operating system's event log for resource errors.
2. Check the number of process threads being used by the OPC server. Some older operating systems will limit the number of process threads to 1024 per process. For newer operating systems, this is limited by available memory.

Unable to create listener on trap socket for binding address <IP Address>, port <Port Number> and protocol <Protocol> for device <Device Name>

Error Type:
Warning

Possible Cause:
An incoming connection request (TCP/IP only) could not be listened for.

Solution:
1. Verify that there is not a resource conflict.
2. Verify that the remote device is able to establish a connection to the trap socket.

Unable to create trap socket on binding address <IP Address>, port <Port Number> and protocol <Protocol> for device <Device Name>

Error Type:
Warning

Possible Cause:
The server was unable to create the specified trap socket on the bound network card.

Solution:
1. Check for other applications listening for IP traffic on the chosen port and IP address.
2. Ensure that the Windows SNMP Trap Service is not running on the OPC server host machine.

Unable to load authentication and privacy passphrases for device '<device name>'. Please specify an authentication and privacy passphrase in the SNMP v3 Security tab of Device Properties

Error Type:
Warning

Possible Cause:
The authentication and privacy passphrases failed to load from the XML project file.

Solution:
Specify both an authentication and privacy passphrase in the **SNMP v3 Security** tab located in **Device Properties**.

See Also:
SNMP v3 Security

Unable to load authentication passphrase for device '<device name>'. Please specify an authentication passphrase in the SNMP v3 Security tab of Device Properties

Error Type:
Warning

Possible Cause:
The authentication passphrase failed to load from the XML project.

Solution:

Specify an authentication passphrase in the **SNMP v3 Security** tab located in **Device Properties**.

See Also:
SNMP v3 Security

Unable to load username for device '<device name>'. Please specify a username in the SNMP v3 Security tab of Device Properties

Error Type:
Warning

Possible Cause:
1. An OPF or XML project file was saved without a username specified in the **SNMP v3 Security** tab located in **Device Properties**.
2. An XML project file was manually edited to remove the username.

Solution:
Specify a username in SNMP v3 Security.

See Also:
SNMP v3 Security

Unable to resolve host address <IP Address> on device <Device Name> for trap processing

Error Type:
Warning

Possible Cause:
The server's Hostname Resolver is unable to resolve the hostname string for the device to an IP address.

Solution:
1. Verify the spelling of the hostname.
2. If the connection was working before, verify the Cache Lifetime settings in the Server Runtime Hostname Resolution settings.

Unable to send transaction: <reason>

The following error/warning messages concern transaction transmission to the remote device.

Reason	Possible Cause	Solution
Generic error	The protocol subsystem has reported a non-specific error.	N/A
Invalid local port	The local port may be restricted or in use.	Select an available port.
Unknown host	The remote hostname did not resolve.	Check the Device ID.
Unknown session	The SNMP session terminated unexpectedly.	Disconnect and reconnect the client to refresh the session.
Too long	The SNMP message was too long.	Reduce the number of items per request.
No socket	The local port may be restricted or in use.	Select an available port.
Failure in send to	Unable to send the transaction.	Check the Device ID and port.
Bad community specified	Bad community specified.	Check the community name.
Authentication failure	Incorrect password, community or key.	Check the community name.
MIB not initialized	MIB module file is not installed.	Check that the MIB module file is installed.

SNMP Agent Error Messages

The following errors reflect problems with the data received from the remote SNMP Agent. They are advisory and no local action is indicated.

SNMP Agent Error Messages
Data for address '<address>' on '<channel name>.<device name>' has an inconsistent value
Data for address '<address>' on '<channel name>.<device name>' has the wrong encoding
Data for address '<address>' on '<channel name>.<device name>' has the wrong length
Data for address '<address>' on '<channel name>.<device name>' has the wrong value

Data for address '<address>' on '<channel name>.<device name>' has an inconsistent value

Error Type:
Advisory

Possible Cause:
Problem with the data received from the remote SNMP Agent. Data for address has an inconsistent value.

Solution:
Check configuration of the remote SNMP Agent.

Data for address '<address>'on '<channel name>. <device name>' has the wrong encoding

Error Type:
Advisory

Possible Cause:
Problem with the data received from the remote SNMP Agent. Data for address has the wrong encoding.

Solution:
Check configuration of the remote SNMP Agent.

Data for address '<address>'on '<channel name>.<device name>' has the wrong length

Error Type:
Advisory

Possible Cause:
Problem with the data received from the remote SNMP Agent. Data for address has the wrong length.

Solution:
Check configuration of the remote SNMP Agent.

Data for address '<address>'on '<channel name>. <device name>' has the wrong value

Error Type:
Advisory

Possible Cause:
Problem with the data received from the remote SNMP Agent. Data for address has the wrong value.

Solution:
Check configuration of the remote SNMP Agent.

XML Error Messages

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

XML Error Messages
Invalid XML document [Reason: The excluded port list is invalid for device <device name>]
Invalid XML document [Reason: Port Status 0 limit must be less than port Status 1 limit for device <device name>]

Invalid XML document [Reason: The excluded port list is invalid for device <device name>]

Error Type:
Fatal

Possible Cause:
The XML project file was edited such that the ExcludePorts element for the device is invalid.

Solution:
Search the XML project file for the ExcludePorts element of the device and make sure that the string value complies with the following guidelines:

1. Port numbers are in ascending order.
2. Port numbers are separated by a comma. For example, 1,3,10.
3. A hyphen may be used for consecutive ports in order to indicate a range. For example, 2, 5-7, 15-18.
4. Port numbers are in the range 1-'Number of Ports' setting.

See Also:
Network Analyst Tags

Invalid XML document [Reason: Port Status 0 limit must be less than Port Status 1 limit for device <device name>]

Error Type:
Fatal

Possible Cause:
The XML project file was edited such that the PortStatusLimit0 element for the device has an integer value that is greater than or equal to the integer value of the corresponding PortStatusLimit1 element.

Solution:
Search the XML project file for the PortStatusLimit0 element of the device and make sure that the integer value is less than the integer value of the corresponding PortStatusLimit1 element.

See Also:
Network Analyst Tags

Communications Error Messages

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

Communications Error Messages
Unable to bind to adapter: '<Adapter Address>'. Connect failed. Winsock Err # n
Winsock initialization failed (OS Error = n)
Winsock shut down failed (OS Error = n)
Winsock V1.1 or higher must be installed to use the SNMP device driver

Unable to bind to adapter: '<Adapter Address>'. Connect failed. Winsock Err # n

Error Type:
Fatal

Possible Cause:
The driver was unable to bind to the specified network adapter, which is necessary for communications with the device. This may have occurred because of the following:

1. The adapter is disabled or no longer exists
2. There was a network system failure (such as Winsock or network adapter failure).
3. There are no more available ports.

Solution:

1. Check the Network Adapter list in the communications server application for network adapters available on the system. If '<adapter>' is not in this list, steps should be taken to make it available to the system. This includes verifying that the network connection is enabled and connected in the PC's Network Connections.
2. Determine how many channels are using the same '<adapter>' in the communications server application. Reduce this number so that only one channel is referencing '<adapter>'. If the error still occurs, check to see if other applications are using that adapter and then shut down those applications.

Winsock initialization failed (OS Error = n)

Error Type:
Fatal

OS Error	Indication	Possible Solution
10091	Indicates that the underlying network subsystem is not ready for network communication.	Wait a few seconds and restart the driver.
10067	Limit on the number of tasks supported by the Windows Sockets implementation has been reached.	Close one or more applications that may be using Winsock and restart the driver.

Winsock shut down failed (OS Error = n)

Error Type:
Fatal

Possible Cause:
The network was unable to disable or shut down a network connection.

Solution:
NA.

Winsock V1.1 or higher must be installed to use the SNMP device driver

Error Type:
Fatal

Possible Cause:
The version number of the Winsock DLL found on the system is less than 1.1.

Solution:
Upgrade Winsock to version 1.1 or higher.

Authentication Error Messages

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

Authentication Error Messages
The authentication passphrase fields do not match. Please retype the passphrase identically in both fields
The privacy passphrase fields do not match. Please retype the passphrase identically in both fields

The authentication passphrase fields do not match. Please retype the passphrase identically in both fields

Error Type:
Information

Possible Cause:
The authentication passphrase entered in the server does not match the passphrase entered into the remote device.

Solution:
Enter the correct passphrase.

The privacy passphrase fields do not match. Please retype the passphrase identically in both fields

Error Type:
Information

Possible Cause:
The privacy passphrase entered in the server does not match the passphrase entered into the remote device.

Solution:
Enter the correct passphrase.

MIB Parser Error Messages

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

MIB Parser Error Messages

Cannot redefine macro name
Cannot redefine primitive type
Close IMPORTS statement with a ';'
Could not add object: '<object name>'; parent object: '<parent object name>' undefined
Could not find module: '<module name>' to import
Could not obtain MIB module information
DEFINITIONS must directly follow MIB module name
End one module definition before beginning another
Failed to open file: '<file path>'
Invalid assignment value
Invalid DESCRIPTION value
Invalid ENTERPRISE value
Invalid MAX-ACCESS value
Invalid module name
Invalid NOTIFICATION-TYPE clause
Invalid object assignment
Invalid OBJECT-IDENTITY clause
Invalid OBJECT-TYPE clause
Invalid OBJECTS value
Invalid octet or bit string
Invalid parent object name
Invalid STATUS value
Invalid SYNTAX value
Invalid TRAP-TYPE assignment
Invalid TRAP-TYPE clause
Open bracket not closed
Open parenthesis not closed
Sub-identifier out of range: 0 to 4294967295
Syntax Error
Undefined identifier: '<identifier name>'

Cannot redefine macro name

Error Type:
Warning

Possible Cause:
An object's name is the same as a macro's name.

Solution:
Change the object's name, in addition to any references made to the object. Then, re-import the MIB file.

Cannot redefine primitive type

Error Type:
Warning

Possible Cause:
An object's name is the same as a primitive data type.

Solution:
Change the object's name, in addition to any references made to the object. Then, re-import the MIB file.

Close IMPORTS statement with a ';'

Error Type:
Error

Possible Cause:
The semicolon was excluded from the end of the MIB's IMPORTS section.

Solution:
Correct the error and then re-import the MIB file.

Could not add object: '<object name>'; parent object: '<parent object name>' undefined

Error Type:
Warning

Possible Cause:
The parent object referenced in an object's definition is either misspelled or undefined.

Solution:
Correct the error and then re-import the MIB file.

Could not find module: '<module name>' to import

Error Type:
Warning

Possible Cause:
The module referenced in the MIB's IMPORTS section is not in the same directory as the module being imported.

Solution:
Add the MIB file to the same directory as the dependent MIB file, and then re-import.

Could not obtain MIB module information

Error Type:
Error

Possible Cause:
1. The selected file is not a MIB file.
2. The MIB file is not defined correctly.

Solution:
Verify that the MIB file begins with "'<module name>' DEFINITIONS". If it does not, correct the error and then re-import the MIB file.

DEFINITIONS must directly follow MIB module name

Error Type:
Error

Possible Cause:
The token preceding DEFINITIONS is not a valid identifier.

Solution:
Correct the error and then re-import the MIB file.

End one module definition before beginning another

Error Type:
Warning

Possible Cause:
The MIB file defined a new module before the 'END' token in the previous module.

Solution:
Signify the end of the previous module with 'END' and then re-import the MIB file.

Failed to open file: '<file path>'

Error Type:
Error

Possible Cause:
The driver was not able to load the MIB file, which may be locked by another process.

Solution:
Try to re-import the MIB file.

Invalid assignment value

Error Type:
Warning

Possible Cause:
The right half of an assignment is not a primitive type, an identifier that resolves to a primitive type, or a TEXTUAL-CONVENTION.

Solution:
Correct the error and then re-import the MIB file.

Invalid DESCRIPTION value

Error Type:
Warning

Possible Cause:
The object's DESCRIPTION value is not a quoted string.

Solution:
Correct the error and then re-import the MIB file.

Invalid ENTERPRISE value

Error Type:
Warning

Possible Cause:
The TRAP-TYPE ENTERPRISE value is not an identifier or an OID.

Solution:
Correct the error and then re-import the MIB file.

Invalid MAX-ACCESS value

Error Type:
Warning

Possible Cause:
The object's ACCESS/MAX-ACCESS value is not valid.

Solution:
Correct the error and then re-import the MIB file.

Invalid module name

Error Type:
Error

Possible Cause:
A reserved word was used as a module name.

Solution:
Change the module's name, in addition to any references made to the module. Then, re-import the MIB file.

Invalid NOTIFICATION-TYPE clause

Error Type:
Warning

Possible Cause:
The NOTIFICATION-TYPE clause is either misspelled or undefined.

Solution:
Correct the error and then re-import the MIB file.

Invalid object assignment

Error Type:
Warning

Possible Cause:
The object's value is not a valid OID.

Solution:
Correct the error and then re-import the MIB file.

Invalid OBJECT-IDENTITY clause

Error Type:
Warning

Possible Cause:
The OBJECT-IDENTITY clause is either misspelled or undefined.

Solution:
Correct the error and then re-import the MIB file.

Invalid OBJECT-TYPE clause

Error Type:
Warning

Possible Cause:
The OBJECT-TYPE clause is either misspelled or undefined.

Solution:
Correct the error and then re-import the MIB file.

Invalid OBJECTS value

Error Type:
Warning

Possible Cause:
The value of an OBJECT or VARIABLE begins does not begin with an open curly brace.

Solution:
Correct the error and then re-import the MIB file.

Invalid octet or bit string

Error Type:
Error

Possible Cause:
1. A character besides 0-F was included within an octet string.
2. The character 'h' or 'b' was excluded from the end of a string.

Solution:
Correct the error and then re-import the MIB file.

Invalid parent object name

Error Type:
Warning

Possible Cause:
The parent object referenced in an object's definition is not an identifier.

Solution:
Correct the error and then re-import the MIB file.

Invalid STATUS value

Error Type:
Warning

Possible Cause:
The object's STATUS value is not valid.

Solution:
Correct the error and then re-import the MIB file.

Invalid SYNTAX value

Error Type:
Warning

Possible Cause:
The object's SYNTAX is neither a primitive type nor an identifier that resolves to a primitive type.

Solution:

Correct the error and then re-import the MIB file.

Invalid TRAP-TYPE assignment

Error Type:
Warning

Possible Cause:
The TRAP-TYPE's value is not a number.

Solution:
Correct the error and then re-import the MIB file.

Invalid TRAP-TYPE clause

Error Type:
Warning

Possible Cause:
The TRAP-TYPE clause is either misspelled or undefined.

Solution:
Correct the error and then re-import the MIB file.

Open bracket not closed

Error Type:
Error

Possible Cause:
A closing bracket was inadvertently omitted from the selected MIB file.

Solution:
Correct the error and then re-import the MIB file.

Open parenthesis not closed

Error Type:
Error

Possible Cause:
A closing parenthesis was inadvertently omitted from the selected MIB file.

Solution:
Correct the error and then re-import the MIB file.

Sub-identifier out of range: 0 to 4294967295

Error Type:
Error

Possible Cause:
An object's sub-identifier is out of the valid range of 0 to 4294967295.

Solution:
Correct the error and then re-import the MIB file.

Syntax Error

Error Type:
Warning

Possible Cause:
An unexpected token was encountered during parsing of the MIB file.

Solution:
Correct the error and then re-import the MIB file.

Undefined identifier: '<identifier name>'

Error Type:
Warning

Possible Cause:
An identifier referenced in an object's SYNTAX clause (or as the right half of an assignment) is undefined.

Solution:
Correct the error and then re-import the MIB file.

Security Related Error Messages

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

Security Related Error Messages
'<channel name>.<device name>' reports a decryption error. Check the privacy passphrase
'<channel name>.<device name>' reports the authentication digest is incorrect. Check the authentication passphrase
'<channel name>.<device name>' reports the request was not within the time window
'<channel name>.<device name>' reports the specified security level is not supported
'<channel name>.<device name>' reports the specified user is unknown
'<channel name>.<device name>' responded to a request with a Report-PDU containing no valid data

'<channel name>.<device name>' reports a decryption error. Check the privacy passphrase

Error Type:
Warning

Possible Cause:
The SNMP device was unable to decrypt the SNMP v3 Read/Write request because the encryption passphrase and/or authentication styles do not match.

Solution:
Verify that the encryption passphrases and authentication styles set in the SNMP device configuration match those specified in the SNMP Driver's Device Properties.

'<channel name>.<device name>' reports the authentication digest is incorrect. Check the authentication passphrase

Error Type:
Warning

Possible Cause:
The authentication passphrase and/or authentication style does not match the authentication passphrase and/or authentication style specified in the SNMP device configuration.

Solution:
Verify that the authentication passphrase and authentication style set in the SNMP device configuration matches those specified in the SNMP Driver's Device Properties.

'<channel name>.<device name>' reports the request was not within the time window

Error Type:
Warning

Possible Cause:
The device rejected the SNMP Read/Write request from the driver due to one of the following reasons:

1. The message was not received within 150 seconds of sending.
2. The SNMP Driver's time parameters are not synchronized with the SNMP device.

Solution:
In most cases, the SNMP Driver will synchronize the SNMP time parameters with the device, and then communicate with the device successfully.

'<channel name>.<device name>' reports the specified security level is not supported

Error Type:
Warning

Possible Cause:
The device does not support the specified SNMP security level.

Solution:
Verify that the security level set in the SNMP device matches the security level specified in the SNMP Driver's Device Properties.

See Also:
SNMP v3 Security

'<channel name>.<device name>' reports the specified user is unknown

Error Type:
Warning

Possible Cause:
The username specified in the SNMP Driver does not match the username configured in the SNMP device.

Solution:
Verify that the username set in the SNMP device configuration matches the username specified in the SNMP Driver's Device Properties.

'<channel name>.<device name>' responded to a request with a Report-PDU containing no valid data

Error Type:
Warning

Possible Cause:
The SNMP device/agent has responded with a report PDU that does not contain an OID (and is not supported by the driver).

Solution:
For more information on the report PDU, refer to the device manual.

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