C H A P T E R 29

SONET/SDH

This chapter describes the level of support that Cisco ANA provides for synchronous optical technology (SONET/SDH), as follows:

- Technology Description, page 29-1
- Information Model Objects (IMOs), page 29-2
- Vendor-Specific Inventory and IMOs, page 29-5
- Service Alarms, page 29-5

Please see Part 1: Cisco VNEs in this guide for information about which devices support the various technologies.

Technology Description

SONET/ SDH was originally standardized for connecting one fiber system to another at the optical level, to form a single international standard for fiber interconnects between telephone networks of different countries. Today it is a widely deployed, mature technology used in implementing high-speed, large-scale IP networks. It combines high bandwidth capacity with efficient link utilization, making it a major building block for accommodating fast-growing IP infrastructure both in the core and at the edge.

SONET/SDH can handle a variety of transmission rates and applications by defining a synchronous, flexible, optical hierarchy for carrying many signals of different capacities. This is accomplished using a byte-interleaved multiplexing scheme, which simplifies multiplexing and offers end-to-end network management. It is a layered protocol that defines four separate layers—Photonic, Section, Line, and Path—within the OSI physical layer (Layer 1).

SONET/SDH networks consist of path terminating elements (PTEs), which represent the physical layer interfaces; add/drop multiplexers (ADMs) or Digital Crossconnect Systems (DCSs); and regenerators interconnected by point-to-point SONET/SDH links called *sections*. These are fundamentally connection oriented, which means that a VC must be set up across the SONET/SDH network prior to any data transfer.

Cisco ANA does not support discovery of SONET/SDH physical layer topology. This topology is manually (statically) configured by the system administrator.

However, it is used in conjunction with the data link layer above it, such as ATM, for discovering its physical topology, while further verifying it by matching the traffic signature of these ports using Cisco's confidential scheme, which requires a substantial amount of traffic in order to function correctly.

Note   This physical technology is supported only insofar as the underlying physical layer is supported in conjunction with other data link layer technologies, such as ATM and PoS.

Information Model Objects (IMOs)

This section describes the following IMOs:

- SONET/SDH Physical (ISonetSdh)
- DS1 Channelized Interface (IDS1PdhChannelized)
- DS3 Channelized Interface (IDS3PdhChannelized)
- SONET SDH Hop (ISonet_SdhHop)
- SONET STS 1 (ISonetSts1)
- SDH AU 4 (ISdhAu4)
- SDH AU 3 (ISdhAu3)

SONET/SDH Physical

The physical layer SONET/SDH Physical object is bound by its Containing Termination Points attribute to a Port Connector object. It is accessed primarily by the data link layer object, such as Asynchronous Transfer Mode and Frame Relay interfaces, as well as the PoS interface (implemented using PPP Encapsulation), bound by its Contained Connection Termination Points attribute.

Table 29-1   SONET/SDH Physical (ISonetSdh)

Attribute Name	Attribute Description	Scheme	Polling Interval
Specific Type	Specific type (*Null, SONET/SDH Mux, OC3, OC12, OC24, OC48, OC192, STM1, STM4, STM16, STM64*)	IpCore	Configuration
Loop Back Type	Loopback type (*Null, Cell, Payload, Diag, Line, None, Other, Path, Metalic, Non Metalic, Serial, Parallel, Local, Internal, Network, Inward, Dual, Remote, Inbound Local, No Loop, Facility Loop, Terminal Loop, Other Loop*)	IpCore	Configuration
Scrambling Mode	Scrambling mode (*Null, On, Off, Payload, Frame, Payload and Frame*)	IpCore	Configuration
TCAThresholdB1	The threshold for B1 threshold crossing alarms (B1-TCA). The value specifies a negative exponent to the power of 10 (10 to the power of minus value) for the threshold value, with a default value of *6* (10e-6).	IpCore	Configuration
TCAThresholdB2	The threshold for B2 threshold crossing alarms (B2-TCA). The value specifies a negative exponent to the power of 10 (10 to the power of minus value) for the threshold value, with a default value of *6* (10e-6).	IpCore	Configuration
TCAThresholdB3	The threshold for B3 threshold crossing alarms (B3-TCA). The value specifies a negative exponent to the power of 10 (10 to the power of minus value) for the threshold value, with a default value of *6* (10e-6).	IpCore	Configuration

Table 29-1   SONET/SDH Physical (ISonetSdh) (continued)

Attribute Name	Attribute Description	Scheme	Polling Interval
Clocking	The SONET port TX clock source where the internal keyword sets the internal clock (*line*, *internal*). The *line* keyword sets the clock recovered from the line (this is the default).	IpCore	Configuration
All additional attributes are the same as Physical Layer (IPhysicalLayer)			

DS1 Channelized Interface

The physical layer DS1 Channelized Interface object represents a high-order SONET/SDH DS1 circuit.

Table 29-2   DS1 Channelized Interface (IDS1PdhChannelized)

Attribute Name	Attribute Description	Scheme	Polling Interval
Description	The description of the channelized DS1 PDH.	IpCore	Configuration
PathType	The type of SONET/SDH high-order interface.	IpCore	Configuration
Sts1OrAu4OrAu3Number	The STS1 number inside a channelized controller configured in SONET framing mode, or the AU4 or AU3 number inside a channelized controller configured in SDH framing mode	IpCore	Configuration
Tug3Number	The TUG-3 number inside a channelized controller configured in SDH framing mode	IpCore	Configuration
T3OrE3Number	The T3 or E3 number inside a channelized controller configured in SONET framing mode.	IpCore	Configuration
PortIps	An array of subinterfaces configured on top of this channelized DS1 PDH.	IpCore	Configuration

DS3 Channelized Interface

The physical layer DS3 Channelized Interface object represents a high-order SONET/SDH DS3 circuit.

Table 29-3   DS3 Channelized Interface (IDS3PdhChannelized)

Attribute Name	Attribute Description	Scheme	Polling Interval
Description	The description of the channelized DS3 PDH	IpCore	Configuration
PathType	The type of SONET/SDH high-order interface.	IpCore	Configuration
Sts1OrAu4OrAu3Number	The STS1 number inside a channelized controller configured in SONET framing mode, or the AU4 or AU3 number inside a channelized controller configured in SDH framing mode	IpCore	Configuration
Tug3Number	The TUG-3 number inside a channelized controller configured in SDH framing mode	IpCore	Configuration
T3OrE3Number	The T3 or E3 number inside a channelized controller configured in SONET framing mode.	IpCore	Configuration
PortIps	An array of subinterfaces configured on top of this channelized DS3 PDH.	IpCore	Configuration

SONET SDH Hop

The physical layer SONET SDH Hop object represents an interface on a high-order SONET/SDH circuit.

Table 29-4   SONET SDH Hop (ISonet_SdhHop)

Attribute Name	Attribute Description	Scheme	Polling Interval
Description	The description of the high-order SONET/SDH interface (for example, *STS1*, *AU4*, *AU3,* and so on)	IpCore	Configuration
AppliqueType	Indicates the lowest level channel type to which this inteface will convert (for example, *DS1*, *E1*, and so on)	IpCore	Configuration
PathType	The type of high-order SONET/SDH circuit (for example, *STS1*, *AU4*, *AU3*, and so on)	IpCore	Configuration
Sts1OrAu4Or Au3Number	The STS1 number inside a channelized controller configured in SONET framing mode, or the AU4 or AU3 number inside a channelized controller configured in SDH framing mode	IpCore	Configuration

SONET STS 1

The physical layer SONET STS 1 object represents an instance of an STS1 circuit.

Table 29-5   SONET STS 1 (ISonetSts1)

Attribute Name	Attribute Description	Scheme	Polling Interval
All attributes are the same as SONET SDH Hop (ISonet_SdhHop)			

SDH AU 4

The physical layer SDH AU 4 object represents an instance of an AU4 circuit.

Table 29-6   SDH AU 4 (ISdhAu4)

Attribute Name	Attribute Description	Scheme	Polling Interval
All attributes are the same as SONET SDH Hop (ISonet_SdhHop)			

SDH AU 3

The physical layer SDH AU 3 object represents an instance of an AU3 circuit.

Table 29-7   SDH AU 3 (ISdhAu3)

Attribute Name	Attribute Description	Scheme	Polling Interval
All attributes are the same as SONET SDH Hop (ISonet_SdhHop)			

Vendor-Specific Inventory and IMOs

There are no vendor-specific inventory or IMOs for this technology.

Service Alarms

The following alarms are supported for this technology:

- Discard Packets, page 41-26
- Dropped Packets, page 41-27
- Link Down, page 41-43
- Port Down, page 41-55
- Rx Utilization, page 41-58
- Tx Utilization, page 41-62
- DS1 Path Port Down, page 41-29
- DS1 Path Link Down, page 41-28
- DS3 Path Port Down, page 41-30
- DS3 Path Link Down, page 41-29
- SONET Path Port Down, page 41-60
- SONET Path Link Down, page 41-59

Service Alarms