

Ethernet (IEEE 802.3)

This chapter describes the level of support that Cisco ANA provides for Ethernet, as follows:

- [Technology Description, page 18-1](#)
- [Information Model Objects \(IMOs\), page 18-5](#)
- [Vendor-Specific Inventory and IMOs, page 18-21](#)
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For information on network topology, see [Chapter 38, “Cisco ANA VNE Topology.”](#)

Technology Description

This section provides the following Ethernet technology descriptions:

- [Ethernet \(IEEE 802.3\)](#)
- [VLAN \(IEEE 802.1Q\)](#)
- [QinQ \(IEEE802.1ad\)](#)
- [LAG](#)
- [EtherChannel](#)
- [STP](#)
- [SVI](#)
- [VTP](#)
- [VPLS](#)
- [H-VPLS](#)
- [REP](#)

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

Ethernet (IEEE 802.3)

Ethernet refers to the family of LAN products covered by the IEEE 802.3 standard that defines the carrier sense multiple access collision detect (CSMA/CD) protocol. Four data rates are currently defined for operation over optical fiber and twisted-pair cables: 10Base-T Ethernet (10 Mb/s), Fast Ethernet (100 Mb/s), Gigabit Ethernet (1000 Mb/s) and 10-Gigabit Ethernet (10 Gb/s).

The IEEE 802.3 standard provides MAC (Layer 2) addressing, duplexing, differential services, and flow control attributes, and various physical (Layer 1) definitions, with media, clocking, and speed attributes. It also provides a **LAG** (similar to **EtherChannel**) definition for providing both higher link capacity and availability.

VLAN (IEEE 802.1Q)

A virtual LAN (VLAN), is a logical group of hosts that communicate as if they were attached to the same network broadcast domain, even though they do not share the same physical location or network switch. Although much like a physical LAN, VLAN hosts can be grouped together even if they are not located on the same network switch. Because a VLAN is a logical entity, its creation and reconfiguration is done through software, rather than by physically locating devices.

IEEE 802.1Q, or VLAN Tagging, is an IEEE standard allowing multiple bridged networks to transparently share the same physical network link without leakage. IEEE 802.1Q (and its shortened form, dot1q) is used to refer to the encapsulation protocol used to implement this mechanism over Ethernet networks.

QinQ (IEEE802.1ad)

QinQ (IEEE802.1) tagging (also known as dot1q tunneling) is a technology that allows the nesting of an additional VLAN tag on a packet, in addition to an existing one. According to the standard, either VLAN tag is an 802.1Q header.

QinQ allows service providers to use a single VLAN to support customers who have multiple VLANs. The core service-provider network carries traffic with double-tagged, stacked VLAN (802.1Q-in-Q) headers of multiple customers while maintaining the VLAN and Layer 2 protocol configurations of each customer and without affecting the traffic of other customers.

LAG

A Link Aggregation Group (LAG) is a group of two or more network links bundled together to appear as a single link based on the IEEE 802.3ad standard. For instance, bundling two 100-Mb/s network interfaces into a single link creates one 200-Mb/s link. A LAG may include two or more network cards and two or more cables, but the software sees the link as one logical link.

A LAG provides capacity increase, load balancing, and higher link availability, which prevents the failure of any single component link leading to a disruption of the communications between the interconnected devices.

EtherChannel

EtherChannel is Cisco's link aggregation port trunking technology. Like [LAG](#), it unifies physical Ethernet links into one link to provide high-speed links between switches, routers, and servers. An EtherChannel can be formed from two to eight active Fast Ethernet, Gigabit Ethernet, or 10 Gigabit Ethernet ports. It also provides fault tolerance in the form of from one to eight inactive failover ports, which can also be aggregated and which become active if the other active ports fail. EtherChannel is primarily a backbone network technology, providing up to 800 Mbps, 8 Gbps, or 80 Gbps of aggregate bandwidth depending on the speeds of the underlying links (100 Mbps, 1 Gbps, or 10 Gbps). Cisco's Virtual Switching System also provides Multichassis EtherChannel (MEC), in which ports can be aggregated toward different physical chassis, forming a single virtual switch.

STP

Spanning Tree Protocol (STP) is a Layer 2 link management protocol that provides path redundancy while preventing undesirable loops in the network. For a Layer 2 Ethernet network to function properly, only one active path can exist between any two devices.

STP defines a tree with a root bridge and a loop-free path from the root to all network devices in the Layer 2 network. STP forces redundant data paths into a standby (blocked) state. If a network segment in the spanning tree fails and a redundant path exists, the STP algorithm recalculates the spanning tree topology and activates the standby path.

Cisco ANA STP modeling supports devices that use the following STP variants:

- STP as defined in the 802.1D standard
- Rapid Spanning Tree Protocol (RSTP) as defined in the 802.1w standard
- Per-VLAN STP (PvSTP and PvSTP+), which are proprietary Cisco protocols, or any per-VLAN spanning tree protocol
- Multiple Spanning Tree protocol (MST) as defined in the 802.1s standard

Note that Cisco ANA does not support these STP modes when they are configured along with a bridge group.

SVI

A switch virtual interface (SVI) is a VLAN of switch ports, represented by one interface to a routing or bridging system. There is no physical interface for the VLAN. The SVI provides the Layer 3 processing for packets from all switch ports associated with the VLAN.

There is one-to-one mapping between a VLAN and SVI. Only a single SVI can be mapped to a VLAN, and the SVI cannot be activated unless associated with a physical port.

SVIs simplify VLAN routing by providing default gateway for the VLAN. They also provide layer 3 switch connectivity to the switch, and provide fallback bridging when required for non routable protocols.

VTP

VLAN Trunk (or Trunking) Protocol (VTP) is a Cisco proprietary Layer 2 messaging protocol that reduces administrative chores in a switched network by managing the addition, deletion, and renaming of VLANs on a network-wide basis. It permits configuration of VLANs on a single VTP server, with the VLAN distributed through all switches in the domain. To enable this, VTP carries VLAN information to all the switches in the VTP domain, using advertisements sent over Inter-Switch Link (ISL), 802.1q, IEEE 802.10 or LAN Emulation (LANE) trunks. VTP traffic is sent over the management VLAN (VLAN1), so all VLAN trunks must be configured to pass VLAN1.

VPLS

Virtual Private LAN Services (VPLS) is a class of Layer 2 VPN that provides Ethernet-based multipoint-to-multipoint communication over MPLS networks. It allows geographically dispersed sites to share an Ethernet broadcast domain by connecting sites through pseudowires. The network then emulates the function of a LAN switch or bridge to connect the different LAN segments to create a single bridged (Ethernet) LAN.

VPLS uses the provider core to join multiple attachment circuits together to simulate a virtual bridge that connects the multiple attachment circuits together. From a customer point of view, there is no topology for VPLS. All of the CE devices appear to connect to a logical bridge emulated by the provider core. The logical bridge performs MAC address learning, just like a physical bridge.

The Virtual Switching Instance (VSI), also known as the Virtual Forwarding Instance (VFI), is the main component in the PE router which constructs the logical bridge. All VSIs which construct a provider logical bridge are connected with MPLS PWs.

Learning is done based on the customer Ethernet frame arriving at the VSI. A Forwarding Information Base (FIB) keeps track of the mapping of customer Ethernet frame addressing and the appropriate pseudowire to use.

H-VPLS

Hierarchical VPLS (H-VPLS) improves the scalability characteristics of VPLS by reducing signaling overhead and packet replication requirements for the provider edge. Two types of provider edge devices are defined in this model:

- User-facing provider edge (u-PE)
- Network provider edge (n-PE)

Customer edge devices connect to u-PEs directly and aggregate VPLS traffic before it reaches the n-PE, where the VPLS forwarding takes place based on the VSI. In this hierarchical model, u-PEs are expected to support Layer 2 switching and to perform normal bridging functions. Cisco VPLS uses 802.1Q Tunneling, a double 802.1Q or QinQ encapsulation, to aggregate traffic between the u-PE and n-PE. The QinQ trunk becomes an access port to a VPLS instance on an n-PE.

REP

Cisco Resilient Ethernet Protocol (REP) is a new technology implemented on Cisco Carrier Ethernet switches and intelligent service edge routers. It extends network resiliency across Cisco IP Next-Generation Network (NGN) Carrier Ethernet Design. Requiring no hardware upgrades, REP is designed to provide network and application convergence within 50 ms. In some scenarios, the network convergence times may increase to within 250 ms, but a 250-ms convergence time is still expected to have limited or no discernible effect on most network applications. REP is a segment protocol that integrates easily into existing Carrier Ethernet networks. It is not intended to replace STP, but allows network architects to limit the scope of STP domains. Since Cisco REP can also notify STP about potential topology changes, it allows for interoperability with STP. Ideally, REP can be positioned as a migration strategy from legacy spanning tree domains.

Because REP is a distributed and secure protocol, it does not rely on a master node controlling the status of the ring. Hence failures can be detected locally either through loss of signal (LOS) or loss of neighbor adjacency. Any REP port can initiate a switchover as long as it has acquired the secure key to unblock the alternate port. By default, REP elects an alternate port unless the administrator defines a preferred port. For optimal bandwidth usage and for traffic engineering, REP supports load balancing per group of VLANs.

Information Model Objects (IMOs)

This section describes the following IMOs:

- [Link Aggregation Group \(ILinkAggregationGroup802dot3ad\)](#)
- [Link Aggregation Group Port Entry \(ILagPortEntry\)](#)
- [Ethernet Interface \(IEthernet\)](#)
- [Ethernet Physical \(IPhysicalLayer\)](#)
- [Virtual LAN Interface \(IVlanInterface\)](#)
- [Virtual LAN Entry \(IVlanEntry\)](#)
- [Virtual LAN Multiplexer \(IVlanEncapMux\)](#)
- [Virtual LAN Encapsulation \(IIEEE802\)](#)
- [Virtual LAN Mapping \(IVlanMapping\)](#)
- [Data Link Aggregation Container \(IDataLinkAggregationContainer\)](#)
- [Spanning Tree Protocol Service \(IStpService\)](#)
- [Multiple Spanning Tree Protocol Service \(IMstService\)](#)
- [Multiple Spanning Tree Protocol Properties \(IMstProperties\)](#)
- [Spanning Tree Protocol Instance Information \(IStpInstanceInfo\)](#)
- [Multiple Spanning Tree Protocol Instance Information \(IMstInstanceInfo\)](#)
- [Per-VLAN Spanning Tree Protocol Service \(IPvstpService\)](#)
- [Per-VLAN Spanning Tree Protocol Instance Information \(IPvstpInstanceInfo\)](#)
- [Per-VLAN Spanning Tree Protocol Port Information \(IPvstPortInfo\)](#)
- [Rapid Spanning Tree Protocol Instance Information \(IRstpInstanceInfo\)](#)
- [Spanning Tree Protocol Port Information \(IStpPortInfo\)](#)

- [Multiple Spanning Tree Protocol Port Information \(IMstPortInfo\)](#)
- [Virtual Switch Interface \(IVsi\)](#)
- [Pseudowire Properties \(IPseudowireProperties\)](#)
- [VLAN Tagged Interface \(IVLANTaggedInterface\)](#)
- [Ethernet Flow Point \(IEfp\)](#)
- [VLAN Trunking Protocol Service \(IVtpService\)](#)

Link Aggregation Group

This object represents a LAG 802.3ad data link aggregation entity, as described in the IEEE LAG 802.3ad document. Each LAG 802.3ad data link aggregation entity will hold a ILagPortEntry for each LAG port that is a member of this aggregation group.

Table 18-1 *Link Aggregation Group (ILinkAggregationGroup802dot3ad)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|--------------------------------|--|--------|------------------|
| Dot3adAggMACAddress | The individual MAC address of the LAG port. | Any | Configuration |
| Dot3adAggActorSystemPriority | The priority value associated with the actor's system ID. | Any | Configuration |
| Dot3adAggActorSystemID | MAC address value used as a unique identifier for the system that contains this aggregator. | Any | Configuration |
| Dot3adAggActorAdminKey | The current administrative value of the key for the aggregator. | Any | Configuration |
| Dot3adAggActorOperKey | The current operational value of the key for the aggregator. | Any | Configuration |
| Dot3adAggPartnerSystemID | MAC address value used as a unique identifier for the current protocol partner of this aggregator. A value of zero indicates that there is no known partner. If the aggregation is manually configured, this system ID value will be a value assigned by the local system. | Any | Configuration |
| Dot3adAggPartnerSystemPriority | The priority value associated with the partner's system ID. | Any | Configuration |
| Dot3adAggPartnerOperKey | The current operational value of the key for the aggregator's current protocol partner. | Any | Configuration |
| Dot3adAggCollectorMaxDelay | The maximum delay, in tens of microseconds, that may be imposed by the Frame Collector between receiving a frame from an Aggregator Parser, and either delivering the frame to its MAC Client or discarding the frame. | Any | Configuration |
| LagPortEntries | An array of all the lag port entries. An entry will be held for each port member in the port LAG aggregation group. | Any | Configuration |

Link Aggregation Group Port Entry

This object describes the Link Aggregation Control configuration parameters for each aggregation port of a [Link Aggregation Group](#).

Table 18-2 *Link Aggregation Group Port Entry (ILagPortEntry)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|---------------------------------------|---|--------|------------------|
| Dot3adAggPortActorAdminKey | The current administrative value of the key for the aggregation port. | Any | Configuration |
| Dot3adAggPortActorOperKey | The current operational value of the key for the aggregation port. | Any | Configuration |
| Dot3adAggPortPartnerAdminKey | The current administrative value of the key for the protocol partner. | Any | Configuration |
| Dot3adAggPortPartnerOperKey | The current operational value of the key for the protocol partner. | Any | Configuration |
| Dot3adAggPortSelectedAggID | The identifier value of the aggregator that this aggregation port has currently selected. Zero indicates that the aggregation port has not selected an aggregator, either because it is in the process of detaching from an aggregator or because there is no suitable aggregator available for it to select. | Any | Configuration |
| Dot3adAggPortAttachedAggID | The identifier value of the aggregator to which this aggregation port is currently attached. Zero indicates that the aggregation port is not currently attached to an aggregator. | Any | Configuration |
| Dot3adAggPortActorPort | The port number locally assigned to the aggregation port. | Any | Configuration |
| Dot3adAggPortActorPortPriority | The priority value assigned to this aggregation port. | Any | Configuration |
| Dot3adAggPortPartnerAdminPort | The current administrative value of the port number for the protocol partner. | Any | Configuration |
| Dot3adAggPortPartnerOperPort | The operational port number assigned to this aggregation port by the aggregation port's protocol partner. | Any | Configuration |
| Dot3adAggPortPartnerAdminPortPriority | The current administrative value of the port priority for the protocol partner. | Any | Configuration |
| Dot3adAggPortPartnerOperPortPriority | The priority value assigned to this aggregation port by the partner. | Any | Configuration |
| Dot3adAggPortActorAdminState | A number whose first byte represents 8 bits, corresponding to the administrative values of Actor_State (43.4.2) as transmitted by the actor in LACPDUs. These values allow administrative control over the values of LACP_Activity, LACP_Timeout and Aggregation. | Any | Configuration |

Table 18-2 *Link Aggregation Group Port Entry (ILagPortEntry) (continued)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|--------------------------------|---|--------|------------------|
| Dot3adAggPortActorOperState | A number whose first byte represents 8 bits, corresponding to the current operational values of Actor_State as transmitted by the actor in LACPDU. | Any | Configuration |
| Dot3adAggPortPartnerAdminState | A number whose first byte represents 8 bits, corresponding to the current administrative value of Actor_State for the protocol partner. | Any | Configuration |
| Dot3adAggPortPartnerOperState | A number whose first byte represents 8 bits, corresponding to the current values of Actor_State in the most recently received LACPDU transmitted by the protocol Partner. In the absence of an active protocol Partner, this value may reflect the manually configured value of AggPortPartnerAdminState. | Any | Configuration |
| AggregatedPortOid | The OID of the aggregated interface. | Any | Configuration |

Ethernet Interface

The data link layer [Ethernet Interface](#) object is bound by its Containing Termination Points attribute to a physical layer interface ([Ethernet Physical](#)) object. It is accessed primarily by the [Virtual LAN Multiplexer/Interface](#), [Link Aggregation Group](#), [Cisco Ethernet Channel](#) or [IP Interface](#) bound by its Contained Connection Termination Points attribute. It is also accessed by the [Bridging Entity](#).

Table 18-3 *Ethernet Interface (IEthernet)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|--|--|---------|------------------|
| MAC Address | MAC address | Product | Configuration |
| Duplex Mode | Duplex mode (<i>Unknown, Full, Half</i>) | Any | Configuration |
| Output Flow Control | Output flow control (<i>Enable, Disable</i>) | Any | Configuration |
| Input Flow Control | Input flow control (<i>Enable, Disable</i>) | Any | Configuration |
| IANA Type | Internet Assigned Numbers Authority (IANA) type of the sublayer | N/A | N/A |
| Containing Connection Termination Points | Underlying termination points (connection or physical) | Any | N/A |
| Contained Connection Termination Points | Bound Connection Termination Point | Any | N/A |
| Port Type | The port type | Any | N/A |
| Is ELMI Enabled | Determines whether ELMI is enabled on the interface. See Ethernet OAM for more information. | Any | Configuration |
| OAM Admin Status | The OAM technology administrative status (<i>Down, Testing, Unknown, Up</i>). See Ethernet OAM for more information. | Any | Configuration |

Table 18-3 Ethernet Interface (IEthernet) (continued)

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|-------------------|--|--------|------------------|
| Aggregation Group | Ethernet Aggregation technologies such as Link Aggregation (IEEE 802.1ad) and Cisco EtherChannel are used to group several physical Ethernet interfaces/links into one logical interface/link to provide higher bandwidth and availability in fault scenarios. If this Ethernet Interface participates in an aggregation group, this property specifies the OID of the aggregation group. This information is updated by the VNE model based on polling of the LAG and EtherChannel information. | Any | Configuration |
| Auto-Negotiate | Specify if the Ethernet port is configured to auto-negotiate with its connected peer on communication parameters such as Speed and Duplex mode. Auto-negotiation was originally defined in the FastEthernet Standard (IEEE 802.3u) and later was significantly extended in the GigabitEthernet standard (IEEE 802.3ab). | Any | Configuration |
| Efps | The list of EFPs (L2 sub-interfaces/service instances) which are configured on this Ethernet interface. This information is updated by the VNE model based on polling of the EFP information (L2 sub-interfaces or Service Instances). | Any | Configuration |
| UNI Properties | A set of User-Network-Interface properties which are available as part of the ELMI configuration of the Ethernet interface. | Any | Configuration |

Ethernet Physical

The physical layer [Ethernet Physical](#) object is bound by its Containing Termination Points attribute to a [Port Connector](#) object. It is accessed by the data link layer [Ethernet Interface](#) bound by its Contained Connection Termination Points attribute.

Table 18-4 Ethernet Physical (IPhysicalLayer)

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|---|-----------------------|--------|------------------|
| All attributes are the same as those of Physical Layer (IPhysicalLayer) . | | | |

Virtual LAN Interface

The data link layer [Virtual LAN Interface](#) object, which is used in a switched LAN environment, is bound by its Containing Termination Points attribute to an [Ethernet Interface](#) object. It is accessed primarily by the network layer object (such as [IP Interface](#)) bound by its Contained Connection Termination Points attribute. It is also accessed by the [Bridging Entity](#).

Table 18-5 Virtual LAN Interface (IVlanInterface)

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|----------------------------|--|--------|------------------|
| Mode | VLAN mode (<i>Access, Trunk, 802.1Q Tunnel</i>) | Any | Configuration |
| Native VLAN Identification | VLAN identifier, used for untagged received and transmitted frames | Any | Configuration |

Table 18-5 *Virtual LAN Interface (IVlanInterface) (continued)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|--|---|---------|------------------|
| Virtual LAN Table | Array of Virtual LAN Entries (instances of IVlanEntry) configured for this VLAN interface | Any | Configuration |
| VlanMappings | Array of all Virtual LAN Mappings (instances of IVlanMapping) defined for this VLAN interface | Product | Configuration |
| IANA Type | Internet Assigned Numbers Authority (IANA) type of the sublayer | N/A | N/A |
| Containing Connection Termination Points | Underlying termination points (connection or physical) | Any | N/A |
| Contained Connection Termination Points | Bound connection termination points | Any | N/A |

Virtual LAN Entry

The [Virtual LAN Entry](#) object describes the association of a [Virtual LAN Interface](#), which operates in Trunk mode, to one of the bridged Virtual LANs configured in the device.

Table 18-6 *Virtual LAN Entry (IVlanEntry)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|---------------------|--|--------|------------------|
| VLAN Identification | VLAN identifier of received and transmitted frames | Any | Configuration |
| Encapsulation Type | VLAN encapsulation (<i>Unknown, ISL, IEEE 802.10, IEEE 802.1Q</i>) | Any | Configuration |
| Upper Layer | Upper layer Object Identifier (OID) | Any | Configuration |

Virtual LAN Multiplexer

The [Virtual LAN Multiplexer](#) object, used in a routed LAN environment, is bound by its Containing Termination Points attribute to an [Ethernet Interface](#) object. It is accessed primarily by the data link layer [Virtual LAN Encapsulations](#) bound by its Contained Connection Termination Points attribute.

Table 18-7 *Virtual LAN Multiplexer (IVlanEncapMux)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|---|--|--------|------------------|
| IANA Type | Internet Assigned Numbers Authority (IANA) type of the sublayer | N/A | N/A |
| Containing Termination Points | Underlying termination points (Ethernet Interface) | Any | N/A |
| Contained Connection Termination Points | Bound connection termination points (Virtual LAN Encapsulations) | Any | N/A |

Virtual LAN Encapsulation

The data link layer [Virtual LAN Encapsulation](#) object, used in a routed LAN environment, is bound by its Containing Termination Points attribute to a [Virtual LAN Multiplexer](#) object. It is accessed primarily by the Network layer object (such as [IP Interface](#)) bound by its Contained Connection Termination Points attribute. It is also accessed by the [Bridging Entity](#).

Table 18-8 **Virtual LAN Encapsulation (IEEE802)**

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|--|---|--------|------------------|
| VLAN Identification | VLAN identifier | Any | Configuration |
| IANA Type | Internet Assigned Numbers Authority (IANA) type of the sublayer | N/A | N/A |
| Containing Connection Termination Points | Underlying termination points (connection or physical) | Any | N/A |
| Contained Connection Termination Points | Bound Connection Termination Point | Any | N/A |

Virtual LAN Mapping

The data link layer [Virtual LAN Mapping](#) object, used in a routed LAN environment, is bound by its Containing Termination Points attribute to a [Virtual LAN Multiplexer](#) object. It is accessed primarily by the Network layer object (such as [IP Interface](#)) bound by its Contained Connection Termination Points attribute. It is also accessed by the [Bridging Entity](#).

Table 18-9 *Virtual LAN Mapping (IVlanMapping)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|-----------------------|--|---------|------------------|
| Direction | Describes whether the VLAN mapping is defined in the egress or ingress direction | Product | Configuration |
| VLANRewriteDefinition | The rewriting actions (push tag, pop tag, and so on.) to be done over the frames which fit the match criteria. | Product | Configuration |
| VLANMatchCriteria | Defines the frames which undergo the VLAN mapping. | Product | Status |
| Drop | Defines if the frame should be dropped, instead of undergoing a rewrite definition. | Product | Status |

Data Link Aggregation Container

The [Data Link Aggregation Container](#) object aggregates or contains a single type of data link aggregation, such as [Link Aggregation Group](#) or [Cisco Ethernet Channel](#).

Table 18-10 *Data Link Aggregation Container (IDataLinkAggregationContainer)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|------------------------|---|--------|------------------|
| Data Link Aggregations | Array of single-type data link aggregations (Link Aggregation Group , Cisco Ethernet Channel) | Any | Configuration |
| Type | Aggregation type (<i>Null</i> , <i>Ethernet Link Aggregator</i>) | Any | Configuration |

Spanning Tree Protocol Service

The [Spanning Tree Protocol Service](#) object is used in a switched LAN environment. It describes the Spanning Tree Protocol service. It is accessed only by the [Logical Root](#)'s Services List attribute.

Table 18-11 *Spanning Tree Protocol Service (IStpService)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|-----------------------|---|--------|------------------|
| Protocol Type | Spanning Tree Protocol type (<i>Unknown</i> , <i>STP</i> , <i>RSTP</i> , <i>PVSTP</i> , <i>MST</i>) | Any | Configuration |
| Current Maximum Age | The current used value for the maximum age of learned Spanning Tree Protocol port information (in hundredths of seconds) | Any | Configuration |
| Current Hello Time | The current used value for hello time messages' keepalive interval of a Spanning Tree Protocol root (in hundredths of seconds) | Any | Configuration |
| Current Forward Delay | The current used value for port delay in each of the listening and learning states, preceding the forwarding one (in hundredths of seconds) | Any | Configuration |

Table 18-11 *Spanning Tree Protocol Service (IStpService) (continued)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|----------------------------|---|--------|------------------|
| Instance Information Table | Array of Spanning Tree Protocol Instance Information | Any | Configuration |
| UplinkFast State | Indicates whether the UplinkFast feature is enabled (<i>true, false</i>) | Any | Configuration |
| BackboneFast State | Indicates whether the BackboneFast feature is enabled (<i>true, false</i>) | Any | Configuration |
| Bridge Maximum Age | The value that all bridges should use (when this bridge is acting as the root) for the maximum age of learned Spanning Tree Protocol port information (in hundredths of seconds) | Any | Configuration |
| Bridge Hello Time | The value that all bridges should use (when this bridge is acting as the root) for hello time messages' keepalive interval of a Spanning Tree Protocol root (in hundredths of seconds) | Any | Configuration |
| Bridge Forward Delay | The current used value, and the value that all bridges should use (when this bridge is acting as the root) for port delay in each of the listening and learning states, preceding the forwarding one (in hundredths of seconds) | Any | Configuration |

All additional attributes are the same as [System Service \(ISystemService\)](#)

Multiple Spanning Tree Protocol Service

The [Multiple Spanning Tree Protocol Service](#) object is used in a switched VLAN environment. It describes the Spanning Tree Protocol service. It is accessed only by the [Logical Root](#)'s Services List attribute.

Table 18-12 *Multiple Spanning Tree Protocol Service (IMstService)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|---------------------|--|--------|------------------|
| Protocol Properties | Multiple Spanning Tree Protocol properties | Any | Configuration |

All additional attributes are the same as [Spanning Tree Protocol Service \(IStpService\)](#).

Multiple Spanning Tree Protocol Properties

The [Multiple Spanning Tree Protocol Properties](#) object, used in a switched VLAN environment. It describes the Multiple Spanning Tree Protocol properties. It is accessed only by the [Multiple Spanning Tree Protocol Service](#)'s Protocol Properties attribute.

Table 18-13 *Multiple Spanning Tree Protocol Properties (IMstProperties)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|----------------------|--|--------|------------------|
| Force Version | Force version (<i>Unknown, STP, RSTP, PVSTP, MST</i>) | Any | Configuration |
| Configuration Format | Configuration format used by this device and negotiated with other devices | Any | Configuration |
| Region Name | Region name used by this device and negotiated with other devices | Any | Configuration |
| Revision Level | Revision level used by this device and negotiated with other devices | Any | Configuration |

Table 18-13 Multiple Spanning Tree Protocol Properties (IMstProperties) (continued)

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|--------------------|--|--------|------------------|
| External Root Cost | External root cost of this Multiple Spanning Tree Protocol | Any | Configuration |
| Maximum Instances | Maximum Multiple Spanning Tree Protocol instances | Any | Configuration |

Spanning Tree Protocol Instance Information

The following [Rapid Spanning Tree Protocol Instance Information](#) objects describe the instance information associated with and accessed by the [Multiple Spanning Tree Protocol Service](#)'s Instance Information Table attribute.

Table 18-14 Spanning Tree Protocol Instance Information (IStplInstanceInfo)

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|----------------------------|---|--------|------------------|
| Object Identification | Instance Object Identifier (OID) | Any | Configuration |
| Identification | Bridge identifier (MAC address) | Any | Configuration |
| Priority | Bridge priority in the Spanning Tree Protocol | Any | Configuration |
| Designated Root and Bridge | MAC addresses of the designated root and bridge in the spanning tree | Any | Configuration |
| Root Cost | Root cost value for this bridge | Any | Configuration |
| Is Root | Is this bridge currently the root of the Spanning Tree Protocol? (<i>True, False</i>) | Any | Configuration |
| Root Port Identification | Object Identifier (OID) of the bridge port used to reach the designated root | Any | Configuration |
| Port Information Table | Array of Spanning Tree Protocol Port Information | Any | Configuration |

Multiple Spanning Tree Protocol Instance Information

Table 18-15 Multiple Spanning Tree Protocol Instance Information (IMstInstanceInfo)

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|-------------------------|---|--------|------------------|
| Instance Identification | Multiple Spanning Tree Protocol instance identifier | Any | Configuration |

All additional attributes are the same as [Spanning Tree Protocol Instance Information \(IStplInstanceInfo\)](#)

Per-VLAN Spanning Tree Protocol Service

The [Per-VLAN Spanning Tree Protocol Service](#) object is used in a switched VLAN environment. It describes the Per-VLAN Spanning Tree Protocol service. It is accessed only by the [Logical Root](#)'s Services List attribute.

Table 18-16 Per-VLAN Spanning Tree Protocol Service (IPvstpService)

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|----------------|--|--------|------------------|
| UplinkFast | Indicates whether the UplinkFast feature is enabled (<i>true, false</i>) | Any | Configuration |
| BackboneFast | Indicates whether the BackboneFast feature is enabled (<i>true, false</i>) | Any | Configuration |

Per-VLAN Spanning Tree Protocol Instance Information

Table 18-17 Per-VLAN Spanning Tree Protocol Instance Information (IPvstpInstanceInfo)

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|----------------------------------|--|--------|------------------|
| Protocol Type | Spanning tree protocol type (<i>Unknown, STP, RSTP, PVSTP, MST</i>) | Any | Configuration |
| Current and Bridge Maximum Age | The current used value, and the value that all bridges should use when this bridge is acting as the root, for the maximum age of learned Spanning Tree Protocol port information (in hundredths of seconds) | Any | Configuration |
| Current and Bridge Hello Time | The current used value, and the value that all bridges should use when this bridge is acting as the root, for hello time messages' keepalive interval of a Spanning Tree Protocol root (in hundredths of seconds) | Any | Configuration |
| Current and Bridge Forward Delay | The current used value, and the value that all bridges should use when this bridge is acting as the root, for port delay in each of the listening and learning states, preceding the forwarding one (in hundredths of seconds) | Any | Configuration |

All additional attributes are the same as [Spanning Tree Protocol Instance Information \(IStpInstanceInfo\)](#)

Per-VLAN Spanning Tree Protocol Port Information

Table 18-18 Per-VLAN Spanning Tree Protocol Port Information (IPvstpPortInfo)

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|----------------|--|--------|------------------|
| PortFast State | Indicates whether PortFast is enabled on the port (<i>true, false</i>) | Any | Configuration |

Rapid Spanning Tree Protocol Instance Information

Table 18-19 *Rapid Spanning Tree Protocol Instance Information (IRstpInstanceInfo)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|----------------|---|--------|------------------|
| Force Version | Force version (<i>Unknown, STP, RSTP, PVSTP, MST</i>) | Any | Configuration |

All additional attributes are the same as [Spanning Tree Protocol Instance Information \(IStpInstanceInfo\)](#)

Spanning Tree Protocol Port Information

The following [Spanning Tree Protocol Port Information](#) objects describe the port information associated with and accessed by the [Spanning Tree Protocol Instance Information](#)'s Port Information Table attribute.

Table 18-20 *Spanning Tree Protocol Port Information (IStpPortInfo)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|------------------------|---|--------|------------------|
| Object Identification | Port Object Identifier (OID) | Any | Configuration |
| Priority | Port priority in the Spanning Tree Protocol | Any | Configuration |
| State | Port state (<i>Unknown, Disable, Blocking, Listening, Learning, Forwarding, Broken, Down, LoopBack</i>) | Any | Configuration |
| Path Cost | Port path cost, which represents the media speed for this port | Any | Configuration |
| Is Edge | Is this an edge port (connected to a nonbridging device)? (<i>True, False</i>) | Any | Configuration |
| Is Point To Point | Is this port connected to a point-to-point link? (<i>True, False</i>) | Any | Configuration |
| Role | Port role (<i>Unknown, Disable, Backup, Alternative, Designated, Root, Boundary</i>) | Any | Configuration |
| Port BPDU Guard State | Indicates whether the PortFast Bridge Protocol Data Unit guard is enabled on the port | Any | Configuration |
| Port BPDU Filter State | Indicates whether PortFast Bridge Protocol Data Unit filtering is enabled on the port | Any | Configuration |

Multiple Spanning Tree Protocol Port Information

Table 18-21 *Multiple Spanning Tree Protocol Port Information (IMstPortInfo)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|----------------|--|--------|------------------|
| Hello Time | Hello time messages' keepalive interval of a Spanning Tree Protocol root (in hundredths of a second) | Any | Configuration |

All additional attributes are the same as [Spanning Tree Protocol Port Information \(IStpPortInfo\)](#)

Virtual Switching Instance

The [Virtual Switching Instance](#) object represents a Virtual Switching Instance (also known as VFI, Virtual Forwarding Instance) component of a VPLS logical bridge.

Table 18-22 *Virtual Switch Interface (IVsi)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|----------------------|--|--------|------------------|
| VPLS Instance Name | The unique VPLS instance name | IpCore | Configuration |
| VPLS VPN ID | The unique VPN ID in the MPLS core | IpCore | Configuration |
| discoveryMode | The VSI discovery mode (<i>Manual, BGP, LDP, RADIUS, DNS, MSS/OSS, Unknown</i>) | IpCore | Configuration |
| vsiMode | The VSI mode (<i>point-to-point, multipoint, unknown</i>) | IpCore | Configuration |
| Operational state | The operational status of the VPLS instance (<i>up, down</i>) | IpCore | Configuration |
| Administrative state | The configured administrative status of the VPLS instance (<i>enabled, disabled</i>) | IpCore | Configuration |
| Pseudowires | An array of Pseudowire Properties (IPseudowireProperties) . | IpCore | System |

Pseudowire Properties

The [Pseudowire Properties](#) object represents an MPLS pseudowire connecting two or more [Virtual Switching Instances](#).

Table 18-23 *Pseudowire Properties (IPseudowireProperties)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|-----------------------|---|--------|------------------|
| Pseudowire OID | The Object Identifier of the pseudowire | IpCore | System |
| isSplitHorizonEnabled | Indicates whether split horizon is enabled on the pseudowire (<i>true, false</i>). The split horizon policy determines whether packets are returned to the MPLS core. | IpCore | System |
| isAutoDiscovered | Indicates how the pseudowire was discovered (<i>manual, automatic</i>). | IpCore | System |

VLAN Tagged Interface

This IMO represents the VLAN layer of a L3 Ethernet sub-interface. It includes the configuration information of the sub-interface, for example, the VLAN tags Match Criteria, and the status of the sub-interface.

The VLANTaggedInterface IMO deprecates the IEEE802dot1q IMO that represents only a single VLAN tagged sub-interface.

Table 18-24 VLAN Tagged Interface (IVLANTaggedInterface)

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|----------------------|--|--------|------------------|
| InterfaceName | The interface name of the Ethernet sub-interface. This name is unique in the context of a device and is used to identify the sub-interface in the CLI interface. In Cisco IOS/IOS-XR devices the format of the interface name for Ethernet sub-interface is: <type><port-location>.<sub-interface-id> For example: GigaEthernet0/0.100 | Any | Configuration |
| Inner Vlan Id | The configured customer-edge VLAN (CE-VLAN) ID. | Any | Configuration |
| Outer Vlan Id | The configured service-provider VLAN (SP-VLAN) ID. | Any | Configuration |
| SP VLAN ID | Service Provider VLAN ID, also referred to as the Outer VLAN. This value represents the outer VLAN ID used in a specific path trace. This attribute is used only in PathTool when doing a path trace that traverses the Ethernet sub-interface. | N/A | N/A |
| CE VLAN ID | Customer Edge VLAN ID, also referred to as the Inner VLAN. This value represents the inner VLAN ID used in a specific path trace. This attribute is used only in PathTool when doing a path trace that traverses the Ethernet sub-interface. | N/A | N/A |
| Encap Type | The encapsulation type (<i>dot1Q</i> , <i>QinQ</i>). | Any | Configuration |
| Match Criteria | VLAN layer-related information used to define matching criteria performed on the traffic ingress on this Ethernet sub interface. This is a general class used for L2 and L3 Ethernet sub-interfaces. For L3 Ethernet sub-interfaces only, Tagged VLANMatchCriteria is used, which defines one of two VLAN tags as the traffic match criteria. | Any | Configuration |
| Operational state | The operational state of the Ethernet sub-interface (<i>Up</i> , <i>Down</i> , <i>Unknown</i> , <i>Testing</i>). This state is derived from the ifOperStatus (1.3.6.1.2.1.2.2.1.7) defined in IF-MIB. For more information please refer to IF-MIB definition (section 6) http://www.rfc-editor.org/rfc/rfc2863.txt | Any | System |
| Administrative state | The administrative state of the Ethernet sub-interface (<i>Up</i> , <i>Down</i> , <i>Unknown</i> , <i>Testing</i>). This state is derived from the ifAdminStatus (1.3.6.1.2.1.2.2.1.7) defined in IF-MIB. For more information please refer to IF-MIB definition (section 6) http://www.rfc-editor.org/rfc/rfc2863.txt | Any | System |

Table 18-24 *VLAN Tagged Interface (IVLANTaggedInterface) (continued)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|------------------------|---|--------|------------------|
| Configured Description | A free text string configured on the device on the sub-interface. The description is mainly used to help adlp administration by adding non-networking information that cannot be captured as part of the sub-interface configuration. | Any | Configuration |
| Binding | The OID of the entity in the VNE to which the sub-interface is bound. Possible values are the IBridgeOid, IPTPLayer2MplsTunnelOid (Pseudowire edge OID), ILocalSwitchingEntry. | Any | Configuration |

Ethernet Flow Point

This IMO represents a L2 Ethernet sub-interface (or Service Instance) configured on an Ethernet port. It includes the configuration information of the sub-interface, such as the VLAN tags Match Criteria and VLAN manipulation definitions. It also include the status of the sub-interface.

Multiple EFPs can be configured on a single physical L2 traffic port, usually on the User-Network Interface [UNI] port. Each EFP can manipulate inbound frames in a different manner and make different forwarding decisions.

Table 18-25 *Ethernet Flow Point (IEfp)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|-------------------|--|---------|------------------|
| EfpId | ID of the Ethernet Flow Point. The possible values of this attribute are non zero unsigned 32 bit integer (based on the definition of Interface Index in IF-MIB rfc1573.txt, and the definition of Service Instance index (cevcSIIndex) in CISCO-EVC-MIB). | Product | Configuration |
| RewriteDefinition | The rewrite definition defines the VLAN tag manipulation that will be done on ingress/egress traffic on this sub interface. There are multiple types of Rewrite Definitions that define different types of actions, such as Pop, Push, and Translate, which can operate on 1 or 2 tags. | IpCore | Configuration |
| AdminStatus | The operational state of the Ethernet sub-interface (<i>Up, Down, Unknown, Testing</i>). This state is derived from the ifOperStatus (1.3.6.1.2.1.2.2.1.7) defined in IF-MIB. For more information please refer to IF-MIB definition (section 6) http://www.rfc-editor.org/rfc/rfc2863.txt | Any | System |
| OperStatus | The administrative state of the Ethernet sub-interface (<i>Up, Down, Unknown, Testing</i>). This state is derived from the ifAdminStatus (1.3.6.1.2.1.2.2.1.7) defined in IF-MIB. For more information please refer to IF-MIB definition (section 6) http://www.rfc-editor.org/rfc/rfc2863.txt | Any | System |
| SplitHorizonGroup | The split horizon group to which the EFP is associated. EFPs which are bound to a L2 forwarding entity, specifically a Bridge (representing Bridge Domain configuration), can be divided into groups such that EFPs in the same split horizon group will not be able to communicate directly with each other. If the EFP is not associated to a Bridge, the value will be null, which means no split horizon group is defined. In a configuration in which only one split horizon group exists and it is enabled for the EFP, this value will always be the default group 0. | IpCore | Configuration |

Table 18-25 Ethernet Flow Point (IEfp) (continued)

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|------------------------|---|--------|------------------|
| matchCriteria | VLAN layer-related information used to define matching criteria performed on the traffic ingress on this Ethernet sub-interface. This is a general class used for L2 and L3 Ethernet sub-interfaces. For L3 Ethernet sub-interfaces only, Tagged VLANMatchCriteria is used, which defines one of two VLAN tags as the traffic match criteria. | IpCore | Configuration |
| Configured Description | A free text string configured on the device on the sub-interface. The description is mainly used to help adlp administration by adding non-networking information that cannot be captured as part of the sub-interface configuration. | Any | Configuration |
| Binding | The OID of the entity in the VNE to which the sub-interface is bound. Possible values are the IBridgeOid, IPTPLayer2MplsTunnelOid (Pseudowire edge OID), ILocalSwitchingEntry. | Any | Configuration |
| SP VLAN ID | Service Provider VLAN ID, also referred to as the Outer VLAN. This value represents the outer VLAN ID used in a specific path trace. This attribute is used only in PathTool when doing a path trace that traverses the Ethernet sub-interface. | N/A | N/A |
| CE VLAN ID | Customer Edge VLAN ID, also referred to as the Inner VLAN. This value represents the inner VLAN ID used in a specific path trace. This attribute is used only in PathTool when doing a path trace that traverses the Ethernet sub-interface. | N/A | N/A |
| SP Translated VLAN ID | Service Provider translated VLAN ID, also referred to as the translated Outer VLAN. This value represents the outer VLAN ID used in a specific path trace after the VLAN manipulation occurs. This attribute is used only in PathTool when doing a path trace that traverses the Ethernet L2 sub-interface. | N/A | N/A |
| CE Translated VLAN ID | Customer translated VLAN ID, also referred to as the translated Inner VLAN. This value represents the inner VLAN ID used in a specific path trace after the VLAN manipulation occurs. This attribute is used only in PathTool when doing a path trace that traverses the Ethernet L2 sub-interface. | N/A | N/A |

VLAN Trunking Protocol Service

The [VLAN Trunking Protocol Service](#) object represents a VTP configuration on a switch. It extends [System Service](#).

Table 18-26 *VLAN Trunking Protocol Service (IVtpService)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|-------------------------|--|---------|------------------|
| Version | The VTP version (<i>Version1</i> , <i>Version2</i> , <i>Version3</i>) | Product | Configuration |
| OperatingMode | The VTP mode (<i>Server</i> , <i>Client</i> , <i>Transparent</i> , <i>Primary Server</i> , <i>Secondary Server</i> , <i>Off</i>) | Product | Configuration |
| DomainName | The VTP domain name | Product | Configuration |
| ConfigurationRevision | The VTP's configuration revision number | Product | Configuration |
| isPruningEnabled | Indicates whether VTP is enabled on the switch (<i>True</i> , <i>False</i>) | Product | Configuration |
| isAuthenticationEnabled | Indicates whether VTP authentication is enabled on the switch (<i>True</i> , <i>False</i>) | Product | Configuration |

Vendor-Specific Inventory and IMOs

Vendor-specific IMOs are implemented only for specific vendor devices. The following sections describe vendor-specific objects for this technology:

- [Cisco Ethernet Channel](#)
- [Cisco REP Service](#)
- [Cisco REP Segment Information](#)
- [Cisco REP Port Information](#)

Cisco Ethernet Channel

The [Cisco Ethernet Channel](#) data link layer object aggregates multiple [Ethernet Interfaces](#), to which it is bound by its Containing Termination Points attribute. It is accessed primarily by the [Virtual LAN Multiplexer](#)/Interface or [IP Interface](#) bound by its Contained Connection Termination Points attribute. It is also accessed by the [Bridging Entity](#).

Table 18-27 *Cisco Ethernet Channel (IEthernetChannel)*

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|----------------------|--|--------|------------------|
| Group Number | Group identifier of the aggregated Ethernet interfaces | Any | Configuration |
| Bandwidth | Accumulated bandwidth of all aggregated Ethernet interfaces, in Mb/s | Any | Configuration |
| Aggregation Protocol | Aggregation protocol (<i>Manual</i> , <i>LACP</i> , <i>PAGP</i>) | Any | Configuration |
| IANA Type | Internet Assigned Numbers Authority (IANA) type of the sublayer | N/A | N/A |
| MAC Address | MAC address of the aggregated Ethernet interfaces | Any | Configuration |

Table 18-27 Cisco Ethernet Channel (IEthernetChannel) (continued)

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|--|--|--------|------------------|
| Administrative Status | Administrative status of the aggregated interfaces | Any | Configuration |
| Operational Status | Operational status of the aggregated interfaces | Any | Configuration |
| Containing Connection Termination Points | Underlying termination points (Ethernet Interface) | Any | N/A |
| Contained Connection Termination Points | Bound connection termination points | Any | N/A |

Cisco REP Service

The [Cisco REP Service](#) object represents REP protocol configured on a device.

Table 18-28 Cisco REP Service (IREPService)

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|---------------------|---|--------|------------------|
| version | The version of REP protocol being used by the REP Service running on this device. | IpCore | Configuration |
| administrativeVlan | The ID of the administrative VLAN used by REP to transmit its hardware flooding layer messages (an integer from 1 to 4094). | IpCore | Configuration |
| notificationEnabled | Indicates whether or not the device will generate REP notifications. | IpCore | Configuration |
| SegmentsTable | The list of all REP segments defined on the REP Service. | IpCore | Configuration |

Cisco REP Segment Information

The [Cisco REP Segment Information](#) object represents a single REP segment.

Table 18-29 Cisco REP Segment Information (IREPSegmentInfo)

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|-------------------|--|--------|------------------|
| segmentId | The ID of the REP segment. | IpCore | Configuration |
| isSegmentComplete | Indicates whether the segment is complete (that is, no port in the segment is in the “failed” state). | IpCore | Configuration |
| portsTable | An array of Cisco REP Port Information objects representing the ports on the device that belong to this REP segment. | IpCore | Configuration |

Cisco REP Port Information

This object represents a REP port. REP ports belong to a REP segment, which in turn is displayed under REP service.

Table 18-30 Cisco REP Port Information (IREPPortInfo)

| Attribute Name | Attribute Description | Scheme | Polling Interval |
|---|---|--------|------------------|
| PortName | The name of the port to which this IREPPortInfo IMO is associated. | IpCore | Configuration |
| PortOid | A reference (OID) to the IEthernet IMO, representing the Ethernet port to which this IREPPortInfo IMO is associated. | IpCore | Configuration |
| portType | The type of port to which this IREPPortInfo IMO is associated (<i>Primary, Secondary, Intermediate</i>). | IpCore | Configuration |
| portRole | The role the REP port is playing, determined by its link state and whether it is forwarding or blocking traffic (<i>Failed, Alternate, Open</i>). | IpCore | Configuration |
| operPortStatus | The current operational link state of the REP port (<i>None, Init Down, No Neighbor, One Way, Two Way, Flapping, Wait, Unknown</i>). | IpCore | Configuration |
| blockedVlans | The list of VLANs that are currently blocked on this REP port. | IpCore | Configuration |
| ConfiguredLoad BalancingBlocked Vlans | The list of VLANs configured to be blocked at the alternate port of this REP segment. | IpCore | Configuration |
| PreemptTimer | Specifies the time interval that REP waits before triggering preemption after the segment is complete (an integer from 0 to 300, or <i>Disabled</i>) <i>Disabled</i> indicates that no time delay is configured and the preemption will happen manually. | IpCore | Configuration |
| IslAgeoutTimer | The link status layer age-out timer; that is, the time, in milliseconds, for which the REP interface remains up without receiving a hello from a neighbor. | IpCore | Configuration |
| remoteDeviceName | The name of the neighbor device on the segment to which this port is connected (may be null). | IpCore | Configuration |
| remoteDeviceMac | The MAC address of the neighbor bridge on the segment to which this port is connected (may be null if this is an edge port). | IpCore | Configuration |
| remotePortName | The name of the remote port on the neighbor device on the segment to which this port is connected (may be null). | IpCore | Configuration |
| SegmentID | The ID of the segment of which this port is a part. | IpCore | Configuration |

Service Alarms

The following alarms are supported for this technology:

- [Cloud Problem, page 41-22](#)
- [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](#)
- [VSI Down, page 41-63](#)
- [EFP Down, page 41-32](#)
- [Subinterface Down, page 41-61](#)

Note that these alarms, apart from Cloud Problem, are related to the underlying physical interface (see [Common Components](#)).

Cisco ANA does not generate service alarms specific to QinQ technology. However, correlation takes this technology into account when performing flow analysis.