

# SNMP Agent Configuration

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This chapter describes how to configure the Simple Network Management Protocol (SNMP) agent. It contains these sections:

- **SNMP Agent Configuration**  
Describes the SNMP Agent configuration member statements including SNMP, POOLDEF, COMMUNITY, VIEW, TRAP, LOGGING, and VARIABLE.
- **SNMCFGxx Customization**  
Describes how to configure the SNMCFGxx member of the PARM data set.

## SNMP Agent Configuration

SNMP provides a simple network management agent task. The SNMP protocol exchanges information about the status of a device. Abstract Syntax Notation (ASN) defines the format of Protocol Data Units (PDUs) within the management framework to obtain information from a device. The device may be a router, a bridge, or a host.

Cisco IOS for S/390 is implemented as a host that supports data in the Management Information Base (MIB) II, as described in RFC 1213. Responses are sent when an SNMP management station requests information about certain MIB quantities.

The SNM task group replies to SNMP (Simple Network Management Protocol) requests from management stations and generates traps. It uses UDP over the API interface. Standard SNMP sends responses to management requests over UDP port 161 and trap information over UDP port 162.

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**Note** SET requests are not supported.

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## Object Identifiers

MIB data groups are known as Object Identifiers (OIDs). These are defined below:

Object Identifier	Description
System	The managed node itself.
Interfaces	The network attachments.
Address Translation	The IP Address Translation table group is obsolete, but still supported.
IP	The Internet Protocol layer group contains these subgroups: IP Scalars—Overall status and counters for the IP layer. IP Address Table—The IP addresses supported by the network interfaces. IP Routing Table—The routing information table used to reach remote addresses. IP Net to Media Table—The hardware address table used for destination IP addresses Address Resolution Protocol (ARP).
ICMP	Counters for each ICMP message sent and received.
TCP	The Transmission Control Protocol group contains these subgroups: TCP Scalars—Overall status and counters for the TCP layer. TCP Connection Table—A description of each connection in TCP.
UDP	The User Datagram Protocol group contains these subgroups: UDP Scalars—Overall status and counters for the UDP layer. UDP Connection Table—A description of each UDP connection.
SNMP	The Simple Network Management Protocol group contains information and counters about the SNMP Layer.

## Supported Traps

The Cisco IOS for S/390 SNMP Agent supports the following traps:

- COLD-START occurs when the ACP Task Group (TCP/IP Stack) is brought up.
- WARM-START occurs when the SNM Task Group is brought up
- LINK-DOWN occurs when a network interface driver is de-activated within the ACP Task Group.
- LINK-UP occurs when a network interface driver is activated within the ACP Task Group.
- AUTHENTICATION FAILURE occurs when a management station attempts to obtain information using a community not defined in the SNMCFGxx PARM member.

## SNMP Activation

Activation of the SNMP Agent involves updating the SNMCFGxx member located in the PARM data set. Specific parameters that may be configured in this member include system MIB variables (sysLocation, sysContact, and sysName), SNMP community values, access mode values, view values, and trap values.

- Community defines a relationship between an SNMP Agent and one or more management stations.
- Access Mode relates to how a management station may access a particular OID. Valid values are READONLY and NONE.
- View defines a subset of object identifiers visible to a particular community.
- Trap defines which management station receives TRAP information.

A combination of these statements can be used to limit access to particular MIB variables and define which management stations will receive specific TRAPs.

The MIB II document describes data for Exterior Gateway Protocol (EGP); since Cisco IOS for S/390 does not support EGP, these MIB II variables are not reported on. The MIB II document also describes place holders for other variables related to network interfaces (for example, if Specific) and application layer variables. These may be supported in future releases, but are not currently supported.

## SNMCFGxx Customization

The SNMCFGxx member in the PARM data set specifies the configuration parameters for the SNM Task Group.

Specify the following in the START00 member of the PARM data set to invoke the SNMP agent in the Cisco IOS for S/390 task:

```
START SNM
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To specify an SNMCFGxx member other than the default of SNMCFG00, add CNFG=xx after the START SNM command, where xx is the two character suffix. The START command is described in detail in the *Cisco IOS for S/390 System Management Guide*.

## SNMP Statement Syntax

**SNMP** [PORT (*nn*)]

**POOLDEF** NAME (*poolname*)

**INITIAL** (*init\_pool\_size*)

**MINIMUM** (*min\_pool\_size*)

**EXPAND** (*amount*)

**CONTRACT** (*amount*)

**COMMUNITY** *community\_name* [[*ipaddress*] [*accessmode*] [*viewname*]]

**VIEW** *viewname* [*subtreename* [*subtreename*]]

**TRAP** *community\_name ipaddress*

**LOGGING** *level*

**THRESHOLD** *type fnum*

**VARIABLE** *variable\_name value*

## Syntax Description

<b>PORT</b> ( <i>nn</i> )	Specifies the UDP port number for SNMP to use. Traps are sent on UDP port nn+1. Internet standard SNMP uses UDP port 161 and 162.  Default: 161
<b>POOLDEF NAME</b> ( <i>poolname</i> )	The following parameters are used on the POOLDEF statement.
<b>INITIAL</b> ( <i>init_pool_size</i> )	<b>NAME</b> ( <i>poolname</i> ) Specifies the name of the pool to be defined. One POOLDEF command must be entered for each of these pools: XAE -
<b>MINIMUM</b> ( <i>min_pool_size</i> )	Used for SNMP requests, responses and traps. SNM - Used to contain data from responses. Default: None (parameter is required).
<b>EXPAND</b> ( <i>amount</i> )	<b>INITIAL</b> ( <i>init_pool_size</i> ) Specifies the initial number of pool elements to be obtained for the pool. Default: None (parameter is required).
<b>CONTRACT</b> ( <i>amount</i> )	<b>MINIMUM</b> ( <i>min_pool_size</i> ) Specifies the minimum number of pool elements to be left in the pool if pool contraction is performed. Default: None (parameter is required).
	<b>EXPAND</b> ( <i>amount</i> ) Specifies the number of pool elements to be obtained when and if the pool must be expanded. Default: None (parameter is required).
	<b>CONTRACT</b> ( <i>amount</i> ) Specifies the number of pool elements to be freed when and if the pool must be contracted. Default: None (parameter is required).
	Refer to Defining Control Block Pools (POOLDEF Statement) for more information on pools that can be defined for SNMCFGxx.
<b>COMMUNITY</b> <i>community_name ipaddress accessmode viewname</i>	The following parameters are used on the COMMUNITY statement.  <b>community_name</b> - Specifies the name of the SNMP community being defined. This is any character string with no spaces in it. Default: None - parameter is required  <b>ipaddress</b> —Specifies the IP address of the management station that uses this community. If absent, or if 0.0.0.0 is specified, then any manager can use this community. Default: 0.0.0.0  <b>accessmode</b> —Specifies the access mode of this community. This is specified as one of readonly, writeonly, readwrite, or none. Currently, writeonly and readwrite are not supported. Default: readonly  <b>viewname</b> —Specifies the view name associated with this community. This object is coded as a string. This name must have a matching view command associated with it. Default: Default view providing readonly access to all MIB groups.

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**VIEW** *viewname*  
*[subtreename subtreename]*

The following parameters are used on the VIEW statement.

*viewname*—Specifies the view name being defined. This is coded as a string and should match a view name variable specified on a community statement.

*subtreename*—Specifies the subtree(s) that compose this view. If no subtrees are specified, then the view contains all objects known to the agent. Subtree names are coded as name fields in the MIB II RFC 1213. Available subtrees are tcp, udp, system, icmp, snmp, at, ip and interfaces. See Usage Notes for SNMP for related RFC numbers.

**TRAP** *community\_name*  
*ipaddress*

The following parameters are used on the TRAP statement.

*community\_name*—Specifies the name of the community where traps are sent. Default: None (parameter is required).

*ipaddress*—Specifies the IP address of the management station where traps are sent. Default: None (parameter is required).

**LOGGING** *level*

The following parameter is used on the LOGGING statement.

*level*—Specifies the level of logging messages to produce. All logging messages are written to the log specified by the SNMLOG DD in the Cisco IOS for S/390 startup JCL.

**PRODUCTION**—LOGGING PRODUCTION produces messages relating to operation of the SNMP agent.

**DEBUG**—LOGGING DEBUG is used for diagnosing problems and is generally used under the direction of Customer Support.

Default: PRODUCTION

**THRESHOLD** *type fnum*

The following parameters are used on the THRESHOLD statement.

*type*—Specifies threshold type as either SCALAR or TABLE. With *fnum*, specifies the time that a retrieval of a data item will be considered valid. After that time, another retrieval will be made. This is used to lower the overhead of SNMP. These numbers default to 5 seconds for SCALARS and 30 seconds for TABLE entries. You may want to specify a time period less than your SNMP management station's polling interval, in order to produce consistent results. Alternatively, set your SNMP management station's polling interval higher than the defaults mentioned above. For the distinction between SCALARS and TABLE entries, refer to the SNMP MIB-II descriptions in the RFCs, or a book on SNMP. See Usage Notes for SNMP for RFC numbers.

*fnum*—Specifies time period as a floating point number. A floating point number is a number with or without a decimal point, optionally followed by an E and another number which represents an exponent.

**VARIABLE** *variable\_name*      The following parameters are used on the VARIABLE statement.  
*value*

*variable\_name*—Specifies the MIB II name of the variable being defined. These variables are valid: sysContact, sysLocation, and sysName. Default: None (parameter is required).

*value*—Specifies the value(s) to be assigned to this variable. If multiple values are specified, they must be enclosed in double quotes. Default: None (parameter is required).

## Usage Notes for SNMP

### SNMP and DNR

For proper operation of the SNMP agent, an entry must be placed in the DNRALCxx member that resolves the Cisco IOS for S/390 subsystem to the IP address of the MVS host being managed. The subsystem identifier is obtained from the Cisco IOS for S/390 startup JCL symbolic 'SSN'. If this alias entry is not defined, the SNMP Agent does not operate properly.

### Multihome Considerations

If Cisco IOS for S/390 is operating in a multihome configuration, and one of the network interfaces fails, a trap of 'Link-Down' is sent over the interface resolved by the subsystem alias. The value of ifOperStatus still reflects a status of 'up' due to a limitation of the Cisco IOS for S/390 device drivers. Requests and traps continue to be sent over the active network interface(s).

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**Note** The value of 'ipAdEntReasmMaxSize' reflects the maximum size of the send buffer of the UDP protocol.

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### Initialization Messages

If the IP/UDP stack is not completely initialized, the SNMP Agent may not be able to respond to error messages stating that either the port 161 is unreachable or that 161 is a bad well known port. These messages should disappear once the Agent and the IP/UDP stack synchronize.

### SNMP RFCs

The relevant RFCs for SNMP are listed below.

- RFC1158 Management Information Base for Network Management of TCP/IP-based Internets: MIB-II
- RFC1156 Management Information Base for Network Management of TCP/IP-based Internets
- RFC1155 Structure and Identification of Management Information for TCP/IP-based Internets

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## Example

This example show the usage of these statements:

```
SNMP      PORT(161)
POOLDEF   NAME(XAE)
          INITIAL(20)
          MINIMUM(40)
          EXPAND(20)
POOLDEF   NAME(SNM)
          INITIAL(50)
          MINIMUM(100)
          EXPAND(25)
COMMUNITY PUBLIC
TRAP PUBLIC 1.0.0.1
VARIABLE SYSNAME "JANE DOE-JAD@YOUR.COM"
VARIABLE SYSLOCATION "123 MAIN ST., ANYTOWN, USA"
LOGGING DEBUG
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