

# **Managing Carrier Ethernet Configurations**

The following topics describe how you can use the Vision client to monitor Carrier Ethernet services. If you cannot perform an operation that is described in these topics, you may not have sufficient permissions; see Permissions for Managing Carrier Ethernet, page B-12.

- Viewing CDP Properties, page 18-2
- Viewing Link Layer Discovery Protocol Properties, page 18-3
- Viewing Spanning Tree Protocol Properties, page 18-5
- Viewing Resilient Ethernet Protocol Properties (REP), page 18-9
- Viewing HSRP Properties, page 18-13
- Viewing Access Gateway Properties, page 18-14
- Working with Ethernet Link Aggregation Groups, page 18-17
- Viewing mLACP Properties, page 18-24
- Monitoring Provider Backbone Bridges, page 18-27
- Monitoring PBB-based Support Service Discovery, page 18-47
- Viewing EFP Properties, page 18-51
- Connecting a Network Element to an EFP, page 18-54
- Understanding EFP Severity and Ticket Badges, page 18-55
- Viewing EVC Service Properties, page 18-56
- Viewing and Renaming Ethernet Flow Domains, page 18-60
- Working with VLANs, page 18-62
- Understanding Unassociated Bridges, page 18-90
- Working with Ethernet Flow Point Cross-Connects, page 18-92
- Working with VPLS and H-VPLS Instances, page 18-94
- Working with Pseudowires, page 18-105
- Working with Ethernet Services, page 18-122
- Viewing IP SLA Responder Service Properties, page 18-129
- Viewing IS-IS Properties, page 18-130
- Viewing OSPF Properties, page 18-133

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• Monitoring the CPT 50 Ring Support, page 18-138

- Configuring REP and mLACP, page 18-144
- Viewing the Remote Loop Free Alternate Configurations, page 18-144
- Using Pseudowire Ping and Show Commands, page 18-149
- Configuring IS-IS, page 18-150

# **Viewing CDP Properties**

Cisco Discovery Protocol (CDP) is primarily used to obtain protocol addresses of neighboring devices and discover the platform of those devices.

### In Logical Inventory

To view CDP properties:

- Step 1 In the Vision client, double-click the device whose CDP properties you want to view.
- **Step 2** In the **Inventory** window, click **Logical Inventory** > **Cisco Discovery Protocol**.

The CDP properties are displayed in logical inventory as shown in Figure 18-1.

Figure 18-1CDP in Logical Inventory

NPE1-9K-FL	Poll Now				
Logical Inventory Access Gateway	Process: Cisco Discovery	Protocol Process Status	Running		
Access Lists	CDP Holdtime: 120.0 sec	CDP Message 2	Interval: 5.0 sec		
ATM Traffic Profiles Bidirectional Forwarding Dete Bridges	ction CDP Local Device ID: NPE1-9K-FL.cisco	.com CDP Version:	2		
Gisco Discovery Protocol	CDP Neighbors Table				
Cisco Discovery Protocol Ethernet Link Aggregation IS-IS Local Switching LSES	Find : 🚺 🛃 🗸	を 昌 臣			
LSEs	Local Port 😔 🖉	Local Port ID	Remote Device ID	Remote Port ID	Remote IP Address
Modular OS	NPE1-9K-FL#0:GigabitEthernet0/0/0/29	GigabitEthernet0/0/0/29	AGG1-6524ME-FL	GigabitEthernet1/32	10.204.55.24
OAM 🗧	NPE1-9K-FL#0:GigabitEthernet0/0/0/30	GigabitEthernet0/0/0/30	CRS1-1-FL.Cisc.com	GigabitEthernet0/4/2/2	10.204.2.1
OSPE Processes	NPE1-9K-FL#0:GigabitEthernet0/0/0/38	GigabitEthernet0/0/0/38	GSR1-IOX-FL	GigabitEthernet0/2/1/0	10.204.2.18
Pseudowires     Routing Entities     Traffic Engineering Tunnels     VC Switching Entities	* NPE1-9K-FL#0:GigabitEthernet0/0/0/39	GigabitEthernet0/0/0/39	NPE2-7600-FL	GigabitEthernet4/10	10.204.2.9
<ul> <li>Routing Entities</li> <li>Traffic Engineering Tunnels</li> </ul>	NPE1-9K-FL#1:GigabitEthernet0/1/0/37	GigabitEthernet0/1/0/37	NPE2-7600-FL	GigabitEthernet4/7	10.220.1.10
VC Switching Entities	NPE1-9K-FL#1:GigabitEthernet0/1/0/39	GigabitEthernet0/1/0/39	CRS1-1-FL.Cisc.com	GigabitEthernet0/4/0/0	10.56.59.30
vvice Zoom)					Line 0 (Size 6
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Table 18-1 describes the CDP instance properties that are displayed.

Field	Description
Process	Process name; in this case, Cisco Discovery Protocol
Process Status	Process status: Running or Disabled.
CDP Holdtime	Specifies the amount of time a receiving device should hold the information sent by a device before discarding it.
CDP Message Interval	Interval between CDP advertisement transmissions.
CDP Local Device ID	Local device identifier.
CDP Version	CDP version: 1 or 2.
CDP Neighbors Table	
Local Port	Local port name.
Local Port ID	Local port identifier.
Remote Device ID	Remote device identifier.
Remote Port ID	Remote port identifier.
Remote IP Address	Remote IP address.

Table 18-1         CDP Properties in Logical Inventory
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### In Physical Inventory

To view CDP on a Layer 2 port:

- Step 1 In the Vision client, double-click the device with the Layer 2 port with the CDP information you want to view.
- Step 2 In the Inventory window, select the required port under Physical Inventory.

The CDP information is displayed in the Discovery Protocols area in the Vision client content pane:

- Discovery Protocol Type—CDP
- Info—Up or Down

# **Viewing Link Layer Discovery Protocol Properties**

Link Layer Discovery Protocol (LLDP) stores and maintains the local device information, including a list of devices directly connected to the device.

### **In Logical Inventory**

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To view LLDP properties:

- Step 1 In the Vision client, double-click the device with the LLDP information you want to view.
- Step 2 In the Inventory window, choose Logical Inventory > Link Layer Discovery Protocol.

The LLDP properties are displayed in logical inventory as shown in Figure 18-2.

🛛 c7	7-sw10 [1N]	Dell Now						
•	Logical Inventory	Process:	Link Layer Dis	covery Protocol	Process Status:	Running		
•	Access Lists Bridges	LLDP Hold Time:	120.0 sec		LLDP Reinitialisation Del			
	CFM	LLDP Advertisements Interval:	30.0 sec		Local System Name:	c7-sw10		
	Cisco Discovery Protocol Ethernet LMI				Local system Name:	C7-5W10		
	Ethernet LMI IP SLA Responder	Local Chassis ID:	00 22 0C 98 F	4 80				
	Link Layer Discovery Protocol							
Þ 33	Local Switching	LLDP Neighbors Table						
	LSEs MPBGPs	-	\$ ⊽ *	<b>H H</b>				
	OAM							
	Operating System	Local Port 👌 🛆		Local Port Name	Remote Chassis ID	Remote System Name		
	Resilient Ethernet Protocol Routing Entities	c7-sw10#0:GigabitEthernet1/0/2		GigabitEthernet1/0/2		c7-sw9	Gi1/0/2	GigabitEthernet1/0/2
	Spanning Tree Protocol	c7-sw10#1:GigabitEthernet1/1/2	Gi1/1/2	GigabitEthernet1/1/2	00 22 OC 99 09 00	c7-sw8	Gi1/1/2	GigabitEthernet1/1/2
•	Tunnel Traffic Descriptors	1						
	VTP							
· 🖷	Physical Inventory							
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Netto IN	etwork Events J EProvisioning Events	2						

Figure 18-2 LLDP in Logical Inventory

Table 18-2 describes the properties that are displayed for LLDP.

Table 18-2	Link Layer L	Discovery Protocol	<b>Properties</b>

Field	Description
Process	Process; in this case, Link Layer Discovery Protocol
Process Status	Process status: Running or Disabled.
LLDP Hold Time	LLDP advertised hold time in seconds.
LLDP Reinitialization Delay	LLDP interface reinitialization delay in seconds
LLDP Advertisements Interval	LLDP advertisements interval in seconds.
Local System Name	Local system name.
Local Chassis ID	Local chassis identifier.

Field	Description
LLDP Neighbors Table	
Local Port	Local port.
Local Port ID	Local port identifier.
Local Port Name	Local port name.
Remote System Name	Remote system name.
Remote Chassis ID	Remote chassis identifier.
Remote Port ID	Remote port identifier.
Remote Port Name	Remote port name.
Remote Management IP	Remote management IP address.

 Table 18-2
 Link Layer Discovery Protocol Properties (continued)

### In Physical Inventory

To view LLDP on a Layer 2 port:

- Step 1 In the Vision client, double-click the device with the Layer 2 port with LLDP information you want to view.
- Step 2 In the Inventory window, select the required port under Physical Inventory.

The LLDP information is displayed in the Discovery Protocols area in the Vision client content pane:

- Discovery Protocol Type—LLDP
- Info-Tx (Enabled or Disabled), Rx (Enabled or Disabled).



If the LLDP transmit is disabled on the interface using CLI and you click the Poll Now button, the LLDP **Info-Tx** field is disabled.

## Viewing Spanning Tree Protocol Properties

Spanning Tree Protocol (STP) is a link management protocol that provides path redundancy while preventing undesirable loops in the network.

To view Spanning Tree properties:

- **Step 1** In the Vision client, double-click the element whose STP properties you want to view.
- Step 2 In the Inventory window, choose Logical Inventory > Spanning Tree Protocol.
- **Step 3** STP properties are displayed in logical inventory as shown in Figure 18-3.

	ogical Inventory [2M]	•	Poll Now						
- 5	Access Gateway								
- <b>-</b>	2 (MSTAG) GigabitEthernet2/0/19		Process:	Spanning Tre	e Protocol	Process Status:	Running		
· · ·	Access Lists		Bridge Hello Time:	1.0 sec		Hello Time:	1.0 sec		
	ATM Traffic Profiles		Bridge Forward Delay:	4.0 sec		Forward Delay:	4.0 sec		
,	Bidirectional Forwarding Detection		Bridge Max Age:	6.0 sec		Max Age:	6.0 sec		
▶ 📑	Bridges								
	Cisco Discovery Protocol		STP Protocol:	MST		UplinkFast:	Down		
• 🔳 🛡	Clock [2M]		BackboneFast:	Down					
	Ethernet Link Aggregation								
	Ethernet LMI Frame Relay Traffic Profiles								
	ICCP Redundancy								
•	IS-IS		STP Instance Info Tal	ble					
	Local Switching		Find :	14 E	v * # !				
▶ 📰	LSEs						1	1.5.2.5.45.5	land an
▶	MPBGPs		STP Instance ID 👌 🖯	VLAN Ids	Bridge Priorit	y STP Root Port	Root Cost	Designated Root	Bridge ID
·	MPLS-TP		MSTO	[1-4094]	32768		0	00 1E BE 8A B7 80	00 1E BE 8A B7 80
	MPLS-TP Global OAM	1							
	Operating System								
> III	OSPE Processes								
	Pseudowires								
-	Resilient Ethernet Protocol								
	SegmentId 100								
_	SegmentId 300								
> 📑	Routing Entities								
- 💻	Spanning Tree Protocol								
80 81	Mst Properties MST0								
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	manic Englieering Tunnes	<b>v</b>							
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	vork Events Provisioning Events							200400-13-0094	

Figure 18-3 STP in Logical Inventory

Table 18-3 describes the properties that are displayed for STP.

Field	Description
Process	Process; in this case, Spanning Tree Protocol.
Process Status	Process status: Running or Disabled.
Bridge Hello Time	Hello message keepalive interval (in seconds) when the port is the root.
Hello Time	Current hello time (in seconds).
Bridge Forward Delay	When the port is the root and in listening or learning state, amount of time to wait (in seconds) before proceeding to the forwarding state.
Forward Delay	Current bridge forward delay (in seconds).
Bridge Max Age	When the port is the root, maximum age of learned Spanning Tree Protocol port information (in seconds).
Max Age	Current maximum age (in seconds).
STP Protocol	STP version: MST, RSTP, PVSTP, MSTP, or RPVST.
UplinkFast	PVSTP Uplink Fast function status: Up or Down.
BackboneFast	PVSTP BackboneFast function status: Up or Down.
STP Instance Info Table	
STP Instance ID	STP instance name.
VLAN ID	VLAN identifiers.
Bridge Priority	Bridge priority.

Table 18-3STP Properties

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Field	Description
STP Root Port	Hyperlinked entry to the STP port in logical or physical inventory.
Root Cost	Root cost value for this bridge.
Designated Root	MAC address of the designated root.
Bridge ID	Bridge identifier (MAC address).
Bridge Hello Time	Hello message keepalive interval (in seconds) when the port is the root.
Hello Time	Current hello time (in seconds).
Bridge Forward Delay	When the port is the root and in the listening or learning state, amount of time to wait (in seconds) before proceeding to the forwarding state.
Forward Delay	Current bridge forward delay (in seconds).
Bridge Max Age	When the port is the root, maximum age of learned Spanning Tree Protocol port information (in seconds).
Max Age	Current maximum age (in seconds).

Table 18-3	STP Properties (continued)
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### Step 4 To view the properties of an STP instance, do one of the following:

- Double-click the required instance.
- Click the required entry in logical inventory under the Spanning Tree Protocol branch.

Table 18-4 describes the information that is displayed in the STP Instance Information Properties window.

Field	Description
STP Instance ID	STP instance identifier.
VLAN ID	VLAN identifier.
Bridge Priority	Bridge priority.
Bridge ID	Bridge identifier (MAC address).
Root Cost	Root cost value for this bridge.
Designated Root	MAC address of the designated root.
Bridge Hello Time	Hello message keepalive interval (in seconds) when the port is the root.
Hello Time	Current hello time (in seconds).
Bridge Forward Delay	When the port is the root and in listening or learning state, amount of time to wait (in seconds) before proceeding to the forwarding state.
Forward Delay	Current bridge forward delay (in seconds).
Bridge Max Age	When the port is the root, the maximum age of learned Spanning Tree Protocol port information (in seconds).
Max Age	Current maximum age (in seconds).
STP Protocol Specification	Specific STP protocol type or variant used for this instance, such as Rapid PvSTP.
Is Root	Whether or not the port is the root: True or False.

 Table 18-4
 STP Instance Information Properties

Field	Description
Ports Info Table	
STP Port	Hyperlinked entry to the STP port in physical inventory.
Port State	STP port state: Disabled, Blocking, Listening, Learning, or Forwarding,
Port Role	Port role: Unknown, Backup, Alternative, Designated, Root, or Boundary.
Port Priority	Default 802.1p priority assigned to untagged packets arriving at the port.
Port Path Cost	Port path cost, which represents the media speed for this port.
Point To Point Port	Whether or not the port is linked to a point-to-point link: True or False.
Edge Port	Whether or not the port is an edge port; that is, whether it is connected to a nonbridging device: True or False.
MST Port Hello Time	This field is displayed in the Ports Info Table only for MST.
	In seconds, the interval between hello BPDUs sent by root switch configuration messages. The range is 1 to 10 seconds.
Port Identifier	STP port identifier.
Portfast	Whether or not STP PortFast is enabled on the port: Up or Down.
Designated Port Identifier	Designated STP port identifier.
Designated Bridge	STP designated bridge.
BPDU Filter	BPDU Filter status: Up or Down.
BPDU Guard	BPDU Guard status: Up or Down.

 Table 18-4
 STP Instance Information Properties (continued)

Step 5 To view MSTP properties, choose the required MSTP entry in logical inventory under Spanning Tree Protocol.

Table 18-5 describes the information that is displayed for MSTP.

 Table 18-5
 MSTP Properties in Logical Inventory

Field	Description
MST Force Version	Force version used: MST, PVSTP, RSTP, STP, or Unknown.
MST Cfg ID Rev Level	Revision level used by the selected device and negotiated with other devices.
MST Cfg ID Name	MSTP instance name.
MST Max Instances	Maximum number of MSTP instances.
MST Cfg ID Fmt Sel	Configuration format used by this device and negotiated with other devices.
MST External Root Cost	External root cost of the MSTP instance.

The following topics describe how to view STP properties related to:

- VLAN domain views and overlays—See Viewing STP Information in VLAN Domain Views and VLAN Overlays, page 18-83.
- VLAN service link properties—See Viewing STP Properties for VLAN Service Links, page 18-84.

## Viewing Resilient Ethernet Protocol Properties (REP)

Cisco Resilient Ethernet Protocol (REP) technology is implemented on Cisco Carrier Ethernet switches and intelligent service edge routers. REP is a segment protocol, and a REP segment is a chain of ports connected to each other and configured with the same segment identifier. Each end of a segment terminates on an edge switch. The port where the segment terminates is called the edge port.

Prime Network discovers and displays REP Segments (identified by a REP segment identifier that is locally configured on the network element) along with Global REP configuration details.

You can also view the REP port roles (open, alternate, and failed) in the Vision client map. The REP port role is displayed as a tool-tip between the REP enabled trunk ports in the Ethernet links. Using the Vision client, you can identify if the segment is open or closed.

The map displays the forwarding direction (REP port roles) along the Physical links within VLAN overlays. It also displays the forwarding direction along the VLAN links among the switching elements within the VLAN logical domain topology.

REP implementation supports the following faults:

- A REP Port Role change to Failed service event will be generated when a REP port role is change from Alternate or Open to Failed.
- A REP Port Role change to OK clearing service event will be generated when a REP port role is change from Failed to Alternate or Open.

Correlation to these service events to physical layer events (for example Link down or Port down) is also performed.

You can view REP properties in logical inventory.

- Step 1 In the Vision client, double-click the device configured for REP.
- **Step 2** In the **Inventory** window, choose **Logical Inventory** > **Resilient Ethernet Protocol**.

Figure 18-4 shows an example of REP in logical inventory.

AGG-7606-TX [5M+]					_ 🗆 ×
AGG-7605-TX [SM+]     Cogical Inventory [IM+]     Cogical Inventory [IM+]     Access Gateway     Access Class     ATM Traffic Profiles     Bidrectional Forwarding Detect     Bidrectional Forwarding     Bidrectiona	Administrative VLAN: 1 REP Version: 1 REP Segments Table			Running true	
Device Zoom Best Fit				L	ine 0 (Size 2)
Find : End : Tickets Network Events Provisioning Events	i in a No ar am	- ···	n li n	la na la s	
			Memory:	16% Connected	

Figure 18-4 REP in Logical Inventory

Table 18-6 describes the information that is displayed for REP.

Field	Description
Process	Process name; in this case, Resilient Ethernet Protocol.
Process Status	State of the REP process, such as Running or Down.
Administrative VLAN	Administrative VLAN used by REP to transmit its hardware flooding layer messages. Values range from 1 to 4094.
Notification Enabled	Whether or not notification is enabled: True or False.
REP Version	Version of REP being used.
<b>REP Segments Table</b>	
Segment ID	Segment identifier.
Segment Complete	Whether the segment is complete; that is, that no port in the segment is in a failed state: True or False.

Table 18-6REP Properties

Step 3To view REP segment properties, double-click the required entry in the REP Segments table.Figure 18-5 shows an example of REP segment properties in logical inventory.

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AGG-7606-TX	[5M+]		_ 🗆 ×
▼ 🖄 😈 🛛 AGG-760	06-TX [5M+]	Poll Now	
🗸 🖳 🕎 🛛 Logic	al Inventory [1M+]		
Au Au Bi Bi Bi Bi	ccess Gateway	Segment ID: 100 Segment Complete: false	
A	access Lists		
A 📰	TM Traffic Profiles		
🗰 Bi	idirectional Forwarding Detect		
P 🛼 Br	ridges	Segment Ports	
P 🔤 🛛	FM	Find:	
🔳 G	isco Discovery Protocol		
• 🔳 🖸	llock	Port 🔁 / Port State Port Type Port Role Remote Device Name Remote Port Name	Blocked VLA
🗐 🐨 Fi	thernet Link Aggregation	AGG-7606-TX#4:GigabitEthernet4/2 Two Way Open	
Et Et	thernet LMI		
Fr Fr	rame Relay Traffic Profiles		
	CCP Redundancy		
• 🔜 🔺 💵	MAGroups		
	5-IS		
	ocal Switching		
	SEs		
	1PBGPs		
	IPLS-TP DAM		
	Derating System		
	SPF Processes		
	seudowires		
	esilient Ethernet Protocol		
	SegmentId 100		
	SegmentId 300		
	outing Entities		
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Tickets Network	Events Provisioning Events		
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Figure 18-5 REP Segment Properties

Table 18-7 describes the information that is displayed for REP segments.

Field	Description			
Segment ID	Segment identifier.			
Segment Complete	Whether the segment is complete; that is, that no port in the segment i in a failed state: True or False.			
Segment Ports Table				
Port	Hyperlinked entry to the port in physical inventory.			
Port State	Current operational link state of the REP port: None, Init Down, No Neighbor, One Way, Two Way, Flapping, Wait, or Unknown.			
Port Type	Port type: Primary Edge, Secondary Edge, or Intermediate.			
Port Role	Role or state of the REP port depending on its link status and whether it is forwarding or blocking traffic: Failed, Alternate, or Open.			
Remote Device Name	Name of the neighbor device that this port is connected to on this segment. This value can be null.			
Remote Port Name	Name of the neighbor port on the neighbor bridge that this port is connected to on this segment. This value can be null.			
Blocked VLANs	VLANs that are blocked on this port.			
Configured Load Balancing Blocked VLANs	List of VLANs configured to be blocked at this port for REP VLAN load balancing.			
Preemptive Timer	Amount of time, in seconds, that REP waits before triggering preemption after the segment is complete. The entry can range from 0 to 300, or be Disabled.			
	The value Disabled indicates that no time delay is configured, and that the preemption occurs manually.			
	This property applies only to REP primary edge ports.			
LSL Ageout Timer	Using the Link Status Layer (LSL) age-out timer, the amount of time, in milliseconds, that the REP interface remains up without receiving a hello from a neighbor.			
Remote Device MAC	MAC address of the neighbor bridge that this port is connected to on this segment. This value can be null.			

Table 18-7 I	<b>REP Segment Properties</b>
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The following topics describe how to view REP properties related to VLANs:

- VLAN domain views and overlays—See Viewing REP Information in VLAN Domain Views and VLAN Overlays, page 18-80.
- VLAN service link properties—See Viewing REP Properties for VLAN Service Links, page 18-81.

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# **Viewing HSRP Properties**

Hot Standby Router Protocol (HSRP) is a protocol that provides backup to a router in case of failure. Using HSRP, several routers are connected to the same Ethernet network segment and work together to present the appearance of a single virtual router. The routers share the same IP and MAC addresses; therefore in the event of failure of one router, the hosts on the LAN will be able to continue forwarding packets to a consistent IP and MAC address.

HSRP groups are configured on IP interfaces. An IP interface is modeled by the VNE through the IPInterface DC. The IPInterface DC maintains the HSRP related information by the use of HSRP group entries. Ethernet DCs, which are used to model Ethernet ports, maintain MAC addresses of the HSRP groups.

To view HSRP properties:

.x-vCenter (13M) Logical Inventory (13M)

Compute Virtualization Virtual DataCenter - Bangalore Datacent

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- Step 1 Double-click the required element in the Vision client.
- **Step 2** In logical inventory, choose **Logical Inventory > Routing Entities > Routing Entity**.

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Step 3 In the IP Interfaces tab, double-click the required interface to view the IP interface properties. If HSRP is configured on the IP interface, the HSRP Group tab is displayed as shown in Figure 18-6.

IP Address:

State:

10.105.172.233

Connected



Name:

DNS Name:

Data Stores EVC Mode: Disabled vMotion Enabled false Host Clusters Hord Clasters Hord Servers Virtual DataCenter - Bangalore De Data Stores Hord Clasters MITC-PRIME-CLUSTER Hord Servers Hord Servers U.10.105.172.140 (Hypervis U.10.105.172.160 (Hypervis U.10.105.172.160 (Hypervis U.10.105.172.160 (Hypervis U.10.105.172.160 (Hypervis) Fault Tolerance Enabled: false Fault Tolerance Version 2.0.1-3.0.0-3.0.0 18-Mar-13 12:19:49 MAC Address: 00 1E 4F 3A 25 85 System Up Time -UUID: 44454c4c-3600-104e-804d-c3c04f563153 PowerEdge 2950 Dell Inc. Vendor: • 6Đ Hypervisor Processor Statistics CPU Allocation Memory Allocation Name: Intel(R) Xeon(R) CPU Description: Intel(R) Xeon(R) CPU E5405 @ 2.00GHz 10.105.172.200 (Hyperviso CPU: 1 Cores Per CPU: 4 10.105.172.232 (Hy 1.99 GHz 0.04 GHz (0%) Rated Speed: Used Speed: 10.105.172.233 (Hypervisor HyperThreading Enabled: false RAM Size: 7.99 GB 畜 al Machines (All Data · E Routing Entities Virtual Machines Data Sti res Virtual Interfaces Compute Re ource Pools ⊧ <del>س</del> Physical Inventory Find : 目をマキーの Resource Pool Provider Name 😔 / Status Root Pool 101 Q Device Zoom 🔀 Best Fit **10**5 test-parent1 10.105.172.233 Normal false Line 0 (Size 2) false Find : 1월 🛃 🗢 🦤 👼 👼 Severity Ticket ID N... Last Modification Time 🛛 🕀 🗸 Root ... Root Event Time Descriptio Location Element Type 5 ~13.18·08· π 20001 14-May-13 18:08:34 14-May-13 18:06:26 V V Virtual machine cpu usage crossed threshold BLR-VCenter#migration-test-vm-123 VMware vCenter Server No 10003 14-May-13 18:06 W 14-May-13 18:06:26 VM Powered Off BLR-WCenter#m Line 0 (Size 3) Tickets Network Events Provisioning Events 10%

Table 18-8 describes the information in the HSRP Group tab.

Field	Description
Group Number	Number of the HSRP group associated with the interface.
Version	Version of the HSRP group.
Port Name	Port on which the HSRP is configured.
Priority	Value that determines the role each HSRP router plays.
	Values are 1 through 254, with higher numbers having priority over lower numbers.
Coupled Router	The partnet router.
State	State of the HSRP group: Active or Standby.
Virtual IP Address	Virtual IP address assigned to the active router.
Virtual MAC Address	Virtual MAC address assigned to the active router.

Table 18-8	HSRP Group	Properties
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# **Viewing Access Gateway Properties**

In an access network, an access gateway configuration ensures loop-free connectivity in the event of various failures by sending statically configured bridge protocol data units (BPDUs) toward the access network. Using statically configured BPDUs enables the gateway device to act appropriately when notified of the following topology changes:

- Failure of a link in the access network.
- Failure of a link between the access network and the gateway device.
- Failure of an access device.
- Failure of a gateway device.

To view access gateway properties:

- Step 1 Double-click the element configured for access gateway.
- Step 2 In the Inventory window, choose Logical Inventory > Access Gateway > access-gateway. The group name is appended by either MSTAG or REPAG, indicating the group type Multiple Spanning Tree Access Gateway or Resilient Ethernet Protocol Access Gateway.

Figure 18-7 shows an example of an access gateway entry in logical inventory.

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Figure 18-7 Access Gateway in Logical Inventory

Table 18-9 describes the information that is displayed for an access gateway.

Field	Description
Group Name	Access gateway group name.
Group Type	Group type: MSTAG or REPAG.
Interface Properties	
Interface	Hyperlink to the interface in physical inventory on which access gateway is configured.
Config Name	Name of the MSTP region.
	The default value is the MAC address of the switch, formatted as a text string using the hexadecimal representation specified in IEEE Standard 802.
Max Age	In seconds, the maximum age for the bridge.
	Values range from 6 to 40 seconds.
Provider Bridge	Whether the current instance of the protocol is in 802.1ad mode: True or False.
Bridge Address	Bridge identifier for the interface.
Port Identifier	Port identifier for the interface.
External Cost	External path cost on the current port.
	Values range from 1 to 200000000.
Config Revision	Number of the configuration revision.

 Table 18-9
 Access Gateway Properties in Logical Inventory

Field	Description
Hello Time	Current hello time (in seconds)
Port Active	Whether or not the port is active: True or False.
BPDUs Sent	Number of BPDUs sent.
Reversion Control Enabled	Whether reversion control is enabled: True or False.

Table 18-9	Access Gateway Properties in Logical Inventory (continued)

Step 3 Choose an access gateway instance to view instance properties.

Figure 18-8 shows an example of the information displayed for an access gateway instance.

Figure 18-8 Access Gateway Instance in Logical Inventory

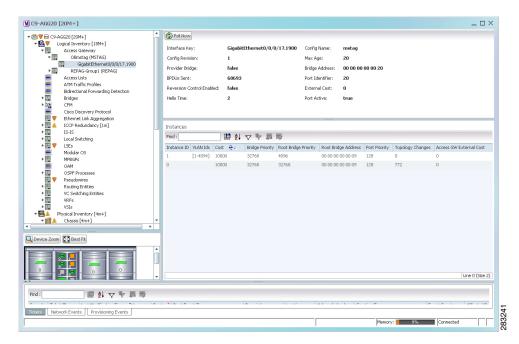


Table 18-10 describes the information that is displayed for an access gateway instance.

Field	Description	
Interface Key	Hyperlink to the interface in physical inventory on which access gateway is configured.	
Config Name	Name of the MSTP region.	
	The default value is the MAC address of the switch, formatted as a text string using the hexadecimal representation specified in IEEE Standard 802.	
Config Revision	Number of the configuration revision.	
Max Age	In seconds, the maximum age for the bridge.	
	Values range from 6 to 40 seconds.	

 Table 18-10
 Access Gateway Instance Properties

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Field	Description		
Provider Bridge	Whether the current instance of the protocol is in 802.1ad mode: True or False.		
Bridge Address	Bridge identifier for the current switch.		
BPDUs Sent	Number of BPDUs sent.		
Port Identifier	Port identifier for the interface.		
Reversion Control Enabled	Whether reversion control is enabled: True or False.		
External Cost	External path cost on the current port.		
	Values range from 1 to 200000000.		
Hello Time	Current hello time (in seconds)		
Port Active	Whether or not the port is active: True or False.		
Instances Table			
Instance ID	Access gateway instance identifier.		
VLAN ID	VLAN identifiers.		
Cost	Path cost for this instance.		
Bridge Priority	Priority associated with current bridge.		
Root Bridge Priority	Priority associated with the root bridge.		
Root Bridge Address	Address of the root bridge.		
Port Priority	Priority of the interface for this instance.		
Topology Changes	Number of times the topology has changed for this instance.		
Access GW External Cost	External root cost of this instance.		

 Table 18-10
 Access Gateway Instance Properties (continued)

# **Working with Ethernet Link Aggregation Groups**

Ethernet link aggregation groups (LAGs) provide the ability to treat multiple switch ports as one switch port. The port groups act as a single logical port for high-bandwidth connections between two network elements. A single link aggregation group balances the traffic load across the links in the channel.

LAG links are discovered automatically for devices that support LAG technology and use VNEs that model Link Aggregation Control Protocol (LACP) attributes.

You can create static links between Ethernet LAGs by choosing a LAG and the desired port channel for the A or Z side as described in Adding a Static Link When a Network Link is Missing, page 4-13.

If a physical link within the link aggregation group fails, the following actions occur:

• Traffic that was previously carried over the failed link is moved to the remaining links.

Most protocols operate over single ports or aggregated switch ports and do not recognize the physical ports within the port group.

• An aggregation service alarm is generated.

The aggregation service alarm indicates the percentage of links within the aggregation that have failed. For example, if an Ethernet link aggregation group contains four Ethernet links and one fails, the aggregation service alarm indicates that 25% of the links are down.

## **Viewing Ethernet LAG Properties**

To view a device's Ethernet LAG properties, the device must be configured to receive SNMP traps as described in the *Cisco Prime Network 5.0 Administrator Guide*. To view properties for Ethernet link aggregation groups:

- **Step 1** In the Vision client, double-click the device with the link aggregation group you want to view.
- Step 2 In the Inventory window, choose Logical Inventory > Ethernet Link Aggregation.

The link aggregation properties are displayed as shown in Figure 18-9.

Figure 18-9 Ethernet Link Aggregation in Logical Inventory

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,	Frame Relay Traffic Profiles IS-IS	AGG-65	500-CA#Aggregation Group 5	Ethernet Channel	5	10.0 Gbps	Manual	Down	00 21 D8 CD 69 80
→ <b></b>	Local Switching	AGG-65	500-CA#Aggregation Group 50	IEEE 8023 AD LAG	50	10.0 Gbps	LACP	Down	00 18 B9 8C E5 04
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Table 18-11 describes the aggregation group properties that are displayed in the Data Link Aggregations table.

Table 18-11Data Link Aggregations Table

Field	Description	
ID	Aggregation identifier. Double-click the entry to view the properties for that aggregation.	
Туре	Aggregation group type: Ethernet Channel or IEEE 802.3 AD LAG.	
Group Number	Aggregation group number.	
Bandwidth	Aggregation bandwidth.	

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Field	Description
Aggregation Control Protocol	Aggregation control protocol: Manual, Link Aggregation Control Protocol (LACP), or Port Aggregation Protocol (PagP).
Status	Aggregation status: Up or Down.
MAC Address	Aggregation MAC address.
Link Type	The type of ethernet bundle link, namely ICL and transport.
	• ICL link type represents the ethernet link bundle between Cisco ASR 9000 device and satellite chassis or between two satellite chassis.
	• Transport link type represents the ethernet link bundle between two Cisco ASR 9000 devices.
Non Revertive	Specifies the currently active but a lower priority port to remain active port even after a higher priority port is capable of being operational (if non revertive is enabled).
	By default, non revertive is disabled.
Load Balance	Load balance type which uses Source and Destination MAC address, Source IP address, or Destination IP address.

 Table 18-11
 Data Link Aggregations Table (continued)

### Step 3 To view properties for a specific aggregation, double-click the group identifier.

The information that is displayed depends on the type of aggregation:

- For Ethernet Channel aggregations, see Table 18-12.
- For IEEE 802.3 AD aggregations, see Table 18-13.

Field	Description	
Group Number	Aggregation group number.	
Bandwidth	Aggregation bandwidth in b/s.	
Control Protocol	Aggregation control protocol: Manual, Link Aggregation Control Protocol (LACP), or Port Aggregation Protocol (PagP).	
MAC Address	Aggregation MAC address.	
Administrative State	Aggregation administrative status: Up or Down.	
Operational State	Aggregation operational status: Up or Down.	
Adjacent	Adjacent group, hyperlinked to the group in logical inventory.	
mLACP Properties	mLACP properties are displayed if the aggregation group is associated with an ICCP redundancy group.	
ICCP Redundancy Group	ICCP redundancy group associated with this aggregation group, hyperlinked to the relevant entry in logical inventory.	
mLACP Role	Role of the LAG in the redundancy group: Active or Standby.	
mLACP Operational System MAC	MAC address used in a dual-homed environment that is selected by ICCP from one of the configured system MAC addresses for one of the points of attachment (PoAs).	

Table 18-12LAG Ethernet Channel Properties

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Field	Description
mLACP Operational System Priority	Priority used in a dual-homed environment that is selected by ICCP from the configured system priority on one of the PoAs.
mLACP Failover Option	Configured mLACP failover mode: Revertive or Nonrevertive.
mLACP Max Bundle	Maximum number of links allowed per bundle.
Aggregated Ports Table	
ID	Aggregated port identifier, hyperlinked to the interface in physical inventory.
Туре	Aggregation type, such as Layer 2 VLAN.
Mode	VLAN mode, such as Trunk.
Native VLAN ID	VLAN identifier (VID) associated with this VLAN. The range of VLANs is 1 to 4067.
VLAN Encapsulation Type	Type of encapsulation configured on the VLAN, such as IEEE 802.1Q.
Allowed VLANs	List of VLANs allowed on this interface.
VLAN Encapsulation Admin Type	VLAN administration encapsulation type, such as IEEE 802.1Q.
Subinterfaces Table	
Address	IP address of the subinterface.
Mask	Subnet mask applied to the IP address.
VLAN Type	Type of VLAN, such as Bridge or IEEE 802.1Q.
Operational State	Operational state of the subinterface: Up or Down.
VLAN ID	VLAN identifier.
Inner VLAN	CE-VLAN identifier.
IP Interface	IP interface configured as part of the subinterface, hyperlinked to the routing entity or VRF in logical inventory.
VRF Name	VRF associated with the subinterface.
Is MPLS	Whether the subinterface is enabled for MPLS: True or False.
	This column is displayed when at least one interface is MPLS-enabled.
Tunnel Edge	Whether this is a tunnel edge: True or False.
VC	Virtual circuit identifier, hyperlinked to the VC Table when the subinterface is configured for ATM VC.
Binding	Hyperlinked entry to the specific bridge in logical inventory.
EFPs Table	
EFP ID	EFP identifier.
Operational State	EFP operational state: Up or Down.
VLAN	VLAN associated with this EFP.
Inner VLAN	CE-VLAN identifier.
Translated VLAN	Translated, or mapped, VLAN identifier.
Translated Inner VLAN	Translated, or mapped, inner VLAN identifier.

Table 18-12         LAG Ethernet Channel Properties (continued)	Table 18-12	LAG Ethernet Channel Properties (continued)
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Field	Description	
Binding	Hyperlinked entry to the specific bridge in logical inventory.	
Description	Description for the EFP.	

### Table 18-12 LAG Ethernet Channel Properties (continued)

Bandwidth         Aggregation bandwidth.           Control Protocol         Aggregation control protocol: Manual, Link Aggregation Control Protocol (LACP), or Port Aggregation Protocol (PagP).           MAC Address         Aggregation MAC address.           Administrative State         Aggregation operational status: Up or Down.           Operational State         Aggregation operational status: Up or Down.           Dot3ad Agg Partner System Priority         Priority of the partner system.           Dot3ad Agg MAC Address         Aggregation MAC address.           Adjacent         Displays the adjacent ethernet link aggregation for the selected Data Link Aggregation ID.           Dot3ad Agg Actor Admin Key         Actor administrative key.           Dot3ad Agg Actor System Priority         Actor system priority.           Dot3ad Agg Collector Max Delay         Maximum delay (in microseconds) for either delivering or discarding a received frame by the frame collector.           Dot3ad Agg Actor System ID         Actor system identifier, in the form of a MAC address.           Dot3ad Agg Partner System ID         Partner system identifier, in the form of a MAC address.           Dot3ad Agg Partner System ID         Partner system identifier, in the form of a MAC address.           Dot3ad Agg Partner System ID         Partner system identifier, on the form of a MAC address.           Dot3ad Agg Partner System ID         Partner system identifier, on the form of a MAC	Field	Description
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hyperlinked to the relevant entry in logical inventory.mLACP RoleRole of the LAG in the redundancy group: Active or Standby.mLACP Operational System MACMAC address used in a dual-homed environment that is selected by ICCP from one of the configured system MAC addresses for one of the points of attachment (PoAs).mLACP Operational System PriorityPriority used in a dual-homed environment that is selected by ICCP from the configured system priority on one of the PoAs.mLACP Failover OptionConfigured mLACP failover mode: Revertive or Nonrevertive.mLACP Max BundleMaximum number of links allowed per bundle.Aggregated Ports TablePort identifier, hyperlinked to the interface in physical inventory.TypeType of VLAN, such as Layer 2 VLAN.	mLACP Properties	
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the configured system priority on one of the PoAs.mLACP Failover OptionConfigured mLACP failover mode: Revertive or Nonrevertive.mLACP Max BundleMaximum number of links allowed per bundle.Aggregated Ports TableIDIDPort identifier, hyperlinked to the interface in physical inventory.TypeType of VLAN, such as Layer 2 VLAN.	mLACP Operational System MAC	ICCP from one of the configured system MAC addresses for one of the
mLACP Max Bundle       Maximum number of links allowed per bundle.         Aggregated Ports Table       Port identifier, hyperlinked to the interface in physical inventory.         Type       Type of VLAN, such as Layer 2 VLAN.	mLACP Operational System Priority	•
Aggregated Ports Table         ID       Port identifier, hyperlinked to the interface in physical inventory.         Type       Type of VLAN, such as Layer 2 VLAN.	mLACP Failover Option	Configured mLACP failover mode: Revertive or Nonrevertive.
IDPort identifier, hyperlinked to the interface in physical inventory.TypeType of VLAN, such as Layer 2 VLAN.	mLACP Max Bundle	Maximum number of links allowed per bundle.
Type of VLAN, such as Layer 2 VLAN.	Aggregated Ports Table	
	ID	Port identifier, hyperlinked to the interface in physical inventory.
Discovery Protocols Discovery protocols used on this port.	Туре	Type of VLAN, such as Layer 2 VLAN.
	Discovery Protocols	Discovery protocols used on this port.

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Field	Description				
Subinterfaces Table					
Address	IP address of the subinterface.				
Mask	Subnet mask applied to the IP address.				
VLAN Type	Type of VLAN, such as Bridge or IEEE 802.1Q.				
Operational State	Operational state of the subinterface: Up or Down.				
VLAN ID	VLAN identifier.				
Inner VLAN	CE-VLAN identifier.				
IP Interface	IP interface configured as part of the subinterface, hyperlinked to the routing entity or VRF in logical inventory.				
VRF Name	VRF associated with the subinterface.				
VC	Virtual circuit identifier, hyperlinked to the VC Table when the subinterface is configured for ATM VC.				
Binding	Hyperlinked entry to the specific bridge in logical inventory.				
EFPs Table					
EFP ID	EFP identifier.				
Operational State	EFP operational state: Up or Down.				
VLAN	VLAN associated with this EFP.				
Inner VLAN	CE-VLAN identifier.				
Translated VLAN	Translated, or mapped, VLAN identifier.				
Translated Inner VLAN	Translated, or mapped, inner VLAN identifier.				
Binding	Hyperlinked entry to the specific bridge in logical inventory.				
Description	Description for the EFP.				
LACP Port Entries					
Aggregated Port	Port on which the aggregation is configured, hyperlinked to the entry in physical inventory.				
Dot3ad Agg Port Partner Admin Port Priority	Administrative port priority for the partner.				
Dot3ad Agg Port Partner Admin Key	Administrative key for the partner port.				
Dot3ad Agg Port Partner Oper Port Priority	Priority assigned to the aggregation port by the partner.				
Dot3ad Agg Port Actor Oper State	Local operational state for the port.				
Dot3ad Agg Port Actor Admin State	Local administrative state as transmitted by the local system in LACP data units (LACPDUs).				
Dot3ad Agg Port Selected Agg ID	Selected identifier for the aggregation port.				
Dot3ad Agg Port Partner Oper Key	Operational key for the partner port.				
Dot3ad Agg Port Partner Admin State	Partner administrative state.				
Dot3ad Agg Port Actor Port Priority	Priority assigned to the local aggregation port.				
Dot3ad Agg Port Partner Oper State	Partner administrative state as transmitted by the partner in the most recently transmitted LAPCDU.				
Dot3ad Agg Port Attached Agg ID	Identifier of the aggregator that the port is attached to.				

## Table 18-13 LAG IEEE 802.3 AD Properties (continued)

Field	Description
Dot3ad Agg Port Actor Admin Key	Administrative key for the local port.
Dot3ad Agg Port Actor Port	Number assigned to the local aggregation port.
Dot3ad Agg Port Partner Oper Port	Number assigned to the aggregation port by the partner.
Dot3ad Agg Port Actor Oper Key	Operational for the local port.
Dot3ad Agg Port Partner Admin Port	Administrative value of the port for the partner.

 Table 18-13
 LAG IEEE 802.3 AD Properties (continued)

# **Viewing mLACP Properties**

The Vision client supports the discovery of Multichassis LACP (mLACP) configurations on devices configured for them, and displays mLACP configuration information, such as redundancy groups and properties, in inventory.

To view mLACP properties:

Step 1 In the Vision client, double-click the element configured for mLACP.

Step 2 In the Inventory window, choose Logical Inventory > ICCP Redundancy.

In response, the Vision client lists the Inter-Chassis Communication Protocol (ICCP) redundancy groups configured on the device as shown in Figure 18-10.

Figure 18-10 ICCP Redundancy in Logical Inventory

NPE1-9K	NGN								_ 🗆 ×
- 🖷	PE1-9K-NGN A Logical Inventory Access Gateway Access Lists	Poli Now Process: IC	CP Redundancy						
Crces Soleway     Crces Soleway     Crces Subs     ATM Taffic Profiles     BidgeLlans     BidgeLlans     BidgeLlans     Coo Discovery Protocol     Ethernet Link Aggregation     Fill		ICCP Redunda	ncy Groups	5 5-					
	Bridges Cisco Discovery Protocol	Group Number	Peer Monitoring Option 2		Member Device Name	mI ACP Node ID	mLACP Configured System MAC	mLACP Configured	System Prinrity
	Ethernet Link Aggregation ICCP Redundancy	10	IP Reachability Monitoring	172.200.1.2	NPE2-9K-NGN	1	17 20 02 00 01 01	500	,
* 🔜	ICCP Redundancy ICCP Group 10 ICCP Group 20	20	IP Reachability Monitoring	172.200.1.2	NPE2-9K-NGN	1	17 20 02 00 01 01	500	_
	CCCP Group 20     IS-IS     Loci Switching     LSEs     Modular OS     MPBCPs     OAM     OS     PPeckoves     Routing Critities     Turfitic Engineering Turnels     U     Subsc Trititie     Turfit Engineering     U								
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	letwork Events Provisioning Events								
	,						Memory: 12%	Connected	

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Table 18-14 describes the information displayed in the ICCP Redundancy Groups table.

Field	Description		
Group Number	ICCP group identifier.		
Peer Monitoring Option	Method used to monitor the peer: BFD or IP Reachability Monitoring.		
Member IP Address	IP address of the neighbor PoA device.		
Member Device Name	Name of the neighbor PoA device.		
mLACP Node ID	Identifier used by this member of the mLACP redundancy group.		
mLACP Configured System MAC	System MAC address of the redundancy group advertised to other members of the mLACP redundancy group and used for arbitration.		
mLACP Configured System Priority	System priority advertised to other mLACP members of the redundancy group.		

 Table 18-14
 ICCP Redundancy Groups in Logical Inventory

- **Step 3** To view additional information about an ICCP redundancy group, do either of the following:
  - In the logical inventory window navigation pane, choose Logical Inventory ICCP Redundancy > *ICCP-group*.
  - In the logical inventory content pane, right-click the required group in the ICCP Redundancy Groups table and choose **Properties**.

The ICCP Redundancy Group Properties window is displayed with the Backbone Interfaces and Data Link Aggregations tabs as shown in Figure 18-11.

Figure 18-11 ICCP Redundancy Group Properties Window

1-npe1-70										_ D >
	ogical Inventory [4M+] Access Lists	*	Poll Now							
	Access Lists ATM Traffic Profiles		Group Number:	60	Pe	er Monitoring O	ption:	BFD		
	Bidirectional Forwarding Detection	0	Member IP Address:	1.1.0.137	rol.	ACP Node ID:		4		
Þ	Bridges									
•	CFM		mLACP Configured System MAC:	00 00 00 0	01 00 01 mL	ACP Configure	d System Priority:	20000		
	Cisco Discovery Protocol Clock				_					
	Ethernet Link Aggregation		Backbone Interfaces Data Lin	k Aggregation	IS					
	Ethernet LMI			AL	を周囲					
	Frame Relay Traffic Profiles		Find :	2↓ ▽	A the late					
<b>1</b>	GRE Tunnels		ID 🔁 🛆	Туре	G	oup Number	Bandwidth	Aggregation Control Protocol	Status /	IAC Address
-	ICCP Redundancy	U.	c1-npe1-76#Aggregation Group (	50 Ethernet	Channel 6		10.0 Gbps	Manual	Down (	IO 19 07 AB 43 00
-12		0.0								
_• <b>(</b> 2	ICCP Group 60									
) ) ) ) ) ) )	IS-IS									
> 📰 🗛	Local Switching									
) 	LSEs									
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nd :	開会マヤー	<b>7</b> 7	6							
verity Ticke	at ID Last Modification Time Root	Tause	Root Event Time Description	Location	Acknowledged	Creation Tir	me Event Count	Affected Devices Count	Duplication Coun	Reduction Count /
										+
										Empty
kets Netw	work Events Provisioning Events	J								
									9% Cor	

Table 18-15 describes the information available in the ICCP Redundancy Group Properties window.

Field	Description			
Group Number	ICCP group identifier.			
Peer Monitoring Option	Method used to monitor the peer: BFD or IP Reachability Monitoring.			
Member IP Address	IP address of the neighbor PoA device.			
Member device name	Name of the neighbor PoA device.			
mLACP Node ID	Identifier used by this member of the mLACP redundancy group.			
mLACP Configured System MAC	System MAC address of the redundancy group advertised to other members of the mLACP redundancy group and used for arbitration.			
mLACP Configured System Priority	System priority advertised to other mLACP members of the redundancy group.			
Backbone Interfaces Tab				
ID	Backbone interface defined for the redundancy group, hyperlinked to the relevant entry in logical inventory.			
Status	Status of the backbone interface: Up, Down, or Unknown.			
Data Link Aggregations Tab				
ID	Link aggregation group associated with the redundancy group, hyperlinked to the relevant entry in logical inventory.			
Туре	Aggregation group type: Ethernet Channel or IEEE 802.3 AD LAG.			
Group Number	ggregation group number.			
Bandwidth	Aggregation bandwidth.			
Aggregation Control Protocol	Aggregation control protocol: Manual, LACP, or PAgP.			
Status	Aggregation status: Up or Down.			
MAC Address	Aggregation MAC address.			

**Step 4** To view additional mLACP properties, double-click the entry for the required link aggregation group in the Data Link Aggregations tab.

mLACP information is displayed in the Link Aggregation Group Properties window, as described in the following tables:

- Table 18-12—LAG Ethernet Channel Properties
- Table 18-13—LAG IEEE 802.3 AD Properties

CE

Port

# **Monitoring Provider Backbone Bridges**

The Provider Backbone Bridge (PBB) specified by IEEE 802.1ah-2008, provide a way to increase the number of service provider supported Layer 2 service instances beyond the number supported by QinQ and VPLS. PBB adds a backbone VLAN tag and backbone destination and source MAC addresses to encapsulate customer Ethernet frames and create a MAC tunnel across core switches.

The PBB network comprises of a set of architecture and protocols for routing over a provider's network. The PBB network interconnects multiple provider bridge networks without losing each customer's individual VLANs. The PBB network encapsulates and decapsulates end-user traffic on a Backbone Edge Bridge (BEB) at the edge of the Provider Backbone Bridged Network (PBBN). A Backbone Core Bridge (BCB)-based network provides internal transport of the IEEE 802.1ah encapsulated frames within the PBBN.

> Backbone BD

Figure 18-12 shows a typical provider backbone network topology.

Provider Backbone Network Topology

BCB

#### Provider Network Port BEB BEB Edge Backbone Backbone Edae CE PBBN BD BD BD BD Customer Provider Provider Customer Network Network Network Network Port Port Port Provider Network Port BCB Backbone BD Ethernet link carrying backbone frames comprising backbone SA and DA, B-VLAN tag, I-tag and customer frame Ethernet link carrying customer frames comprising optional service VLAN tag and original octets of data BEB internal link between edge BD and backbone BD

## **BFD** Templates Support

BFD (Bidirectional Forwarding Detection Templates) are the new features added in CPT devices. Prime Network uses Telnet Command to get the BFD templates in existing CPT devices.

Telnet /CLI Command for listing the BFD template

*Figure 18-12* 

Show running-config|section bfd-template

## **Cerent Trap Support**

Cerent trap alarms are supported for CPT devices. There are 170 traps supported.

### Change Settings in CTC (Cisco Transport Controller)

Any configurations settings made in CPT should be done through CTC. To receive traps in a particular server, that server IP needs to be entered in the device through CTC. Most of the traps are on device dependencies.

## Link and Port Parameters

Configuration of Ethernet loopback is used to add and remove loopback. Link and Port parameters have been used for Prime Network configuration scripts in both TLI and Telnet. The link and port parameters are supported for the following: Ethernet Parameter Configuration

- MTU
- Link State
- Expected Speed
- Expected Duplex
- Operating Flow Control
- Carrier Delays
- Auto Negotiation

## **Port Parameter Configuration**

- Port Name
- Admin State
- AINS Soak
- Reach
- Wavelength

## L2 Parameter Configuration

- CDP
- DOTIX
- DTP
- LACP
- PAGP
- VTP
- STP

The following are the configuration scripts supported,

- Add Loopback
- Remove Loopback
- Configure CDP
- Configure Ethernet
- Configure L2 Control Protocol
- Configure Port Parameters
- Show Ethernet Parameters
- Show L2 Control Parameters
- Show Port Parameters

This chapter describes the following topics:

- Working with PBB-EVPN, page 18-29
- Working with PBB-VPLS, page 18-40
- Working with PBB-MMRP, page 18-44

# **Working with PBB-EVPN**

Ethernet Virtual Private Network (EVPN) is a solution for secure and private connectivity of multiple sites within an organization. The EVPN service extends the benefits of Ethernet technology to the WAN. This service is delivered over Multiprotocol Label Switching (MPLS) networks.

EVPN allows you to manage routing over a virtual private network, providing complete control and security. EVPN introduces a solution for multipoint L2VPN services with advanced multi-homing capabilities, using BGP for distributing customer or client MAC address reachability information over the MPLS/IP network. EVPN advertises each customer MAC address as BGP routes, therefore allowing BGP policy control over MAC addresses.

The PBB-EVPN solution combines Ethernet Provider Backbone Bridging (PBB - IEEE 802.1ah) with Ethernet VPN, where provider edges (PEs) perform as PBB Backbone Edge Bridge (BEB). The PEs receive 802.1Q Ethernet frames from their attachment circuits. These frames are encapsulated in the PBB header and forwarded over the Internet Protocol / Multi-protocol label switching (IP/MPLS) core. On the egress side (EVPN PE), the PBB header is removed after MPLS disposition, and the original 802.1Q Ethernet frame is delivered to the customer equipment.

The PE routers perform these functions:

- Learns customer or client MAC addresses (C-MACs) over the attachment circuits in the data-plane, per normal bridge operation.
- Learns remote C-MAC to backbone MAC (B-MAC) bindings in the data-plane from traffic ingress from the core.
- Advertises local B-MAC address reachability information in BGP to all other PE nodes in the same set of service instances. Note that every PE has a set of local B-MAC addresses that uniquely identify the device.

I

• Builds a forwarding table from the received remote BGP advertisements, associating remote B-MAC addresses with remote PE IP addresses.

PBB-EVPN scales well for large network with millions of customer MAC addresses by constraining customer MAC address in access. Only B-MAC addresses are advertised in core, making the number of BGP routes exchanged manageable.

This section describes the following topics:

- EVPN Instance, page 18-30
- Ethernet Segment, page 18-30

## **EVPN Instance**

E-VPN Instance (EVI) identifies a VPN in the MPLS/IP network. There can only be one EVI per core bridge.

### Ethernet Segment

Ethernet Segment is a site connected to one or more PEs. The Ethernet Segment can be a single device like a Customer Edge (CE) or an entire network, such as:

- Single-Homed Device (SHD)
- Multi-Homed Device (MHD) using Ethernet Multi-chassis Link Aggregation Group
- Single-Homed Network (SHN)
- Multi-Homed Network (MHN)

The Ethernet segment is uniquely identified by a 10-byte global Ethernet Segment Identifier (ESI).

You can view the following properties in the PBB-EVPN network:

- Viewing PBB-EVPN Core Bridge Properties, page 18-30
- Viewing EVPN Container Properties, page 18-34
- Viewing EVPN Properties, page 18-35
- Viewing Ethernet Segment Container Properties, page 18-36
- Viewing Ethernet Segment Properties, page 18-38

## Viewing PBB-EVPN Core Bridge Properties

To view the PBB-EVPN core bridge properties:

- **Step 1** Double-click the required device in the Vision client.
- **Step 2** In the **Inventory** window, choose **Logical Inventory** > **Bridges** to view the list of bridges.
- Step 3 Select a PBB-EVPN bridge to view the properties.

Table 18-16 describes the information displayed for PBB-EVPN bridge properties.

Γ

Field	Description						
Name	PBB bridge name.						
Туре	Specifies the type of bridge. There can be two types of bridges:						
	• I-Bridge—Interfaces with the customer edge.						
	• B-bridge—Interfaces with the core network.						
	The PBB-EVPN core bridge is a B-bridge						
VLAN ID	VLAN identifier configured for the subscriber.						
VSI	VSI information, hyperlinked to the VSI entry in logical inventory.						
Evi	Specifies an unique route distinguisher per customer. There can only b one Evi per core bridge.						
MMRP Enabled	Denotes Multiple MAC Registration Protocol (MMRP). It allows multicast traffic in bridged LANs.						
	Note The MMRP is disabled by default in the EVPN network.						
Pseudowires Tab	1						
ID	Pseudowire identifier, hyperlinked to the VLAN entry in Bridges in logical inventory.						
Peer	Identifier of the pseudowire peer, hyperlinked to the entry in the Pseudowire Tunnel Edges table in logical inventory.						
SAII	Specifies the Source Access Individual Identifier (SAII) of the tunnel.						
	Note The SAII attribute can be configured only if the Pseudowire type is FEC129 TYPE II.						
Tunnel Status	Operational state of the tunnel: Up or Down.						
TAII	Specifies the Target Attachment Individual Identifier (TAII) of the tunnel.						
	Note The TAII can be configured only if the Pseudowire type is FEC129 TYPE II.						
Peer Router IP	IP Address of the peer router for this pseudowire.						
Pseudowire Type	Type of pseudowire, such as Ethernet, Ethernet Tagged, CESoPSN Basic, PPP, SAToP or FEC129 TYPE II.						
Pseudowire Role	If the pseudowire is in a redundancy configuration, then the pseudowire role indicates whether its a primary pseudowire or a secondary pseudowire in the configuration.						
	If the pseudowire is not configured for redundancy, the field is blank.						
Preferred Path Tunnel	Specifies the path that has to be used for MPLS pseudowire traffic.						

### Table 18-16 PBB-EVPN Core Bridge Properties

Field	Description				
Local Router IP	Specifies the IP address of the tunnel edge, which is used as the router identifier.				
Local MTU	Specifies the byte size of the MTU on the local interface.				
Remote MTU	Specifies the byte size of the MTU on the remote interface.				
Local VC Label	Specifies the MPLS label that is used by the local router to identify or access the tunnel. It is inserted in the MPLS label stack by the local router.				
Peer VC Label	Specifies the MPLS label that is used by the peer router to identify or access the tunnel. It is inserted in the MPLS label stack by the peer router.				
Signaling Protocol	Specifies the protocol that is used to build the tunnel, such as the LDP or TDP.				
Peer Status	Specifies the status of the peer link.				
Associated EVC Name	Specifies the name of the associated Ethernet Virtual Circuits (EVC).				
I-Bridge Associations	ſab				
I-SID	Specifies a 24-bit identifier that represents the backbone service instance.				
I-Bridge	Specifies the exchange identification (XID) in the I-Bridge component. The XID is hyperlinked to the relevant bridge in the logical inventory.				

Table 18-16	<b>PBB-EVPN</b> Core Bridge Properties (continued)
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## **Viewing PBB-EVPN Customer Bridge Properties**

To view the PBB-EVPN customer bridge properties:

- Step 1 Double-click the required device in the Vision client.
- Step 2 In the Inventory window, choose Logical Inventory > Bridges to view the list of bridges.
- Step 3 Select a PBB-EVPN customer bridge to view the properties.

Table 18-17 describes the information displayed for PBB-EVPN customer bridge properties.

Field	Description
Name	PBB bridge name.
Туре	Specifies the type of bridge. The PBB-EVPN customer bridge is an I-bridge
VLAN ID	VLAN identifier configured for the subscriber.

 Table 18-17
 PBB-EVPN Customer Bridge Properties

Γ

Field	Description						
I-SID	Specifies a 24-bit identifier that represents the backbone service instance.						
B-Bridge	Specifies the XID of the B-Bridge component. The XID is hyperlinked to the relevant bridge in logical inventory.						
Pseudowires Tab							
ID	Pseudowire identifier, hyperlinked to the VLAN entry in Bridges in logical inventory.						
Peer	Identifier of the pseudowire peer, hyperlinked to the entry in the Pseudowire Tunnel Edges table in logical inventory.						
SAII	Specifies the Source Access Individual Identifier (SAII) of the tunnel.						
	Note         The SAII attribute can be configured only if the Pseudowire type is FEC129 TYPE II.						
Tunnel Status	Operational state of the tunnel: Up or Down.						
TAII	Specifies the Target Attachment Individual Identifier (TAII) of the tunnel.						
	NoteThe TAII can be configured only if the Pseudowire type is FEC129 TYPE II.						
Peer Router IP	IP address of the peer router for this pseudowire.						
Pseudowire Type	Type of pseudowire, such as Ethernet, Ethernet Tagged, CESoPSN Basic, PPP, SAToP or FEC129 TYPE II.						
Pseudowire Role	If the pseudowire is in a redundancy configuration, then the pseudowire role indicates whether its a primary pseudowire or a secondary pseudowire in the configuration.						
	If the pseudowire is not configured for redundancy, the field is blank.						
Preferred Path Tunnel	Specifies the path that has to be used for MPLS pseudowire traffic.						
Local Router IP	Specifies the IP address of the tunnel edge, which is used as the router identifier.						
Local MTU	Specifies the byte size of the MTU on the local interface.						
Remote MTU	Specifies the byte size of the MTU on the remote interface.						
Local VC Label	Specifies the MPLS label that is used by the local router to identify or access the tunnel. It is inserted in the MPLS label stack by the local router.						
Peer VC Label	Specifies the MPLS label that is used by the peer router to identify or access the tunnel. It is inserted in the MPLS label stack by the peer router.						
Signaling Protocol	Specifies the protocol that is used to build the tunnel, such as the LDP or TDP.						
Peer Status	Specifies the status of the peer link.						

 Table 18-17
 PBB-EVPN Customer Bridge Properties (continued)

Field	Description	
Associated EVC Name	Specifies the name of the associated EVC.	
EFPs Tab	·	
EFP ID	EFP identifier.	
Operational State	EFP operational state.	
VLAN	VLAN identifier.	
Inner VLAN	CE-VLAN identifier.	
Translated VLAN	Translated VLAN identifier.	
Translated Inner VLAN	Translated CE-VLAN identifier.	
Binding Port	Hyperlinked entry to the port in physical inventory.	
Description	Brief description of the EFP.	
Ingress Policy	The name of the ingress service policy associated with the subscriber template. This field is applicable only for IP Subscriber and Service templates.	
Egress Policy	The name of the egress service policy associated with the subscriber template. This field is applicable only for IP Subscriber and Service templates.	
Service Control Policy	Specifies the policy for a port or operation.	
MMRP Participants	•	
Associated MMRP Participant	Specifies an entry that is hyperlinked to an associated MMRP service for that bridge.	

## **Viewing EVPN Container Properties**

To view the EVPN container properties:

Step 1 Right-click the required device in the Vision client and choose Inventory.

Step 2 In the Inventory window, choose Logical Inventory > EVPN to view the EVPN container properties.Table 18-18 describes the information displayed for the EVPN container properties.

Field	Description	
EVI	The EVI identifies a VPN (Virtual Private Network) in the MPLS/IP network. There can only be one EVI per core bridge.	
Bridge Domain	Maintains a forwarding database of MAC addresses from packets received from its interfaces. The bridge domain is hyperlinked to the relevant core bridge in the logical inventory.	

Field	Description	
EVPN Type	Specifies the type of bridges. There can be two types of bridges:	
	• PBB-EVPN	
	• BD	
Route Distinguisher	Creates a unique 96-bit VPNv4 address to distinguish routes within a single internet service provider's (ISP) MPLS network.	
Multicast Label	Specifies a 20-bit multicast label in the MPLS packet to make forwarding decisions and to pre-establish a path for switch-labeled packets at the Layer 2.	
Unicast Label	Specifies a 20-bit unicast label in MPLS packet to make forwarding decisions and to pre-establish a path for switch-labeled packets at the Layer 2.	
Route Distinguisher (Auto)	The Route Distinguisher (Auto) is generated by default as a combination of Loopback IP Address and EVI.	
Route Target (Auto)	Communicates the VPN route to the PE routers.	

 Table 18-18
 EVPN Container Properties (continued)

## **Viewing EVPN Properties**

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To view the EVPN properties:

- Step 1 Right-click the required device in the Vision client and choose Inventory.
- Step 2 In the Inventory window, choose Logical Inventory > EVPN to display the EVPN container properties.
- **Step 3** Double-click an EVI to view its EVPN properties.

Table 18-19 describes the information displayed for EVPN properties.

Field	Description	
EVI	The EVI identifies a VPN in the MPLS/IP network. There can only be one EVI per core bridge.	
Bridge Domain	Maintains a forwarding database of MAC addresses from packets received from its interfaces. The bridge domain is hyperlinked to the relevant core bridge in the logical inventory.	
EVPN Type	<ul><li>Specifies the type of bridges. There can be two types of bridges:</li><li>PBB-EVPN</li><li>BD</li></ul>	
Route Distinguisher	Creates a unique 96-bit VPNv4 address to distinguish routes within a single ISP-MPLS network.	

Table 18-19EVPN Properties

Field	Description	
Multicast Label	Specifies a 20-bit multicast label in MPLS packet to make forwarding decisions and to pre-establish a path for switch-labeled packets at the Layer 2.	
Unicast Label	Specifies a 20-bit unicast label in MPLS packet to make forwarding decisions and to pre-establish a path for switch-labeled packets at the Layer 2.	
Route Distinguisher (Auto)	The Route Distinguisher (Auto) is generated by default as a combination of Loopback IP Address and EVI.	
Route Target (Auto)	Communicates the VPN route to the PE routers.	
EVPN BMAC Addres	s Entries Tab	
MAC Address	It is an unique identifier of the bridge clients in a PE router for an EVPN instance.	
Next HOP	Specifies the peer router associated to each EVPN instance.	
MPLS Label	Enables the MPLS network data packets to make packet forwarding decisions. This allows the data packets to create end-to-end circuits across any type of transport medium, using any protocol.	
Import Route Targets	5 Tab	
Route Target	The PE imports routes with specific prefixes or subnet masks based on the Route Target.	
Export Route Targets	Tab	
Route Target	The Route Target attribute defines the prefixes that are exported on the PE routers.	

Table 18-19	<b>EVPN</b> Properties
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## **Viewing Ethernet Segment Container Properties**

The Ethernet segment is a site that is connected to one or more Provider Edge Switches (PEs). The Ethernet segment can be a single device such as a customer edge or an entire network. The Ethernet segment in a network can be of the following types:

- Single-homed device (SHD)
- Multi-homed device (MHD)
- Single-homed network (SHN)
- Multi-homed network (MHN)

The Ethernet segment is unique and identified by a 10-byte global Ethernet Segment Identifier (ESI).

To view the Ethernet segment container properties:

- **Step 1** Right-click the required device in the Vision client and choose **Inventory**.
- **Step 2** In the **Inventory** window, choose **Logical Inventory** > **Ethernet Segments** to view the Ethernet segment container properties.

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Table 18-20 describes the information displayed for PBBe VPN Ethernet segment container properties.

Field	Description		
Interface Name	Name of the interface that is connected to the Ethernet segment.		
Associated Interface	Associated Name of the interface that is connected to the Ethernet segment.		
ES ID	The Ethernet Segment Identifier (ES ID) is a 10-byte field. It identifies the unique Ethernet segment in the core network of the PE routers.		
Source MAC Address	Specifies the Ethernet Segment MAC Address.		
Access Topology Mode	Specifies one of the following network types:		
	• Single Home Device (SH)		
	• Single Home Network (SHN)		
	• Dual Home Device (DHD)		
	• Dual Home Network (DHN)		
	• Multi Home Network (MHN)		
	The default value is MHN.		
Access Topology Flow Mode	Specifies the flow of traffic in a network. The flow mode can be one of the following options:		
	Active/Active per-flow		
	Active/Active per-service		
I-SID Primary Services	Specifies the type of primary customer service interfaces provided by the I-Bridge Backbone Edge Bridge (IB-BEB). The primary customer service interfaces can be one of the following types:		
	Port based		
	• S-tagged		
	• I-tagged		
I-SID Secondary Services	Specifies the type of secondary customer service interfaces provided by the IB-BEB bridge. The secondary customer service interfaces can be one of the following types:		
	• Port based		
	• S-tagged		
	• I-tagged		
Total I-SID Count	Specifies the total number of elected and non-elected ports.		
Elected I-SIDs	Specifies the Elected Service Identifiers (I-SID) list.		
Non-Elected I-SIDs	Specifies the Non-Elected Service Identifiers (I-SID) list.		

 Table 18-20
 Ethernet Segment Container Properties

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Field	Description	
MAC Flushing Mode	Specifies the MAC flush over Multiple VLAN Registration Protocol (MVRP). The possible values in the MAC Flushing Mode field can be one of the following:	
	• Spanning Tree Protocol - Topology Change Notification (STP-TCN)	
	• MVRP	
	The default value is STP-TCN.	
Peering Timer	Specifies the interface-specific peering timer in seconds. The default value is 45 seconds.	
Recovery Timer	Specifies the interface-specific recovery timer in seconds. The range is 20 to 3600 seconds. The default value is 20 seconds.	
Flush Again Timer	Specifies the interface-specific MAC flush again timer in seconds. The range is 0 to 120 seconds. The default value is 60 seconds.	

# **Viewing Ethernet Segment Properties**

To view the Ethernet segment properties:

- Step 1 Right-click the required device in the Vision client and choose Inventory.
- **Step 2** In the **Inventory** window, choose **Logical Inventory** > **Ethernet Segments** to view the Ethernet segment container properties.
- Step 3 Double-click an interface to view its PBBe VPN Ethernet segment properties.

Table 18-21 describes the information displayed for PBBe VPN Ethernet segment properties.

Field	Description		
Interface Name	Name of the interface that is connected to the Ethernet segment.		
Associated Interface	Associated Name of the interface that is connected to the Ethernet segment.		
ES ID	The Ethernet Segment Identifier (ES ID) is a 10-byte field. It identifies the unique Ethernet segment in the core network of the PE routers.		
Source MAC Address	Specifies the Ethernet Segment MAC Address.		
Access Topology Mode	Specifies one of the following network types:		
	• Single Home Device (SH)		
	• Single Home Network (SHN)		
	• Dual Home Device (DHD)		
	• Dual Home Network (DHN)		
	• Multi Home Network (MHN)		
	The default value is MHN.		

Table 18-21Ethernet Segment Properties

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Field	Description		
Access Topology Flow Mode	Specifies the flow of traffic in a network. The flow mode can be one of the following options:		
	Active/Active per-flow		
	Active/Active per-service		
I-SID Primary Services	Specifies the type of primary customer service interfaces provided by the IB-BEB bridge. The primary customer service interfaces can be one of the following types:		
	Port based		
	• S-tagged		
	• I-tagged		
I-SID Secondary Services	Specifies the type of secondary customer service interfaces provided by the IB-BEB bridge. The secondary customer service interfaces can be one of the following types:		
	• Port based		
	• S-tagged		
	• I-tagged		
Total I-SID Count	Specifies the total number of elected and non-elected ports.		
Elected I-SIDs	Specifies the Elected Service Identifiers (I-SID) list.		
Non-Elected I-SIDs	Specifies the Non-Elected Service Identifiers (I-SID) list.		
MAC Flushing Mode	<ul> <li>Specifies the MAC flush over MVRP. The possible values in the MAC Flushing Mode field can be one of the following:</li> <li>STP-TCN</li> </ul>		
	MVRP		
Peering Timer	The default value is STP-TCN. Specifies the interface-specific peering timer in seconds. The default value is 45 seconds.		
Recovery Timer	Specifies the interface-specific recovery timer in seconds. The range is 20 to 3600 seconds. The default value is 20 seconds.		
Flush Again Timer	Specifies the interface-specific MAC flush again timer in seconds. The range is 0 to120 seconds. The default value is 60 seconds.		
Redundancy Group En	itries		
IP Address	Identifies the redundancy group IP address that is associated to an Ethernet segment.		
Is Self	Specifies whether the redundancy group IP Address belongs to a local border gateway protocol (BGP).		

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# Working with PBB-VPLS

The Virtual Private LAN service (VPLS) is a class of VPN that supports the connection of multiple sites in a single bridged domain over a managed MPLS network. The VPLS is a multipoint service and it can also transport non-IP traffic. All customer premises at a VPLS instance appear to be on the same local area network regardless of their actual locations. The VPLS uses an Ethernet interface to the customer.

A VPLS network consists of the following three main components.

- Customer Edges
- Provider Edges
- IP/MPLS core network

This section consists of the following topics:

- Viewing PBB-VPLS Core Bridge Properties, page 18-40
- Viewing PBB-VPLS Customer Bridge Properties, page 18-42
- Working with PBB-MMRP, page 18-44

## Viewing PBB-VPLS Core Bridge Properties

To view the PBB-VPLS bridge properties:

- **Step 1** Double-click the required device in the Vision client.
- **Step 2** In the **Inventory** window, choose **Logical Inventory** > **Bridges** to view the list of bridges.
- **Step 3** Select a PBB-VPLS bridge to view the properties.

Table 18-22 describes the information displayed for PBB-VPLS bridge properties.

Field	Description		
Name	PBB bridge name.		
Туре	Specifies the type of bridge. There can be two types of bridges:		
	I-Bridge—Interfaces with the customer edge.		
	B-bridge—Interfaces with the core network.		
VLAN ID	Specifies the VLAN identifier of the subscriber.		
VSI	VSI information, hyperlinked to the VSI entry in logical inventory.		
Evi	Specifies a unique route distinguisher per customer. There can only be one EVI per core bridge.		
MMRP Enabled	Denotes Multiple MAC Registration Protocol (MMRP). It allows multicast traffic in bridged LANs.		
	Note The MMRP is enabled in the VPLS network.		

Table 18-22PBB-VPLS Bridge Properties

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Field	Description		
ID	Pseudowire identifier, hyperlinked to the VLAN entry in Bridges in logical inventory.		
Peer	Identifier of the pseudowire peer, hyperlinked to the entry in the Pseudowire Tunnel Edges table in logical inventory.		
SAII	Specifies the Source Access Individual Identifier (SAII) of the tunnel.NoteThe SAII attribute can be configured only if the Pseudowire type is FEC129 TYPE II.		
Tunnel Status	Operational state of the tunnel: Up or Down.		
TAII	Specifies the Target Attachment Individual Identifier (TAII) of the tunnel.         Note         The TAII can be configured only if the Pseudowire type is		
	FEC129 TYPE II.		
Peer Router IP	IP address of the peer router for this pseudowire.		
Pseudowire Type	Type of pseudowire, such as Ethernet, Ethernet Tagged, CESoPSN Basic, PPP, SAToP or FEC129 TYPE II.		
Pseudowire Role	If the pseudowire is in a redundancy configuration, then the pseudowire role indicates whether its a primary pseudowire or a secondary pseudowire in the configuration.		
	If the pseudowire is not configured for redundancy, the field is blank.		
Preferred Path Tunnel	Specifies the path that has to be used for MPLS pseudowire traffic.		
Local Router IP	Specifies the IP address of the tunnel edge, which is used as the router identifier.		
Local MTU	Specifies the byte size of the MTU on the local interface.		
Remote MTU	Specifies the byte size of the MTU on the remote interface.		
Local VC Label	Specifies the MPLS label that is used by the local router to identify or access the tunnel. It is inserted in the MPLS label stack by the local router.		
Peer VC Label	Specifies the MPLS label that is used by the peer router to identify or access the tunnel. It is inserted in the MPLS label stack by the peer router.		
Signaling Protocol	Specifies the protocol that is used to build the tunnel, such as the LDP or TDP.		
Peer Status	Specifies the status of the peer link.		
Associated EVC Name	Specifies the name of the associated EVC.		
VPLS I-Bridge Associa	ations Tab		

 Table 18-22
 PBB-VPLS Bridge Properties (continued)

Field	Description
I-SID Specifies a 24-bit identifier that represents the backbone suinstance.	
I-Bridge	Specifies the exchange identification (XID) in the I-Bridge component The XID is hyperlinked to the relevant bridge in the logical inventory.

 Table 18-22
 PBB-VPLS Bridge Properties (continued)

# **Viewing PBB-VPLS Customer Bridge Properties**

The PBB-VPLS customer bridges communicates directly with the customer edge. Multiple customer bridges can communicate with the core bridge.

To view the PBB-VPLS customer bridge properties:

- **Step 1** Double-click the required device in the Vision client.
- **Step 2** In the **Inventory** window, choose **Logical Inventory** > **Bridges**.
- Step 3 Select a PBB-VPLS customer bridge to view the properties.

Table 18-22 describes the information displayed for PBB-VPLS bridge properties.

Field	Description	
Name	PBB customer bridge name.	
Туре	Specifies the type of bridge. There can be two types of bridges:	
	I-Bridge—Interfaces with the customer edge.	
	B-bridge—Interfaces with the core network.	
VLAN ID	Specifies the VLAN identifier of the subscriber.	
I-SID	Specifies a 24-bit identifier that represents the backbone service instance.	
B-Bridge	Specifies the XID of the B-Bridge component. The XID is hyperlinked to the relevant bridge in logical inventory.	
Pseudowires Tab	)	
ID	Pseudowire identifier, hyperlinked to the VLAN entry in Bridges in logical inventory.	
Peer	Identifier of the pseudowire peer, hyperlinked to the entry in the Pseudowire Tunnel Edges table in logical inventory.	

Table 18-23	PBB-VPLS Customer	r Bridge Properties
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Field	Description			
SAII	Specifies the Source Access Individual Identifier (SAII) of the tunnel.			
	Note	The SAII attribute can be configured only if the Pseudowire type is FEC129 TYPE II.		
Tunnel Status	Operat	Operational state of the tunnel: Up or Down.		
TAII	Specifi tunnel.	es the Target Attachment Individual Identifier (TAII) of the		
	Note	The TAII can be configured only if the Pseudowire type is FEC129 TYPE II.		
Peer Router IP	IP add	IP address of the peer router for this pseudowire.		
Pseudowire Type	Type of pseudowire, such as Ethernet, Ethernet Tagged, CESoPSN Basic, PPP, SAToP or FEC129 TYPE II.			
Pseudowire Role	If the pseudowire is in a redundancy configuration, then the pseudowire role indicates whether its a primary pseudowire or a secondary pseudowire in the configuration.			
	If the p	If the pseudowire is not configured for redundancy, the field is blank.		
Preferred Path Tunnel	Specifi	Specifies the path that has to be used for MPLS pseudowire traffic.		
Local Router IP	Specifies the IP address of the tunnel edge, which is used as the router identifier.			
Local MTU	Specifies the byte size of the MTU on the local interface.			
Remote MTU	Specifies the byte size of the MTU on the remote interface.			
Local VC Label	Specifies the MPLS label that is used by the local router to identify or access the tunnel. It is inserted in the MPLS label stack by the local router.			
Peer VC Label	Specifies the MPLS label that is used by the peer router to identify or access the tunnel. It is inserted in the MPLS label stack by the peer router.			
Signaling Protocol	Specifies the protocol that is used to build the tunnel, such as the LDP or TDP.			
Peer Status	Specifies the status of the peer link.			
Associated EVC Name	Specifi	Specifies the name of the associated EVC.		
EFPs Tab	1			
EFP ID	EFP id	EFP identifier.		
Operational State	EFP op	perational state.		
VLAN	VLAN	VLAN identifier.		
Inner VLAN	CE-VI	CE-VLAN identifier.		
Translated VLAN	Translated VLAN identifier.			
Translated Inner VLAN	Translated CE-VLAN identifier.			

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Field	Description					
Binding Port	Hyperlinked entry to the port in physical inventory.					
Description	Brief description of the EFP.					
Ingress Policy	The name of the ingress service policy associated with the subscriber template. This field is applicable only for IP Subscriber and Service templates.					
Egress Policy	The name of the egress service policy associated with the subscriber template. This field is applicable only for IP Subscriber and Service templates.					
Service Control Policy	Specifies the policy for a port or operation.					
MMRP Participants Ta	ab					
Associated MMRP Participant	Specifies an entry that is hyperlinked to an associated MMRP service for that bridge.					

Table 18-23	PBB-VPLS Customer Bridge Properties
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# Working with PBB-MMRP

Multiple MAC registration protocol (MMRP) is a data link layer 2 protocol that registers group MAC addresses on multiple switches. The MMRP allows multicast traffic in bridged LANs and provides a mechanism to achieve the following:

- Register or unregister group membership information across the bridges attached to the same LAN.
- Register or unregister individual MAC address information across the bridges attached to the same LAN.
- Communicate the registration information across all the bridges that support extended filtering services in the bridged network.

MMRP operates on the services provided by the Multiple Registration Protocol (MRP). It allows bridges, switches or other similar devices to register or unregister attribute values such as VLAN identifiers and multicast the group membership information across a large LAN.

You can view the following properties in the PBB-MMRP network:

- Viewing MMRP Container Properties, page 18-44
- Viewing MMRP Registration Properties, page 18-46

# **Viewing MMRP Container Properties**

To view MMRP container properties:

- Step 1 Right-click the required device in the Vision client and choose Inventory.
- **Step 2** In the **Inventory** window, choose **Logical Inventory** > **MMRP** to view the container properties.

Table 18-24 describes the information displayed for the MMRP container properties.

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Field	Description						
Flood Time	Specifies the flood time to enable the flooding of traffic for the whole core bridge when the MMRP feature is first enabled on the core brid. The range is 3 to 600 seconds.						
Leave All Time	Specifies the minimum time in seconds for the Leave All timer parameter to check how often Leave All messages are sent for all the active ports. The range is 5 to 30 seconds.						
	The default value is 10 seconds.						
Leave Time	Specifies the leave time for all the active ports. The range is 1 to 90 seconds.						
	The default value is 30 seconds.						
Join Time	Specifies the maximum time for controlling the interval between transmit opportunities that are applied to the applicant state machine for all active ports.						
Periodic Transmit	Specifies the periodic transmit interval of Multiple MAC Registration Protocol Data Units (MMRPDU) on all active ports. The range is 2 to 1 seconds.						
<b>MMRP</b> Participants	Tab						
Peer IP Address	Specifies the neighbor Peer IP address.						
PW ID	Specifies the associated Pseudowire ID.						
Bridge Domain	Specifies the associated B-Bridge domain.						
Participant Type	Specifies the node participating in MMRP. In PBB-MMRP, each IB-PE router in B-domain is a participant. The possible value is FULL.						
Flood Optimization	Specifies if the flood optimization is enabled between two point-to-point peers. The possible value is Yes.						
Participant State	Specifies the state of the Participant. The possible value is Normal.						
Registrar State	Specifies the state of the Registrar. The Registrar listens to the MRPDU and registers the applicants. The possible value is Normal.						
Leave State	Specifies the state of one or more remote IB-PE routers that must leave the group B-MAC address flooding tree.						
Join State	Specifies the state of one or more remote IB-PE routers that must join th group B-MAC address flooding tree.						
Last Peer	Specifies the last peer.						
Failed RegistrationsSpecifies the number of failed registrations when the PE binetwork.							

Table 18-24	MMRP Container Properties
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# **Viewing MMRP Registration Properties**

To view the MMRP registration properties:

- Step 1 Right-click the required device in the Vision client and choose Inventory.
- Step 2 In the Inventory window, choose Logical Inventory > MMRP to view the container properties.
- Step 3 Double-click any row to view its registration properties.

Table 18-25 describes the information displayed for MMRP registration properties.

Field	Description						
Peer IP Address	Specifies the neighbor peer IP address.						
PW ID	Specifies the associated pseudowire ID.						
Bridge Domain	Specifies the associated B-Bridge domain						
Participant Type	Specifies the participating node in MMRP. In PBB-MMRP, each IB-PE router in B-domain is a participant. The possible value is FULL.						
Point To Point	Specifies if flood optimization is enabled between two point-to-point peers. The possible value is Yes.						
Applicant State	Announces the group B-MAC address and triggers MRPDU propagation. The possible values can be one of the following:						
	• Normal						
	• Quiet Active						
Registrar State	Specifies the state of the Registrar. The Registrar listens to the MRF and registers the applicants. The possible value is Normal.						
Leave	Specifies the state of one or more remote IB-PE routers that must leav the group B-MAC address flooding tree.						
Join	Specifies the state of one or more remote IB-PE routers that must join group B-MAC address flooding tree.						
Last Peer	Specifies the last peer.						
Failed Registrations	Specifies the number of failed registrations when the PE bridges join t network.						
Registered Neighbour	rs Tab						
I-SID	Specifies a 24-bit identifier that represents the backbone service instance.						
B-MAC	Specifies the bridge MAC Address.						
Participant State	Specifies the state of the Participant. The default value is Normal.						
Registrar State	Specifies the state of the Registrar. The Registrar listens to the MRPDU and registers the applicants. The possible value is In.						

 Table 18-25
 MMRP Registration Properties

# **Monitoring PBB-based Support Service Discovery**

**Managing Carrier Ethernet Configurations** 

The Cisco Prime Network delivers PBB-based discovery for various support services over VLAN, VPLS, EVC, and pseudowires.

The Cisco Prime Network supports the following service discoveries:

- VLAN Discovery—Discovers bridges domains such as I-Bridges, B-Bridges, and regular bridges that are unassociated.
- VPLS Discovery—Discovers VFIs and their associations between I-Bridges and B-Bridges.
- Pseudowire Discovery—Discovers pseudowires and their associations between I-Bridges and ٠ **B-Bridges**.
- EVC Discovery—Creates an end-to-end complex circuit representing the network associations in the core network of the above discovered elements.

The PBB specified by IEEE 802.1ah-2008, provides a way to increase the number of service provider supported Layer 2 service instances beyond the number supported by QinQ and VPLS. PBB adds a backbone VLAN tag, and backbone destination and source MAC addresses to encapsulate customer Ethernet frames and create a MAC tunnel across core switches. The PBB network interconnects multiple provider bridge networks without losing each customer's individual VLANs.

The Prime Network PBB-based support service discovery recognizes service entities in the network. Service discovery are either network data discovered by Prime Network VNEs or other underlying services discovered by other service discoveries. The network data is stored and cached (in memory) in Snapshots on the Prime Network gateway machine. After which, the data is transformed into service data, and then stored in the Prime Network database.

The Prime Network PBB-based support services can be discovered either by using a full discovery mode or a notification-based discovery mode.

The Prime Network supports the following PBB-based support services:

- PBB-based VLAN Discovery, page 18-47
- PBB-based EVC Discovery, page 18-48
- Discovering PBB-links Between I-Bridge and B-Bridge, page 18-49
- PBB-based Pseudowire Discovery, page 18-49 •
- PBB-based VPLS Discovery, page 18-50

# **PBB-based VLAN Discovery**

Chapter 18

Prime Network discovers and allows you to display maps with a network-level view of VLANs.

A VLAN entity consists of one or more bridges and the corresponding EFP elements. When the VLAN discovery is initiated, it identifies VLANs that are considered as part of a switching entity.

### **Associated and Unassociated Bridges**

Generally, all the bridges are categorized as associated or unassociated based on their association with the type of switching entities such as pseudowire and VPLS. In the Provider Backbone configuration, the VLANs identified by VLAN discovery are considered as a part of associated bridges and the VLANs that are not identified are considered as a part of unassociated bridges. For example, if a regular bridge

is associated with a pseudowire or a VPLS, then it is classified as an associated bridge. Otherwise, it is classified as an unassociated bridge. However, the I-Bridges and B-Bridges are always considered as a part of unassociated bridges irrespective of their association with the switching entities.

### **Discovering Unassociated Domains**

To discover the VLAN service configured in a network, a component called VLAN data plug-in collects information related to VLAN from various devices. The data plug-in holds all the data related to the bridges in a centralized location. To discover an unassociated bridge, for example, an I-bridge or a B-bridge, it is essential to verify whether the plug-in has information related to the I-bridge or the B-bridge, or any other additional I-bridge PBB information. To verify, see Verifying Bridge domains, page 18-48. Based on the information collected, a discovery plug-in is created, and the plug-in receives the necessary data from the VLAN plug-in to create the VLAN instances.

### Verifying Bridge domains

To verify the bridge domains, follow the steps provided below:

- Step 1 Create a new map in the Vision client. For example, VLAN.
- Step 2 Add bridges to the map.
- Step 3 Right-click one of the bridges and choose Inventory.
- Step 4 Verify the bridge type in the **Inventory** window.
- Step 5 Open the Add Bridge Domain dialog box in one of the following ways:
  - Choose File Add to Map > Bridge Domain.
  - In the toolbar, click Add to Map and choose Bridge Domain.
- **Step 6** In the **Add Bridge Domain** dialog box, select **Show All** to display the list of bridge domains.
- Step 7 Verify whether the bridge that you identified in the **Inventory** window is listed in the Bridge Domain list.



The bridges of type I-Bridges or B-Bridges are considered as the bridge domains. These I-Bridges or B-Bridges are added in the Bridge Domain list.

## **PBB-based EVC Discovery**

PBB-based EVC discovery is dependent on the following discovery processes:

- VPLS Discovery
- Network VLAN Discovery
- Network Pseudowire Discovery
- Bridge Domain Discovery

EVC discovery plug-in is responsible for handling Carrier Ethernet technologies such as VPLS, VLAN, bridge domains, cross connect, and pseudowires. This plug-in connects all the domains together in a map from the Vision client.

For more information on the Ethernet services, refer to Working with Ethernet Services in the Cisco Prime Network 5.0 User Guide.

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### **PBB-based EVC Multiplexing**

Every EVC should be created with the following rules:

- Every network element, for example, I-Bridge, B-Bridge, pseudowire, or VPLS that is discovered in the inventory should definitely be part of at least one EVC.
- If a network element is associated with the I-Bridge, EVC is created for each I-SID (I-Bridge unique identifier).
- If no I-Bridges are associated, then the EVC is created based on the association between the B-Bridge and VPLS.
- EVC creation for regular bridges works in the same way as that of Prime Network 5.0.

Prime Network supports EVC multiplexing to create an EVC. EVC creation involves the following processes:

- Discovers all dependent discoveries such as VLAN, VPLS, or pseudowires.
- Notifications for each discovery are received by related processors and the Information Model Objects (IMOs) are processed to loaders for creating building blocks based on the associations between the network elements.
- Segmenter collects building blocks from all the above mentioned discoveries and creates segments based on the associations.
- Every segment created is processed based on the rules specified above and creates a complex virtual circuit.

## **Discovering PBB-links Between I-Bridge and B-Bridge**

The PBB I-Bridge interfaces with the customer edge and the B-bridge interfaces with the core network. To discover the link between the I-Bridge and the B-Bridge, follow the steps provided below:

- Step 1 Create a new map in the Vision client. For example, VLAN.
- Step 2 Open the Add Bridge Domain dialog box in one of the following ways:
  - Choose File Add to Map > Bridge Domain.
  - In the toolbar, click Add to Map and choose Bridge Domain.
- Step 3 In the Add Bridge Domain dialog box, select Show All to display the list of bridge domains.
- Step 4 From the bridge domains, select an I-Bridge and a B-Bridge and click OK.
- Step 5 Add the selected bridges to the map. The map displays the PBB links between the newly added bridges.

## **PBB-based Pseudowire Discovery**

A pseudowire is a point-to-point connection between pairs of provider edge (PE) routers.

### Discovering PBB-links Between Pseudowire and I-Bridge/B-Bridge

To discover the link between the pseudowire and the I-Bridge or B-Bridge, follow the steps provided below:

- Step 1 Create a new map in the Vision client. For example, Pseudowire.
- **Step 2** Open the **Add Bridge Domain** to *domain* dialog box in one of the following ways:
  - Choose File Add to Map > Bridge Domain.
  - In the toolbar, click Add to Map and choose Bridge Domain.
- **Step 3** In the **Add Bridge Domain** dialog box, select **Show All** to display the list of bridge domains.
- Step 4 From the bridge domains, select an I-Bridge and a B-Bridge and click **OK** to add the selected bridges to the map.
- **Step 5** Choose **Add to Map > Pseudowire** to open the **Add Pseudowire** to *map* dialog box.
- **Step 6** In the **Add Pseudowire** to *map* dialog box, select **Show All** to display the list of pseudowires.
- **Step 7** Add any pseudowire from the list to the map.
- Step 8 The map displays the link between the pseudowires and the bridge domains.

## **PBB-based VPLS Discovery**

Prime Network provides Virtual Private LAN Service (VPLS) plug-in to gather VPLS relevant information in a network.

The VPLS plug-in gathers VPLS relevant information from all the VNEs, including the VFIs or VSIs, to create a VPLS service. A VPLS instance representing the VPLS configuration is created on the network. The VPLS snapshot finds out VNEs that are running to retrieve potential VFIs and VSIs. The bridge domains that are connected to the VSIs are attached to VPLS instances to create connection between the VPLS and the Network VLANs.

Based on data gathered, the VPLS discovery constructs the VPLS instances. This discovery can be viewed from the client GUI. A map in the GUI represents VPLS instances in addition to regular VNEs. Thereby, the bridges connected to VSI or VFI are discovered and connected. The VPLS container sends notifications when an VPLS instance is added, modified, or deleted.

### **Discovering PBB-links Between VPLS and I-Bridge/B-Bridge**

To discover the link between the VPLS and the I-Bridge or B-Bridge, follow the steps provided below:

Step 1	Create a new map in the Vision client. For example, VPLS.					
Step 2	Open the Add Bridge Domain to domain dialog box in one of the following ways:					
	Choose File Add to Map > Bridge Domain.					
	• In the toolbar, click Add to Map and choose Bridge Domain.					
Step 3	In the Add Bridge Domain dialog box, select Show All to display the list of bridge domains.					
Step 4	From the bridge domains, select an I-Bridge and a B-Bridge and click <b>OK</b> to add the selected bridges to the map.					
Step 5	Choose Add to Map > VPLS to open the Add Vpls Instance to map dialog box.					
Step 6	In the Add Vpls Instance to map dialog box, select Show All to display the list of VPLS instances.					
Step 7	Add a VPLS instance from the VPLS instances list. The map displays the link between the VPLS instance and bridge domains.					

### Viewing EFP Properties

# **Viewing EFP Properties**

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The Vision client provides information about EFPs in a number of ways. For example:

- EFP names displayed in Vision client maps add EFP and the managed element name to the interface name, such as GigabitEthernet4/0/1 EFP: 123@c4-npe5-67.
- If you select an EFP in the navigation pane in the Vision client and then click **Show List View**, an Ethernet Flow Points table lists the network element, port, and network VLAN associated with the EFP.

To view additional EFP properties:

- Step 1 In the Vision client map view, select the required EFP in the navigation pane or in the map pane and then do either of the following:
  - Right-click the EFP and choose Properties.

• Choose Node > Properties.

Figure 18-13 shows an example of the EFP Properties window.

Figure 18-13 EFP Properties Window

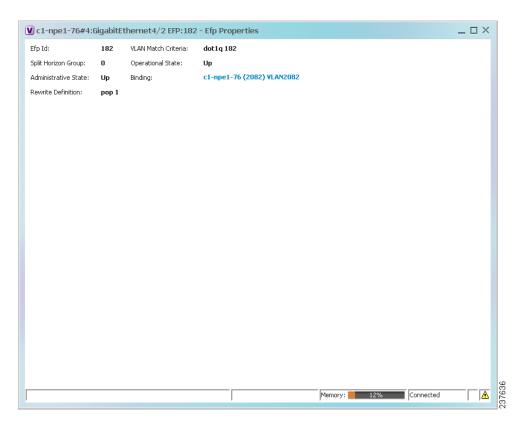


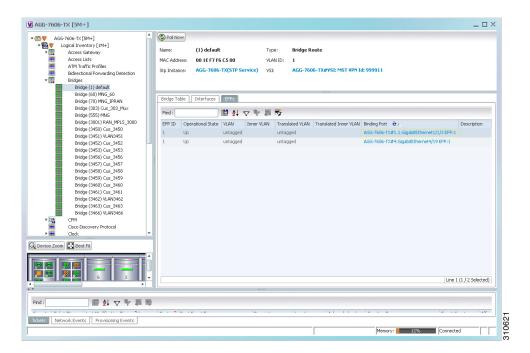
Table 18-26 describes the information displayed in the EFP Properties window.

Field	Description			
EFP ID	Identifier for the EFP.			
VLAN Match Criteria	Match criteria configured on the EFP for forwarding decisions.			
Split Horizon Group	Split horizon group to which the EFP is associated.			
	If no split horizon group is defined, the value is null.			
	If only one split horizon group exists and it is enabled for the EFP, the value is the default group 0.			
Operational State	Operational status of the EFP: Up or Down.			
Administrative State	Administrative status of the EFP: Up or Down.			
Binding	Hyperlinked entry to the relevant item in logical inventory, such as a pseudowire or bridge.			
Rewrite Definition Rewrite command configured on the EFP: <b>pop</b> , <b>push</b> , or <b>t</b>				

Table 18-26EFP Properties Window

Step 2 Click the hyperlink entry in the Binding field to view the related properties in logical inventory.In this example, clicking the hyperlink displays the relevant bridge in logical inventory, as shown in Figure 18-14.

Figure 18-14	Bridge Associated with EFP in Logical Inventor
1 igure 10-14	Druge Associated with LTT in Logical Invento



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Table 18-27 describes the information displayed for an EFP associated with a bridge.

Field	Description					
Name	VLAN bridge name.					
Туре	VLAN bridge type.					
MAC Address	VLAN bridge MAC address.					
VLAN ID	VLAN bridge VLAN identifier.					
STP Instance	STP instance information, hyperlinked to the STP entry in logical inventory.					
VSI	VSI information, hyperlinked to the VSI entry in logical inventory.					
EFPs Table						
EFP ID	EFP identifier.					
Operational State	EFP operational state: Up or Down.					
VLAN	VLAN associated with this EFP.					
Inner VLAN	CE-VLAN identifier.					
Translated VLAN	VLAN Translated, or mapped, VLAN identifier.					
Translated Inner VLAN	Translated, or mapped, inner VLAN identifier.					
Binding	Hyperlinked entry to the specific interface and EFP entry in physical inventory.					
Description	Description for the EFP.					

 Table 18-27
 EFP Associated with a Bridge in Logical Inventory

- **Step 3** To view EFP properties in physical inventory, navigate to the required interface in one of the following ways:
  - In the bridge entry in logical inventory, click the hyperlinked entry in the Binding field.
  - Use the procedure described in Viewing and Renaming Ethernet Flow Domains, page 18-60 to navigate to the individual interface.
  - In physical inventory, navigate to and then select the required interface.

The EFPs tab is displayed in the content pane next to the Subinterfaces tab as shown in Figure 18-15.

v	OSPF Processes Pseudowines	* E	Location I	nformation						
▶ <b>₩</b>	Resilient Ethernet Protocol		Type:	Pluggal	ble L	ocation: 4	.GigabitEthern	ot4/4		
▶ <b></b>	Routing Entities									
٠ 🏥	Spanning Tree Protocol		Sending	Alarms: true	P		igabitEthernet	14/4		
	Traffic Engineering Tunnels		Manage	d: true	S	tatus: C	ж			
	Tunnel Traffic Descriptors VC Switching Entities		🔒 Disal	ole Sending Alarms						
▶ <b></b>	VRFs		Pluggable	Transceiver						
	VSIs VTP				RJ45			Pluopable Type: SFF		
Pt	vsical Inventory		Connect							
- 1111	Chassis		Connect	or Description:	Transo	eiver 1000E	BaseT Gi4/4	PID: QB	CU-5798R	
Þ	Slot 1: Card - RSP720-30		Connect	or Serial Number:	AGM12	22720¥C		Pluggable Port State: In		
×	Slot 2: Card - 7600-SIP-4 Slot 4: Card - 7600-ES+2									
	Subslot 3: Subcard - 1	L C								
	Subslot 6: Subcard - 1		Find :		10 A	1 7 1	<b>5</b> 🔽			
	GigabitEthernet4/1 GigabitEthernet4/2		EFP ID	Operational State	VLAN	Inner VLAN		AN Translated Inner VLAN	Binding 😌 🗸	Description
	GigabitEthernet4/3		42	Up	40	404	40	404	c1-npe1-76 (42) VLANO	
	GigabitEthernet4/4		41	Up	40	402-403	40	402-403	c1-npe1-76 (41) VLANO	
	GigabitEthernet4/5		40	Up	40	400	40	400	cr-nper-vo (+r) vrAno	
	GigabitEthernet4/6 - GigabitEthernet4/7		50	Up	40	401	40	401		
	GigabitEthernet4/8 -		50	op	40	401	40	401		
	GigabitEthernet4/9	-								
		÷.								
Device Zoo	m Best Fit		۹ (							) •
		<b>^</b>								Line 2 (1 / 4 Selected)
	<u>.</u>		EFPs							
1	<u> </u>	-								💮 Refresh
	•	_								( C
		-								
nd :	📰 ĝi 🗸	4	豊臣							
verity Tic	ket ID Last Modification	Time	₽v	Root Root E	Event Tim	ne	Descripti	ion Location	Acknowledged Creation	on Time
										Empty
ets Ne	twork Events Provisioning	Events	;							

Figure 18-15 EFPs Tab in Physical Inventory

Table 18-28 describes the information displayed in the EFPs tab.

Table 18-28	EFPs Tab

Field	Description		
EFP ID	EFP identifier.		
Operational State EFP operational state.			
VLAN	VLAN identifier.		
Inner VLAN	CE-VLAN identifier.		
Translated VLAN Translated VLAN identifier.			
Translated Inner VLAN	Translated CE-VLAN identifier.		
Binding	Hyperlinked entry to the specific bridge or pseudowire in logical inventory.		
Description Configured description for the EFP.			

# **Connecting a Network Element to an EFP**

You can add and connect network elements to an EFP under an existing aggregation for VLAN, VPLS, Pseudowire, and Ethernet Service.

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To connect network elements to an EFP:

- Step 1Select an EFP node under the VLAN/VPLS/Pseudowire/Ethernet Service aggregation node and chooseFile > Add to Map > Network Element.
- Step 2 In the Add Network Element dialog box, search for the desired network elements and choose the network element that you want to add.

The selected network element appears under the aggregation node in the navigation pane.

- **Step 3** Right-click the EFP node and choose **Topology > Connect CE Device**.
- **Step 4** Right-click the network element that you added and choose **Topology > Connect to** *EFP*.

The map view displays a link between the EFP and the added network element. If required, you can remove the link, by right-clicking the link and choosing **Remove Link**.

Step 5 To hide or show the connected network elements, right-click the EFP node and choose **Hide Connected Devices** or **Show CE device**.

# **Understanding EFP Severity and Ticket Badges**

Severity and ticket badges are displayed on EFP icons as follows:

If the VLAN EFP element represents a configuration, such as a service instance on a Cisco 7600 device or an enhanced port on a Cisco ASR 9000 device, and is associated directly with a network VLAN or a bridge domain switching entity, the severity and ticket badges are based on the underlying service instance or enhanced port configuration.

Figure 18-16 shows an example of a ticket badge based on a service instance.

-Total Total Slot 0: Card - ME-3 🖸 🤗 🔳 VLAN-3450@UPE19-ME3600-TX [1M] VLAN-3450@AGG4-ME3800-TX <--> <--> <--> VLAN-3450@UPE20-ME3600-TX GigabitEthernet4/2 E. «--**9** 🗎 🏭 🗸 日本マを見 283648

Figure 18-16 EFP Severity and Ticket Badges Based on Underlying Service Instance

• If the Ethernet flow point element represents a VLAN interface for a regular switch port, the severity and ticket badges are based on the corresponding port, as shown in Figure 18-17.

I

▼ 페 🖤 Slot 0: Card - ME-3600	, File Edit View Node Italis Network Inventory Reports Window Help
GigabitEthernet0	
GigabitEthernet0/1	
GigabitEthernet0/2	▶ <b>7</b> 123Doc ×
GigabitEthernet0/3	
- GigabitEthernet0/4	V 122Doc [9M]
GigabitEthernet0/S	🗑 👽 LPE2-3400ME-FL [1M]
GigabitEthernet0/6	▼ UPE4-3750ME-FL (1M)
GigabitEthernet0/7	
GigabitEthernet0/8	
GigabitEthernet0/9	
- GigabitEthernet0/10	UE21-920WE-CA[IM] VLAN-3450@AGG4-ME3800-TX
GigabitEthernet0/11	1 I data 3450
GigabitEthernet0/13	
GigabitEthernet0/15	
GigabitEthernet0/16	GigabitEthemet0/13/9/AG64-ME3300-TX GigabitEthemet0/13 GigabitEthemet0/14
GigabitEthernet0/11	TanGrab/Ethernet/01/8/AGG4/ME2800_TX
GigabitEthernet0/18	
GigabitEthernet0/19	9- GaskEthernet0/11 EFP: 3450@UFE19-ME3600
GigabitEthernet0/20	0- GjabitEthernet0/13@UPE19-ME3600-TX [1M]
GigabitEthernet0/2	1 Ggab/tEthernet0/14@UPE19-ME3600-TX
GigabitEthernet0/2	
GigabitEthernet0/23	
GinabitEthernet002	GigabitEthernet0/149/UPE20-ME3600-TX / GigabitEthernet4/2 E
	VLAN-34608CataLinkAggregation208LPE18-ME3400-T GgabitEthernet0/13 GgabitEthernet0/14 GgabitEthernet0/13
Device Zoom 🔀 Best Fit	dotta 3450
Skt Fan 0 1	
Find : 🔛 🛃 🗸	
Severity Ticket ID Last Modification	
	End: 변화 및 1 · · · · · · · · · · · · · · · · · ·
Tickets Network Events Provisioning	20

Figure 18-17 EFP Severity and Ticket Badges Based on Corresponding Port

# **Viewing EVC Service Properties**

Certain EVC service properties are configured as port attributes. These attributes determine the degree of service transparency and protect the service provider's network from protocol control traffic. For information on the devices for which Prime Network discovers and models these key EVC service properties, refer to *Cisco Prime Network 4.1 Supported VNEs*.

#### Shared Switching Entities and EVC Service View

Some switching entities that the Vision client discovers are concurrently part of a network VLAN and VPLS/EoMPLS instance. These switching entities are referred to as *shared switching entities*.

The Vision client displays the switching entity information for shared switching entities only under the VPLS instances in the EVC service view.

To view EVC port-related properties for the supported devices and software versions:

- Step 1 In the Vision client, double-click the required device.
- **Step 2** In the **Inventory** window, choose **Physical Inventory** > **Chassis** > module > port.

Figure 18-18 shows an example of a port in physical inventory configured with these EVC properties.

Γ

▼ III Cha	assis	C Poll Now	
¥	Slot 0: Card - ME-3400-24T5-A - F	Location Information	_
-16	FastEthernet0/1	-Location Information	
-16	FastEthernet0/2	Type: RJ45 Location: 0.FastEthernet0/1	
410	FastEthernet0/3		
-10	FastEthernet0/4	Sending Alarms: true Port Alias: FastEthernet0/1	
-16	FastEthernet0/5	Managed: true Status: OK	
15	FastEthernet0/6		
-15	FastEthernet0/7	the sending Alarms	
16	FastEthernet0/8	-VLAN Interface	
450	FastEthernet0/9	-vLAN Interface	
15	FastEthernet0/10	Mode: Trunk VLAN Type: Layer 2 VLAN	
450	FastEthernet0/11	Native VLAN ID: 1 VLAN Encapsulation Type: IEEE802.10	
-10	FastEthernet0/12	Native VLAN ID: 1 VLAN Encapsulation Type: IEEE802.1Q	
-16	FastEthernet0/13	Allowed VLANs: 1-4094 VLAN Encapsulation Admin Type: IEEE802.1Q	
-16	FastEthernet0/14		
10	FastEthernet0/15		
10	FastEthernet0/16		
1	FastEthernet0/17	Storm Control and Monitoring Properties	
45	FastEthernet0/18	Storm Control: Disabled Port Monitoring Status: Enabled	
15	FastEthernet0/19		
-	FastEthernet0/20	Port Monitoring Interval: 10.0 sec MAC Address: 00 24 C3 C6 7B 83	
-161	FastEthernet0/21	Ethernet LMI Enabled: false Port Type: NNI	
45	FastEthernet0/22		
-16	FastEthernet0/23		
-16	FastEthernet0/24		
-16	GigabitEthernet0/1 - No Transc	Find: 自	
-E	GigabitEthernet0/2 - No Transc 🔻		_
(	• • •	Address Mask VLAN Type Operational State VLAN ID 2011 Inner VLAN IP Interface VRF Name VC Binding	
Device Zoom	Best Fit	Bridge (1) default	<u>^</u>
		Bridge (400) VLAN0400	
		Bridge (401) VLAN0401	
1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			-
gan gan		Line 0 (S	Size 102)
Slot Fa		Sub Interfaces	_
		Jou internaces	
Find :			
	24 8 1 4		_
		la state de la complete de la comple	_
Tickets Network E	vents Provisioning Events		

Figure 18-18 EVC Port Properties in Physical Inventory

Table 18-29 describes the information displayed for these properties.

 Table 18-29
 EVC Port Properties in Physical Inventory

Field	Description			
Storm Control and Monitoring Properties Area				
Storm Control	Status of storm control on the port: Enabled or Disabled.			
Port Monitoring Status	Status of port monitoring:			
	• Enabled—The switch sends keepalive messages on user network interfaces (UNIs) and enhanced network interfaces (ENIs) and does not send keep alive messages on network node interfaces (NNIs).			
	• Disabled—The switch does not send keepalive messages.			
Port Monitoring Interval	Keepalive interval in seconds. The default value is ten seconds.			
Storm Control Level	Representing a percentage of the total available bandwidth of the port, the threshold at which additional traffic of the specified type is suppressed until the incoming traffic falls below the threshold.			
Storm Control Type	Type of storm the port is configured for protection from: Broadcast, Multicast, or Unicast.			
Security Properties Areas				
Port Security	Status of security on the port: Enabled or Disabled.			
MAC Address Limit	Maximum number of MAC addresses allowed on the interface.			

Field	Description			
Aging Type	Type of aging used for automatically learned addresses on a secure port:			
	• Absolute—Times out the MAC address after the specified age-time has been exceeded, regardless of the traffic pattern. This is the default for any secured port, and the age-time value is set to 0.			
	• Inactivity—Times out the MAC address only after the specified age-time of inactivity from the corresponding host has been exceeded.			
Aging Time	Length of time, in minutes, that a MAC address can remain on the port security table.			
Violation Mode	Action that occurs when a new device connects to a port or when a new device connects to a port after the maximum number of devices are connected:			
	• Protect—Drops packets with unknown source addresses until a sufficient number of secure MAC addresses are removed to drop below the maximum value			
	• Restrict—Drops packets with unknown source addresses until a sufficient number of secure MAC addresses are removed to drop below the maximum value and causes the Security Violation counter to increment.			
	• Shutdown—Puts the interface into the error-disabled state immediately and sends an SNMP trap notification.			

 Table 18-29
 EVC Port Properties in Physical Inventory (continued)

# Viewing the Virtual Connections for a Port

In Prime Network, you can view the related virtual connections for an ethernet port or LAG port. In other words, you can view a list of Ethernet Virtual Connections (EVCs) to which the selected port is linked to. The virtual connections can be of type L2 (if the virtual connection is a L2 service) or L3 (if the virtual connection is an L3 service or combination of L2 and L3 service).

To view the related virtual connections for an ethernet port:

- Step 1 Right-click on the required device and choose the Inventory option.
- **Step 2** In the **Inventory** window, choose **Physical Inventory** > **Chassis** > *slot* > port.
- Step 3 Right-click on the selected port and choose Get Virtual Connections. The Virtual Connections window is displayed as shown in Figure 18-19.

Find :		
Vame	Туре	System Name
	VLAN-1@DataLinkAggregation10@c? Ethernet Virtual Connection	VLAN-1@DataLinkAggregation10@c7
	VLAN-1@GigabitEthernet1/0/1@c7 Ethernet Virtual Connection	VLAN-1@GigabitEthernet1/0/1@c7-sv
	VLAN-100@DataLinkAggregation10 Ethernet Virtual Connection	VLAN-100@DataLinkAggregation10@
	VLAN-555@DataLinkAggregation10 Ethernet Virtual Connection	VLAN-555@DataLinkAggregation10@
	VLAN-700@DataLinkAggregation10> Ethernet Virtual Connection	VLAN-700@DataLinkAggregation10@
	VLAN-700@GigabitEthernet1/0/1@c? Ethernet Virtual Connection	VLAN-700@GigabitEthernet1/0/1@c7
	VLAN-701@GigabitEthernet1/0/1@c? Ethernet Virtual Connection	VLAN-701@GigabitEthernet1/0/1@c7
	VLAN-702@DataLinkAggregation10> Ethernet Virtual Connection	VLAN-702@DataLinkAggregation10@
	VLAN-702@GigabitEthernet1/0/1@c? Ethernet Virtual Connection	VLAN-702@GigabitEthernet1/0/1@c7
_	VLAN-703@DataLinkAggregation10> Ethernet Virtual Connection	VLAN-703@DataLinkAggregation10@
	VLAN-703@GigabitEthernet1/0/1@c? Ethernet Virtual Connection	VLAN-703@GigabitEthernet1/0/1@c7
	VLAN-704@DataLinkAggregation10> Ethernet Virtual Connection	VLAN-704@DataLinkAggregation10@
	VLAN-704@GigabitEthernet1/0/1@c	VLAN-704@GigabitEthernet1/0/1@c7
	VLAN-705@DataLinkAggregation10> Ethernet Virtual Connection	VLAN-705@DataLinkAggregation10@
	VLAN-705@GigabitEthernet1/0/1@c Ethernet Virtual Connection	VLAN-705@GigabitEthernet1/0/1@c7
	VLAN-706@DataLinkAggregation10> Ethernet Virtual Connection	VLAN-706@DataLinkAggregation10@
_	VI. AM. 706@CiashitEthoroat1/0/1@c 🤊 Ethoroat Virtual Connection	ULAN 706@CiashitEtharpat1/0/1@c7
•		Line 2 (1 / 209 Selected)
		OK Cancel

#### Figure 18-19 Virtual Connections



If no related virtual connections are available for a port, then a message indicating that there are no virtual connections for the port is displayed.

Step 4 In the Virtual Connections window, select the relevant connections and click OK. A temporary map that contains the selected connections is created and displayed in the Prime Network Vision window.You can also view the virtual connections for an ethernet link aggregation.

To view the related virtual connections for an ethernet link aggregation:

- Step 1 Right-click on the required device and choose the Inventory option.
- **Step 2** In the **Inventory** window, choose **Logical Inventory** > **Ethernet Link Aggregation**. The link aggregation details are displayed in the content pane.
- Step 3 In the Data Link Aggregations section, Right-click the ID and select Get Virtual Connections. The Virtual Connections window is displayed.
- **Step 4** Select the relevant connections and click **OK** to create a temporary map for the connections.

# **Viewing and Renaming Ethernet Flow Domains**

An Ethernet flow domain represents an Ethernet access domain. The Ethernet flow domain holds all network elements between the CE (inclusive, if managed by the SP), up to the SP core (exclusive). This includes CE, access, aggregation, and distribution network elements.

An Ethernet flow domain can have no N-PEs (flat VLAN) or one or more N-PEs (N-PE redundancy configuration). The Ethernet flow domain is defined using physical connectivity at the port level, and not at the network element level. STP is used to mark the root bridge, root or blocked ports, and blocked VLAN links.

To view Ethernet flow domains:

#### Step 1 In the Vision client, choose Network Inventory > Ethernet Flow Domains.

The Ethernet Flow Domain List window is displayed with the domain name, the system-defined domain name, and a brief description for each Ethernet flow domain as shown in Figure 18-20.

#### Figure 18-20 Ethernet Flow Domain List Properties Window

Ethernet Flow Domains			
Find : 📃 🔛 👘 🖡	5 <b>5</b>		
Domain Name 🛛 🕀 🛆	System Defined Name	Description	
DataLinkAggregation1@c2-dist4	DataLinkAggregation1@c2-dist4		
DataLinkAggregation1@c3-ac4	DataLinkAggregation1@c3-ac4		
DataLinkAggregation10@c7-sw1	DataLinkAggregation10@c7-sw1		
DataLinkAggregation12@10.56.101.176	DataLinkAggregation12@10.56.101.176		
DataLinkAggregation12@3750E-24TD-AGG2	DataLinkAggregation12@3750E-24TD-AGG2		
DataLinkAggregation20@3750E-48PD-AGG6	DataLinkAggregation20@3750E-48PD-AGG6		
FastEthernet0/1@c4-ce8	FastEthernet0/1@c4-ce8		
FastEthernet1/0/1@c1-upe2	FastEthernet1/0/1@c1-upe2		
FastEthernet1/0/1@c3-ac3	FastEthernet1/0/1@c3-ac3		
FastEthernet1/0/1@c7-sw10	FastEthernet1/0/1@c7-sw10		
FastEthernet1/0/10@c4-upe9	FastEthernet1/0/10@c4-upe9		
GigabitEthernet1/1@c1-ce7	GigabitEthernet1/1@c1-ce7		
GigabitEthernet1/1@c4-ce2	GigabitEthernet1/1@c4-ce2		
GigabitEthernet1/1@c4-upe4	GigabitEthernet1/1@c4-upe4		
GigabitEthernet1/10@c4-ce3	GigabitEthernet1/10@c4-ce3		
GigabitEthernet3/1@c3-agg1	GigabitEthernet3/1@c3-agg1		
GigabitEthernet3/1@c7-npe1-76	GigabitEthernet3/1@c7-npe1-76		
			Line O (Oine 47)
	Me	mory: 7% Co	Line 0 (Size 17)

**Step 2** To rename an Ethernet flow domain:

- a. Right-click the required domain, then choose Rename.
- b. In the Rename Node dialog box, enter a new name for the domain.
- c. Click OK.

The window is refreshed, and the new name is displayed.

**Step 3** To view Ethernet flow domain properties, do either of the following:

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- Right-click the required domain, then choose Properties.
- Double-click the required domain.

The Ethernet Flow Domain Properties window is displayed as shown in Figure 18-21.

Figure 18-21 Ethernet Flow Domain Properties Window

V FastEthernet1/0/1@	)c3-ac	2 - Ethernet Fl	ow Domain Proper	ties				_ 🗆 ×
Domain Name: FastEther	net1/0	/ <b>1@c3-ac2</b> 5y	stem Defined Name:	FastEthernet1/	0/1@c3-ac2			
Elements								
	-La	• =						
Find :	2 ź	V 🕆 📰						
ID €∧	Туре	Discovery Protoco	ls Aggregation Group	UNI Properties	OAM Admin Status	Is ELMI Enabled	Efps	
c3-ac2#0:FastEthernet1/0/1								<b>^</b>
c3-ac2#0:FastEthernet1/0/2								
c3-ac2#0:FastEthernet1/0/3								
c3-ac2#0:FastEthernet1/0/4								
c3-ac2#0:FastEthernet1/0/5								
c3-ac2#0:FastEthernet1/0/6								
c3-ac2#0:FastEthernet1/0/7								
c3-ac2#0:FastEthernet1/0/8								
c3-ac2#0:FastEthernet1/0/9								
c3-ac2#0:FastEthernet1/0/10	)							
c3-ac2#0:FastEthernet1/0/11								
c3-ac2#0:FastEthernet1/0/12	2							
c3-ac2#0:FastEthernet1/0/13	)							
c3-ac2#0:FastEthernet1/0/14	ł.							-
								0 (Size 26)
					Memory:	10% Conne	cted	

Table 18-30 describes the information displayed in the Ethernet Flow Domain Properties window.

Note Not all fields are available in all tables. The table contents depend on the domain type, such as FastEthernet.

### Table 18-30Ethernet Flow Domain Properties Window

Field	Description		
Domain Name	Name of the selected domain.		
System Defined Name	Domain name as identified by the most dominant device and its lowest port name lexicographically.		
Elements Table			
ID	Interface identifier, hyperlinked to the interface in physical inventory.		
Туре	Aggregation group type: Ethernet Channel (EtherChannel), or IEEE 802.3 AD LAG (IEEE 802.3 link aggregation group).		
Discovery Protocols	Discovery protocols used on the interface.		
Is ELMI Enabled	Whether or not Ethernet LMI is enabled on the interface: True or False.		

Step 4 To navigate to the individual interface or link aggregation group, click an interface identifier or group.The interface or link aggregation group properties are displayed in the inventory window.

# Working with VLANs

The following topics provide information and procedures for working with VLANs. The Vision GUI client supports a VLAN overlay which, when applied, highlights the network elements and links that a VLAN (and its associated VLANs) traverse. The overlay displays STP and REP link and port information. Using overlays is described in Displaying VLANs By Applying VLAN Overlays to a Map, page 18-77.

- Understanding VLAN and EFD Discovery, page 18-62
- Understanding VLAN Elements, page 18-63
- Switching Entities Containing Termination Points, page 18-67
- Adding and Removing VLANs from a Map, page 18-67
- Viewing VLAN Mappings, page 18-70
- Working with Associated VLANs, page 18-71
- Viewing VLAN Links Between VLAN Elements and Devices, page 18-75
- Displaying VLANs By Applying VLAN Overlays to a Map, page 18-77
- Viewing VLAN Service Link Properties, page 18-80
- Viewing REP Information in VLAN Domain Views and VLAN Overlays, page 18-80
- Viewing REP Properties for VLAN Service Links, page 18-81
- Viewing STP Information in VLAN Domain Views and VLAN Overlays, page 18-83
- Viewing STP Properties for VLAN Service Links, page 18-84
- Viewing VLAN Trunk Group Properties, page 18-85
- Viewing VLAN Bridge Properties, page 18-87
- Using Commands to Work With VLANs, page 18-89

## **Understanding VLAN and EFD Discovery**

When you start the Prime Network gateway the first time, the Prime Network waits for two topology cycles to complete before discovering new VLANs, VLAN associations, and EFDs. The default configured time for two topology cycles to complete is one hour, but might be configured for longer periods of time on large setups. This delay allows the system to stabilize, and provides the time needed to model devices and discover links.

During this delay, Prime Network does not add VNEs or apply updates to existing VLANs or EFDs.

After the initial delay has passed, Prime Network discovers new VLANs, VLAN associations, and EFDs, applies updates to existing VLANs, VLAN associations, and EFDs, and updates the database accordingly.

When you restart the gateway, Prime Network uses the persisted topology information instead of waiting two topology cycles, thus improving the discovery time for new VLANs, VLAN associations, and EFDs.

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## **Understanding VLAN Elements**

The following concepts are important to understand when working with the representation of edge EFPs inside VLANs:

- VLAN Elements in the Vision Client, page 18-63
- VLANs, page 18-63
- Switching Entities, page 18-63
- Ethernet Flow Points, page 18-64

### VLAN Elements in the Vision Client

Table 18-31 describes the icons that the Vision client uses to represent VLAN elements.

Element	<b>Associated Network Element</b>	Icon
Network VLAN	None	
Switching entity	Bridge	**
Ethernet Flow Point (EFP)	Ethernet port	<u> </u>

 Table 18-31
 VLAN Elements and Icons in the Vision Window

### VLANs

Prime Network discovers and allows you to display maps with a network-level view of VLANs.

In Prime Network, a VLAN entity consists of one or more switching entities and the corresponding EFP elements.

A network VLAN represents the virtual LAN. The network VLAN holds its contained switching entities and can be associated to a customer. The network VLAN also holds the Ethernet flow points that are part of the network VLAN but not part of any switching entity. For example, a port that tags ingress flows after which the flow moves to a different VLAN.

### **Switching Entities**

A switching entity represents a device-level Layer 2 forwarding entity (such as a VLAN or bridge domain) that participates in a network VLAN. A switching entity is associated to a network VLAN according to its relationship to the same Ethernet Flow Domain (EFD) and the VLAN identifier.

If you right-click a switching entity in the Vision client and then choose **Inventory**, the inventory window is displayed with the corresponding bridge selected in Logical Inventory.

A switching entity typically contains EFP elements.

#### **Ethernet Flow Points**

An Ethernet flow point (EFP) can represent a port that is configured for participation in a specific VLAN.

If you right-click an EFP in the Vision client and then choose **Inventory**, the inventory window is displayed with the corresponding port selected in Physical Inventory.

EFPs that are located in a switching entity represent Ethernet ports that are configured as switch ports (in either Access, Trunk, or Dot1Q tunnel mode).

Figure 18-22 shows an example of EFPs configured as switch ports in the Vision client.

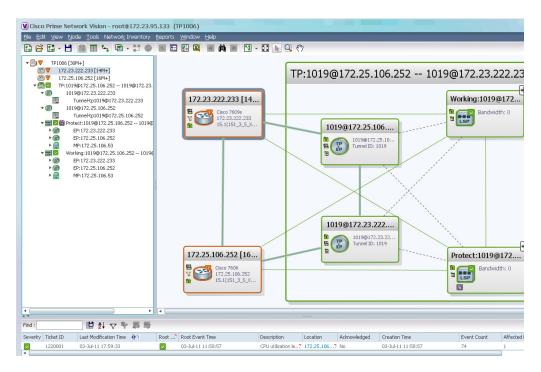


Figure 18-22 EFPs Configured as Switch Ports

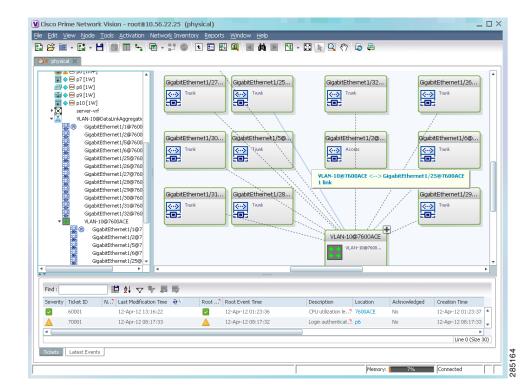
EFPs that are located directly inside a VLAN represent one of the following:

• Termination point EFPs—Ethernet ports that are at the edge of a Layer 2 domain flow, such as a VLAN, on which traffic enters a Layer 3 domain or a different Layer 2 domain, such as EoMPLS (for example, in Cisco 7600 series, Cisco GSR, and Cisco ASR 9000 series devices).

These EFPs are typically connected to a switching entity inside the VLAN by a VLAN link, as shown in Figure 18-23.

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#### Figure 18-23 Termination Point EFP Inside a VLAN

• Edge EFPs—A subset of EFPs that exist inside a switching entity but that are not connected to other EFPs and that represent edge EFPs in the context of the VLAN.

In the Vision client, edge EFPs are displayed directly under the VLAN at the same level as their switching entities and are connected to their corresponding switching entities by a dotted link, as shown in Figure 18-24.

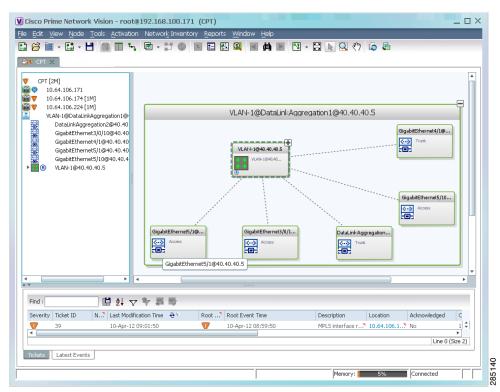


Figure 18-24 Edge EFP Inside a VLAN

An edge EFP can be displayed both inside and outside of its switching entity, as shown (highlighted with a red outline) in Figure 18-25:

3 🗳 🖹 • 🖾 • 💾 🔳 🖿 ۲.	Network Inventory Reports Window Help	_ u ×
CPT [2M]     10.64.106.171     10.64.106.171     10.64.106.174 [IM]     10.64.106.124 [IM]     10.64.106.224 [IM]     VLAN-1@DataLinkAggregation1@     GabitEthernet3/0/10@40.40.40     GgabitEthernet3/10@40.40.40     GgabitEthernet3/10@40.40.40     GgabitEthernet5/10@40.40.40      GgabitEthernet5/10@40.40     GgabitEthernet5/10@40     GgabitEthernet5/10@40     GgabitEthernet5/10@40     GgabitEthernet5/10@40     GgabitEthernet5/10@40     Ggab	VLAN-1@DataLinkAggrega VLAN-1@40.40.40.5	ation1@40.40.40.5
Find: 1 2↓ ▽	<b>本智</b> 會	
Severity Ticket ID N Last Modifica 39 10-Apr-12 01		Description         Location         Acknowledged         C           MPLS interface r*         10.64.106.1*         No         1         1           Line 0 (Size 2)         Line 0 (Size 2)         1         1         1
Tickets Latest Events		Memory: 6% Connected

Figure 18-25 Edge EFPs Displayed Inside and Outside of Switching Entities

You can delete EFPs and switching entities that have a reconciliation icon by right-clicking them and choosing **Delete**. After all switching entities and EFPs are deleted from a network VLAN, the empty network VLAN is automatically deleted from the Vision client after a few minutes.

## **Switching Entities Containing Termination Points**

For certain devices (for example, the Cisco 7600 series, Cisco GSR series, and Cisco ASR 9000 series devices), the related switching entities can contain Ethernet flow point elements that serve as termination points on different network VLANs. If a single map contains both the switching entities and the network VLANs, a link is displayed between them.

## Adding and Removing VLANs from a Map

### Adding VLANs to a Map

You can add VLANs to a map if the VLANs were previously discovered by Prime Network and are not currently displayed in the map.



Adding VLANs affects other users if they are working with the same map.

To add VLANs to a map:

Step 1 In the Vision client, display the map to which you want to add the VLANs.

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Step 2 Choose File > Add to Map > VLAN. The Add VLAN to map dialog box is displayed as shown in Figure 18-26.

~	earch EFD Name 💌		Go			
vail	able VLANs as of [03-Nov-10 12:48] 🙆					
nd :	🔛 🛃 🗸 🔻 🐺 👼					
ame	€∧	ID	EFD Name	EFD System Name	System Name	Description
6	VLAN-1@DataLinkAggregation10@c7-sw1	1	DataLinkAggregation10@c7-sw1	DataLinkAggregation10@c7-sw1	VLAN-1	
6	VLAN-1@DataLinkAggregation12@10.56.101.176	1	DataLinkAggregation12@10.56.101.176	DataLinkAggregation12@10.56.101.176	VLAN-1	
F.	VLAN-1@DataLinkAggregation12@3750E-24TD-AGG2	1	DataLinkAggregation12@3750E-24TD-AGG2	DataLinkAggregation12@3750E-24TD-AGG2	VLAN-1	
F.	VLAN-1@DataLinkAggregation20@3750E-48PD-AGG6	1	DataLinkAggregation20@3750E-48PD-AGG6	DataLinkAggregation20@3750E-48PD-AGG6	VLAN-1	
6	VLAN-1@FastEthernet1/0/1@c3-ac3	1	FastEthernet1/0/1@c3-ac3	FastEthernet1/0/1@c3-ac3	VLAN-1	
h	VLAN-1@FastEthernet1/0/1@c7-sw10	1	FastEthernet1/0/1@c7-sw10	FastEthernet1/0/1@c7-sw10	VLAN-1	
I.	VLAN-1@FastEthernet1/0/10@c4-upe9	1	FastEthernet1/0/10@c4-upe9	FastEthernet1/0/10@c4-upe9	VLAN-1	
£.	VLAN-1@GigabitEthernet1/1@c1-ce7	1	GigabitEthernet1/1@c1-ce7	GigabitEthernet1/1@c1-ce7	VLAN-1	
đ.	VLAN-1@GigabitEthernet1/1@c4-upe4	1	GigabitEthernet1/1@c4-upe4	GigabitEthernet1/1@c4-upe4	VLAN-1	
đ.	VLAN-1@GigabitEthernet1/10@c4-ce3	1	GigabitEthernet1/10@c4-ce3	GigabitEthernet1/10@c4-ce3	VLAN-1	
T.	VLAN-1@GigabitEthernet3/1@c3-agg1	1	GigabitEthernet3/1@c3-agg1	GigabitEthernet3/1@c3-agg1	VLAN-1	
T.	VLAN-1@GigabitEthernet3/1@c7-npe1-76	1	GigabitEthernet3/1@c7-npe1-76	GigabitEthernet3/1@c7-npe1-76	VLAN-1	
÷.	VLAN-2@DataLinkAggregation12@10.56.101.176	2	DataLinkAggregation12@10.56.101.176	DataLinkAggregation12@10.56.101.176	VLAN-2	
Ъ.	VLAN-2@DataLinkAggregation12@3750E-24TD-AGG2	2	DataLinkAggregation12@3750E-24TD-AGG2	DataLinkAggregation12@3750E-24TD-AGG2	VLAN-2	
А	VLAN-2@DataLinkAggregation20@3750E-48PD-AGG6	2	DataLinkAggregation20@3750E-48PD-AGG6	DataLinkAggregation20@3750E-48PD-AGG6	VLAN-2	
đ.	VLAN-3@DataLinkAggregation12@10.56.101.176	3	DataLinkAggregation12@10.56.101.176	DataLinkAggregation12@10.56.101.176	VLAN-3	
T.	VLAN-3@DataLinkAggregation12@3750E-24TD-AGG2	3	DataLinkAggregation12@3750E-24TD-AGG2	DataLinkAggregation12@3750E-24TD-AGG2	VLAN-3	
					Line 29 (1	/1,811 Selec

Figure 18-26 Add VLAN Dialog Box

**Step 3** In the Add VLAN dialog box, do either of the following:

• Choose a search category, enter a search string, then click **Go** to narrow the VLAN display to a range of VLANs or a specific VLAN.

The search condition is "contains." Search strings are case-insensitive. For example, if you choose the Name category and enter "net," the Vision client displays VPNs "net" and "NET" in the names whether net appears at the beginning, middle, or at the end of the name: for example, Ethernet.

- Choose Show All to display all the VLANs.
- **Step 4** Select the VLANs that you want to add to the map.

### <u>)</u> Tip

Press **Shift** or **Ctrl** to choose multiple adjoining or nonconsecutive VLANs.

### Step 5 Click OK.

The VLANs are displayed in the Vision client content pane as shown in Figure 18-27.

Any tickets that apply to the VLANs are displayed in the ticket pane.

Cisco Prime Network Vision - root@192.168.100.171 (CPT)	
CPT [2M] <ul> <li>O 10.64.106.174 [1M]</li> <li>O 10.64.106.174 [</li> </ul> <li>I 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</li>	
	•
Find:	
Seventy Ticket ID N Last Modification Time 😜 Root Root Event Time Description Location Acknowledged C	
V 39 10-Apr-12 09:01:50 V 10-Apr-12 08:59:50 MPL5 interface r 10.64.106.1 No 1	•
	•
Line 0 (Size 2	2)
Tickets Latest Events	_
Memory: 6% Connected	==

#### Figure 18-27 VLANs in Map View

After you add a VLAN to a map, you can use the Vision client to view its switching entities and Ethernet flow points. For more information, see:

- Viewing and Renaming Ethernet Flow Domains, page 18-60
- Viewing EFP Properties, page 18-51

You can view additional information about REP and STP in logical inventory, VLAN domain views, and VLAN overlays.

For REP, see:

- Viewing Resilient Ethernet Protocol Properties (REP), page 18-9
- Viewing REP Information in VLAN Domain Views and VLAN Overlays, page 18-80
- Viewing REP Properties for VLAN Service Links, page 18-81

For STP, see:

- Viewing Spanning Tree Protocol Properties, page 18-5
- Viewing STP Information in VLAN Domain Views and VLAN Overlays, page 18-83
- Viewing STP Properties for VLAN Service Links, page 18-84

#### **Removing VLANs From a Map**

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You can remove one or more VLANs from the current map. This change does not affect other maps. Removing a VLAN from a map does not remove it from the Prime Network database. You can add the VLAN to the map at any time.

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When removing VLANs from maps, keep the following in mind:

- Removing a VLAN affects other users who are working with the same map view.
- This option does not change the business configuration or database.
- You cannot remove virtual routers or sites from the map without removing the VLAN.

To remove a VLAN, in the Vision client navigation pane or map view, right-click the VLAN and choose **Remove from Map**.

The VLAN is removed from the navigation pane and map view along with all VLAN elements such as connected CE devices. Remote VLANs (extranets) are not removed.

## Viewing VLAN Mappings

VLAN mapping, or VLAN ID translation, is used to map customer VLANs to service provider VLANs. VLAN mapping is configured on the ports that are connected to the service provider network. VLAN mapping acts as a filter on these ports without affecting the internal operation of the switch or the customer VLANs.

If a customer wants to use a VLAN number in a reserved range, VLAN mapping can be used to overlap customer VLANs by encapsulating the customer traffic in IEEE 802.1Q tunnels.

To view VLAN mappings:

- Step 1 In the Vision client, double-click the device with VLAN mappings configured.
- Step 2 In the Inventory window, choose Physical Inventory > Chassis > slot > port.
- Step 3 Click VLAN Mappings next to the Subinterfaces tab in the lower portion of the content pane. The VLAN Mappings tab is displayed as shown in Figure 18-28.

<b>V</b> c7-sw10 [1N]							_ 🗆 ×
🔻 📰 🔽 c7-sw10 [1N]	Poll Now						
Logical Inventory     Physical Inventory	-Location Information	1					<b>^</b>
Physical Inventory     Chassis	Type:	Pluggable	Location:	1.GigabitEthernet1/1	/1		
Slot 0: Card - ME-C3750-24TE - Fixed	Sending Alarms:	true	Port Alias:	GigabitEthernet1/1/1			
Slot 1: Card - ME-C3750-24TE - Fixed	Managed:	true	Status:	ок			
GigabitEthernet1/1/1 GigabitEthernet1/1/2			200.001				
🕨 📾 Slot Fan	lead a contract of the contrac						
Slot Power	-Pluggable Transceiver						
	Connector Type:	RJ	45	Pluggable Ty	/pe: SFP		
	Connector Descrip	tion: 10	/100/1000Ba	SeTX SFP PID:	GLC-T		
	Connector Serial N	lumber: AG	M122820AV	Pluggable Po	ort State: In		
	-VLAN Interface						
	Mode:	Trunk	VI AN Type:	Lave	r 2 VI AN		-
	Find :	E.	2 🖓 🖷	- 首 厚			
	Direction	VLAN	Inner VLAN	Translated VLAN	Translated Inner VLAN	Action 👌 🗸	
	Out	1702				Drop	<b>^</b>
	Out	1762				Drop	
•	Out	1761				Drop	
	Out	1761	761	761		Translate	
Q Device Zoom Est Fit	Out	1728		728		Translate	
	Out	1727		727		Translate	
	Out	1726		726		Translate	T
Slot Fan U A							Line 0 (Size 69)
	Sub Interfaces	VLAN Mapping	)S				
· ·							
Find:	ł						
	la i Na ir			s de la e		- · · -	
		· •					

Figure 18-28 VLAN Mappings Tab in Physical Inventory

Table 18-32 describes the information that is displayed in the VLAN Mappings table.

Field	Description
Direction	Whether the VLAN mapping is defined in the incoming or outgoing direction: In or Out.
VLAN	Customer-side VLAN identifier.
Inner VLAN	Used for two-to-one mappings, the customer-side inner VLAN identifier.
Translated VLAN	Translated, or mapped, service-provider side VLAN identifier.
Translated Inner VLAN	Translated, or mapped, service-provider side inner VLAN identifier.
Action	Action taken if the VLAN traffic meets the specified mapping: Translate or Drop.

Table 18-32VLAN Mappings Table

## Working with Associated VLANs

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Prime Network discovers associations between network VLANs and displays the information in the Vision client. Network VLAN associations are represented by VLAN service links, and can be any of the tag manipulation types described in Table 18-33.

VLAN Tag Manipulation	Description	Example
One-to-one	One VLAN tag is translated to another VLAN tag.	VLAN tag 100 > VLAN tag 200
Two-to-two	• Two VLAN tags exist and both are translated to other tags.	• Inner tag 100, Outer tag 101 > Inner tag 200, Outer tag 201
	• Two VLAN tags exist, but tag manipulation is applied only to the outer tag.	• Inner tag 100, Outer tag 101 > Inner tag 100, Outer tag 201
One-to-two	One VLAN tag exists and an additional tag is inserted into the packet.	VLAN tag 100 > Inner tag 100, Outer tag 101

Table 18-33	Types of Tag Manipulations in VLAN Associations
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When working with VLANs, you can:

- Add an associated VLAN—See Adding an Associated VLAN, page 18-72.
- View properties for associated VLANs—See Viewing Associated Network VLAN Service Links and VLAN Mapping Properties, page 18-74.

### Adding an Associated VLAN

To add an associated VLAN to an existing VLAN in a map:

- Step 1 In the Vision client, select the required VLAN in the map view.
- Step 2 Right-click the VLAN and choose Add Associated VLAN.

The Add Associated VLAN table is displayed as shown in Figure 18-29.

Add A	ssociated VL	AN						×
Find : [			₿↓	$\nabla^{1}$	1	5		
Name					I	ID	EFD Name	EFD System Name
Ŧ.	VLAN-1742@Fast	Ethernet1	1/0/1	@c7-sw	10 1	1742	FastEthernet1/0/1@c7-sw1	0 FastEthernet1/0/1@c7-sw10
•								
								Line 0 (Size 1)
							ſ	OK Cancel
							l	

Figure 18-29 Add Associated VLAN Window

In this example, the selected network VLAN has one associated VLAN: VLAN-1742. Table 18-34 describes the information displayed in the Add Associated VLAN table.

Iable 18-54     Add Associated VLAN Iable	Table 18-34	Add Associated VLAN Table
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Field	Description			
Name	Name of the VLAN.			
ID	VLAN identifier.			
EFD Name	Name of the Ethernet flow domain.			
EFD System Name	Name that Prime Network assigns to the EFD.			
System Name	Name that Prime Network assigns to the VLAN.			
Description	Brief description of the VLAN.			

Step 3Select the required VLAN in the Add Associated VLAN table, then click OK.The associated network VLAN is added to the map in the Vision client.

### Viewing Associated Network VLAN Service Links and VLAN Mapping Properties

After you add an associated network VLAN, you can:

- View the associated network VLAN service links in the Vision client in the thumbnail view.
- View VLAN mapping properties in the Link Properties window.

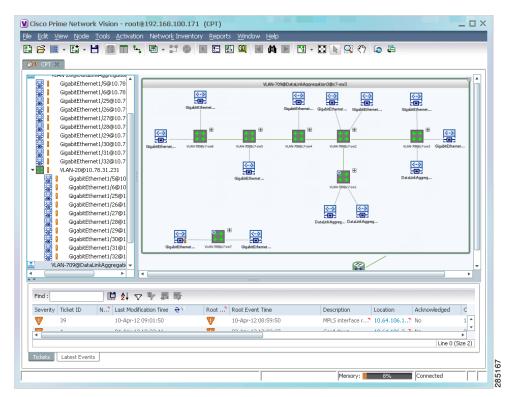
To view associated network VLAN service links and VLAN mapping properties:

- **Step 1** Select the required network VLAN in the map view.
- Step 2 Right-click the VLAN, then choose Show Thumbnail.

Figure 18-30 shows an example of a network VLAN in a thumbnail.

The VLAN service links are displayed as 5.0 between the associated network VLANs. The links represent the connections between the Ethernet flow points that are part of each network VLAN.

Figure 18-30 VLAN Service Links Between Associated Network VLANs



Step 3 To view additional information, right-click a link, and choose Properties.The Link Properties window is displayed as shown in Figure 18-31.

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If VLAN tag manipulation is configured on the link, the VLAN Mapping Properties area in the Link Properties window displays the relevant information. For example, in Figure 18-31, the VLAN Mapping Properties area shows that a one-to-one VLAN mapping for VLAN tag 1709 to VLAN tag 709 is configured on GigabitEthernet1/1/1 on c7-sw8 on the egress direction.

Figure 18-31 VLAN Mapping Properties in Link Properties Window

For additional information about viewing network VLAN service link properties, see:

- Viewing REP Properties for VLAN Service Links, page 18-81
- Viewing STP Properties for VLAN Service Links, page 18-84

### Viewing VLAN Links Between VLAN Elements and Devices

If a Vision client map contains a VLAN and the network element on which the VLAN is configured, along with EFPs, switching entities, or network VLANs, you might see what appear to be multiple associations between the logical and physical entities. Actually, however, you are seeing other views of the original VLAN link.

For example, assume that you have the following situation, as shown in Figure 18-32 and described in the following paragraphs.

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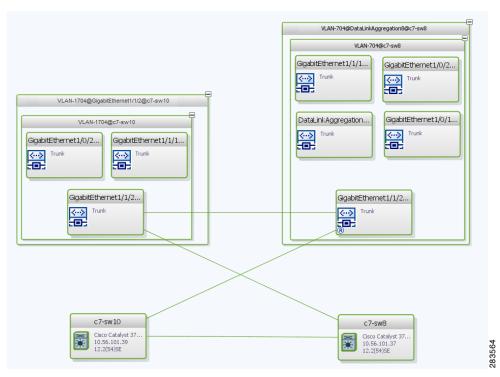


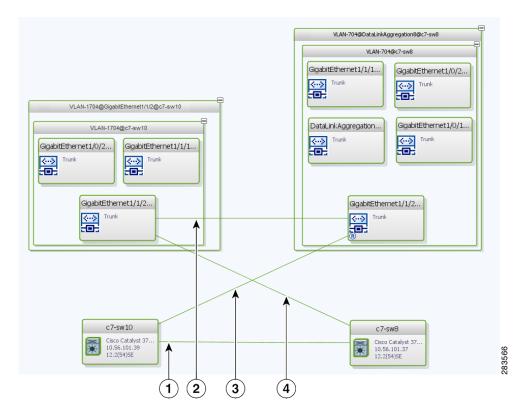
Figure 18-32 VLAN Elements and Devices in the Vision Window

The elements are configured as follows:

- Port GigabitEthernet1/1/2 on element c7-sw10 is connected to port GigabitEthernet1/1/2 on element c7-sw8 by an Ethernet topology link.
- Port GigabitEthernet1/1/2 on element c7-sw10 is a trunk port associated with VLAN-1704 which is configured on element c7-sw10.
- Port GigabitEthernet1/1/2 on element c7-sw8 is a trunk port associated with VLAN-704 which is configured on element c7-sw8.
- Port GigabitEthernet1/1/2 on element c7-sw8 has a VLAN mapping to tunnel VLAN-1704 (C-VLAN) in VLAN-704 (SP-VLAN).

In this example, VLAN discovery identified two network VLANs: VLAN-1704 and VLAN-704. Each of these network VLANs contains a switching entity and an EFP that represent the connected ports, GigabitEthernet1/1/2@c7-sw10 and GigabitEthernet1/1/2@c7-sw8, respectively.

The four links in the map are identified in Figure 18-33 and described in the following table.



#### Figure 18-33 Links Between VLAN Elements and Devices

- 1 The Ethernet topological link between port GigabitEthernet1/1/2 on VNE c7-sw10 and GigabitEthernet1/1/2 on VNE c7-sw8.
- 2 The VLAN link between GigabitEthernet1/1/2@c7-sw10 EFP and GigabitEthernet1/1/2@c7-sw8 EFP.
- 3 Another view of the VLAN link (link 2), shown as a link between GigabitEthernet1/1/2@c7-sw10 EFP and GigabitEthernet1/1/2@c7-sw8 EFP.
- 4 Another view of the VLAN link (link 2), shown as a link between GigabitEthernet1/1/2@c7-sw10 EFP and GigabitEthernet1/1/2@c7-sw8 EFP.

The key point is that a link between a VNE and EFP, switching entity, or network VLAN **does not** represent an association between the VNE and the logical element. Such a link is simply another view of the VLAN link.

If the thumbnail view is closed, instead of a link between the VNE and EFP, you will see a link between the VNE and the switching entity or network VLAN.

## Displaying VLANs By Applying VLAN Overlays to a Map

You can create an overlay of a specific VLAN on top of the physical network elements displayed in a map view. The overlay highlights the network elements and links that the selected VLAN and its associated VLANs traverse. Network elements and links that are not part of the VLAN are dimmed in the map view.

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The VLAN overlay is a snapshot of the network to help you visualize the network elements and links connected to a VLAN. The overlay displays STP and REP link and port information.

If you select a network VLAN that is associated with other VLANs, the associated VLANs are included in the overlay.

The VLAN service overlay allows you to isolate the parts of a network that are being used by a particular service. This information can then be used for troubleshooting. For example, the overlay can highlight configuration or design problems when bottlenecks occur and all site interconnections use the same link.

### Adding a VLAN Overlay

To add a VLAN overlay:

- **Step 1** Display the network map for which you want to create an overlay in the Vision client.
- **Step 2** In the toolbar, choose **Choose Overlay Type > VLAN**.
- **Step 3** In the Select VLAN Overlay dialog box, do either of the following:
  - Choose a search category, enter a search string, then click **Go** to narrow the selection to a set of overlays or a specific overlay.

The search condition is "contains." Search strings are case-insensitive. For example, if you choose the Name category and enter "net," the Vision client displays overlays that have "net" in their names. The string "net" can be at the beginning, middle, or end of the name, such as Ethernet.

- Choose **Show All** to view all overlays.
- Step 4 Select an overlay, then click **OK**.

The network elements and physical links used by the selected VLAN overlay are highlighted in the network map. All other network elements and links are dimmed. The VLAN name is displayed in the title of the window. See Figure 18-34.

I         GigabitEthernet1 (269:10.78)           GigabitEthernet1 (279:10.78)         GigabitEthernet1 (279:10.78)           GigabitEthernet1 (279:10.78)         GigabitEthernet1 (279:10.78)           I         GigabitEthernet1 (		🕅 - 🔀 📐 🔇 🏷 🧔 🛱 🛛 VLAN Overlay fi	rom 12-Apr-12 16:50
Ford         GgabiEtherret1/S@10.78.31.4           GgabiEtherret1/S@10.78.31.2         GgabiEtherret1/S@10.78.31           GgabiEtherret1/S@10.78.31         GgabiEtheret1/S@10.78.31           GgabiEtheret1/S@10.78.31         Ggab			
GgabiEthernet (591) 0.78.31.2           GgabiEthernet (591) 0.78.31.3           GgabiEthernet (591) 0.78.31           GgabiEthernet (591) 0.78.31           GgabiEthernet (12691) 0.78.31           GgabiEthernet (1591) 0.78.31           GgabiEthernet (12691) 0.78           GgabiEthernet (12791) 0.78           GgabiEthernet (12791) 0.78           GgabiEthernet (12891) 0.78 <th></th> <th></th> <th></th>			
VLAN-20910.78.31.231           GapAbEthernet1.(5910.78.5)           GapAbEthernet1.(5910.78.5)           GapAbEthernet1.(26910.78.5)           GapAbEthernet1.(26910.78.5)           GapAbEthernet1.(26910.78.5)           GapAbEthernet1.(26910.78.5)           GapAbEthernet1.(26910.78.5)           GapAbEthernet1.(26910.78.5)           GapAbEthernet1.(26910.78.5)           GapAbEthernet1.(26910.78.5)           GapAbEthernet1.(30910.78.5)           VLAH-709@obetherlet1.00.75.5)           Y           Y           Y           Y           Y           Y           Y           Y           Y           Y           Y           Y           Y		VLAN-70960545.inAcareaston1690.40.415 8 VLAN-709606.4. Destinktore	
End :         Image: Severity Ticket ID         N?         Last Modification Time Show All Rows           78         13-Apr-12 OS 19/07         78         10-Apr-12 OS 19/07         10-Apr-12 OS 19/07	10.64.106.171	Gastilleren. Gastilleren. Gastilleren. Gastilleren.	
Find :         Image: Severity         Ticket ID         N         Last Modification Time         Show AI Rows           7         78         13-Apr-12 05:19:07         10-4pr-12 05:19:07         10-4pr-12 05:19:07		Gubititeret.	•
Severity         Ticket ID         N         Last Modification Time         Show All Rows           78         13-Apr-12 05:19:07         7         10-Apr-12 05:19:07         10-Apr-12 05:19:07			
Sevency         Inclusion			
	oot Root Event Time	Description Location Acknowledged	Creation Time
	13-Apr-12 05:17:01	Pluggable Transc. 7 10.64.106.1. No	13-Apr-12 05:19:07
	10.4=- 10.00.50.50	MOLC Jaharénan - N 10 24 102 1 N Na	
Tickets Latest Events			Line 0 (Size 3)
Lacost EVEIRS			

#### Figure 18-34 VLAN Overlay Example



The overlay is a snapshot taken at a specific point in time. As a result, the information in the overlay might become stale. To update the overlay, click **Refresh the Last Selected Overlay** in the toolbar.

The VLAN overlay service also supports multi-chassis devices. If a network element in the overlay is dimmed, then all the hosts of the network element along with the Inter Rack Links (IRL) and the Inter Chassis Links (ICL) used for transportation will also be dimmed. Apart from these, the chassis that holds the configured port will also be dimmed.

### **Displaying or Hiding VLAN Overlays**

After you create a VLAN overlay, you can hide it by clicking **Hide Overlay** in the toolbar. All previously dimmed network elements and links are displayed. To display the overlay, click **Show Overlay**.

Note

The Overlay icon toggles between Show Overlay and Hide Overlay. When selected, the VLAN overlay is displayed and the Hide Overlay tool is active. When deselected, the VLAN overlay is hidden and the Show Overlay tool is active.

#### **Removing a VLAN Overlay**

To remove a VLAN overlay from a map, choose **Choose Overlay Type > None** in the toolbar. The overlay is removed from the map, and the Show Overlay/Hide Overlay icon is dimmed.

# **Viewing VLAN Service Link Properties**

See the following topics for information on viewing VLAN service link properties:

- Viewing REP Properties for VLAN Service Links, page 18-81
- Viewing STP Properties for VLAN Service Links, page 18-84
- Viewing Associated Network VLAN Service Links and VLAN Mapping Properties, page 18-74

# **Viewing REP Information in VLAN Domain Views and VLAN Overlays**

You can view REP segment and port information in the Vision client in the map view. The icons displayed depend on whether you view the REP information in the VLAN domain view or in a VLAN overlay. Table 18-35 describes the icons and badges used to represent REP segment and port information.

Table 18-35	<b>REP</b> Icons and Badges in VLAN Domain Views and Overlays
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Item	Description	VLAN Domain View	VLAN Overlay
REP-140	REP identifier—Uses the format REP- <i>id</i> where <i>id</i> represents the REP segment identifier.	The REP identifier is displayed in the domain view if the visual link represents only one link. f the visual link represents more than one link, no REP identifier is displayed.	C4-upe8 [1N] C15C0 CATALYS. 10254 J01228 The REP identifier is displayed in a VLAN overlay view if all the links represented by the visual link are from the same source to the same destination.
REP No Neighbor-25	REP No Neighbor segment— Indicates that the specified segment has no neighbor.	M+] Italyst 3 01.38 SE	C7-sw9 (2M) Cisco Calayet 3 Cisco Calayet 3 122(55)52 Cisco Calayet 3 Cisco Calayet 3 C
REP-?	REP identifier for incorrect configuration—Indicates that the two sides of the link are configured differently or incorrectly.	VLAN-711@c7-sw9 [] VLAN-711@c7-sw10 VLAN-711@c7-sw10 ULAN-711@c7-sw10 0 VLAN-711@c7-sw10	C7-sw10 [1N] Citco Catalyst 3 10.56.101.39 12.2(54)SE Citco Catalyst 3 10.56.101.38 12.2(55)SE Citco Catalyst 3 12.2(55)SE

Item	Description	VLAN Domain View	VLAN Overlay
<b>(</b> €	Multiple links with badges icon—Indicates that one or more link is represented by the visual link and at least one of the links contains a badge.	Upe4 [1M] USS.01224 USS.01224 ULAN-402@DataL ULAN-402 ULAN-40	<ul> <li>c4-upe7[IN]</li> <li>c1500 CATALYSL</li> <li>c1500 CATALYSL</li></ul>
Р	REP primary badge—Indicates a REP primary port.	407@c4-upe5 REP-140 VLAN-407@c4-upe VLAN-407@c4-u VLAN-407@c4-u	e4 [1M] :0 CATALYS. 6.101234 (53)5G2
0	Blocking badge—Indicates a REP alternate port.	VLAN-407@c4-upe3	C1500 CATALYS 1056.101.230 12.2(53)5G2
Po	Primary and blocking badge—Indicates a REP primary port that is also blocking.		c4-upe7 [1N] CISCO CATALYS 10.56.101.241 12.2(54)5E CISCO CATALYS 10.56.101.238 12.2(54)5E CISCO CATALYS 10.56.101.238 12.2(54)5E

# **Viewing REP Properties for VLAN Service Links**

To view REP properties for a VLAN service link, open the Link Properties window in either of the following ways:

• Double-click the VLAN service link.

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• Right-click the VLAN service link, and choose Properties.

Figure 18-35 shows an example of the Link Properties window with REP information.

-upe4 [1M] <-> c4-upe5				_ 🗆
<pre>c4-upe4#1:GigabiEthernet1/6 &lt;&gt; c4-upe5#0:FasEthernet0/1 Ethe c4-upe4#1:GigabiEthernet1/6 &lt;&gt; c4-upe5#0:FasEthernet0/1 WAN c4-upe4#1:GigabiEthernet1/6 &lt;&gt; c4-upe5#0:FasEthernet0/1 VLAN</pre>	Connection Properties Location: c4-upe4#1:0 Port Alias: GigabitEther		t Alias: FastEthe	#0:FastEthernet0/1 rnet0/1
	REP Properties			
	Segment ID: 140 Port Type: Primary Port Role: Alternat Port Status: Two Way Blocked VLANs: [1-4094]	Edge Por te Por y Por	gment ID: 140 rt Type: Intern rt Role: Open rt Status: Two W	ediate ay
	VLAN Properties			
	VLAN ID: 500 Mode: Trunk Vlan Type: IEEE802. Native Vlan Id: 1	1Q Via	AN ID: 500 de: Trun n Type: IEEE0 tive Vlan Id: 1	k 102.1Q
	Ethernet Properties	F2 A5 85 MA	C Address: 00 24	C3 C6 7B 83
	Physical Properties Oper Status: Up Admin Status: Up Maximum Speed: 100.0 N	Ad	er Status: Up min Status: Up ximum Speed: 10	
	Port Utilization Graph		Port Utilization Graph	
■針▽专園屋				
Network Events			Memory: 12°	% Connected

Figure 18-35 VLAN Service Link Properties Window with REP Information

Table 18-36 describes the information that is displayed for REP for each end of the link.

 Table 18-36
 REP Properties in VLAN Service Link Properties Window

Field	Description	
Segment IDREP segment identifier.		
Port Type Port type: Primary Edge, Secondary Edge, or Intermed		
Port Role	Role or state of the REP port depending on its link status and whether it is forwarding or blocking traffic: Failed, Alternate, or Open.	
Port Status	Operational link state of the REP port: None, Init Down, No Neighbor, One Way, Two Way, Flapping, Wait, or Unknown.	

# Viewing STP Information in VLAN Domain Views and VLAN Overlays

You can view STP segment and port information in the Vision client in the map view. The icons displayed depend on whether you view the STP information in the VLAN domain view or in a VLAN overlay. Table 18-37 describes the icons and badges used to represent STP link and port information.

<b>Table 18-37</b>	STP Information in VLAN Domain Views and Overlays
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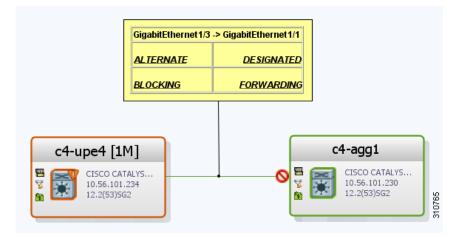
Item	Description	VLAN Domain View	VLAN Overlay
R	The STP root bridge, or root of the STP tree, is indicated by an uppercase R.	VLAN-2501@c7	
	An STP root port is the port at the root of the STP tree. Each switching entity in the network VLAN should have a port designated as the root port. The STP root port is indicated by an uppercase R on the Ethernet flow point that is designated the root port.	Trunk	GigabitEthernet
0	STP blocks some VLAN ports to ensure a loop-free topology. The blocked port is marked with a red deny badge on the side on which traffic is denied.	57@c4-agg1 VLAN-2157@c4-upe	pe4 [1M] ISCO CATALYS 156.101.224 2.2(53)5G2

To view additional STP information in a VLAN overlay, right-click an STP link and choose **Show Callouts**. The following STP port information is displayed as shown in Figure 18-36:

- Port name
- Port role
- Port state

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# **Viewing STP Properties for VLAN Service Links**

To view STP properties for a VLAN service link, open the Link Properties window in one of the following ways:

- Double-click the VLAN service link.
- Right-click the VLAN service link, and choose Properties.

Figure 18-37 shows an example of the Link Properties window with STP information.

Figure 18-37 STP Properties in VLAN Service Link Properties Window

	Connection Properties					
c7-sw8#1:GigabitEthernet1/1/2 <-> c7-sv						
	Location: c7-sw8#1:GigabitEthernet1/1/2	Location: c7-sw10#1:GigabitEthernet1/1/2				
	Port Alias: GigabitEthernet1/1/2	Port Alias: GigabitEthernet1/1/2				
	STP Properties					
	Port State: FORWARDING	Port State: FORWARDING				
	Port Role: ROOT	Port Role: DESIGNATED				
	N N					
	VLAN Properties					
	VLAN ID: 709	VLAN ID: 709				
	Mode: Trunk	Mode: Trunk				
	Vlan Type: IEEE802.1Q	Vlan Type: IEEE802.1Q				
	Native Vlan Id: 1	Native Vlan Id: 1				
	-Ethernet Properties MAC Address: 00 22 0C 99 09 1C	MAC Address: 00 22 0C 98 F4 9C				
	Physical Properties	And Datasan Ma				
	Oper Status: Up	Oper Status: Up				
	Admin Status: Up Maximum Speed: 1000.0 Mbps	Admin Status: Up Maximum Speed: 1000.0 Mbps				
		maximum speed: 1000.0 Mbps				
	Port Utilization Graph	Port Utilization Graph				
d: 🚺 🛃 🔽 🖤 🕽						
ets Network Events						

Table 18-38 describes the information that is displayed for STP for the VLAN service link.

 Table 18-38
 STP Properties in VLAN Service Link Properties Window

Field	Description
Port State	STP port state: Disabled, Blocking, Listening, Learning, or Forwarding,
Port Role	STP port role: Unknown, Backup, Alternative, Designated, Root, or Boundary.

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# **Viewing VLAN Trunk Group Properties**

VTP is a Layer 2 multicast messaging protocol that manages the addition, deletion, and renaming of VLANs on a switched network-wide basis.

The Vision client displays VTP information in the logical inventory. VTP information is shown only for Cisco devices that support VTP, and support is provided only for VTP Version 1 and 2. Support for Version 3 is limited to the additional attributes that are supported by the version, such as primary and secondary server. No support is provided for the display of VTP information at the port (trunk) level.

The Vision client shows all VTP modes: Server, Client, Transparent, and Off. For each mode, the Vision client displays the relevant mode information such as VTP domain, VTP mode, VTP version, VLAN trunks, and the trunk encapsulation. The Vision client also displays VTP domain information in a view that includes a list of all switches that are related to these domains, their roles (server, client, and so on), and their VTP properties.

To view VTP properties:

### Step 1 In the Vision client, choose Network Inventory > VTP Domains.

**Step 2** Double-click the VTP domain you want to view.

The VTP Domain Properties window is displayed as shown in Figure 18-38.

Services		-			
Find :	🖺 🛃 🗸 🛉 👼				
Managed Element 🛛 🔁 🛆	Operating Mode	Process Status	Authentication Enabled	Configuration Revision	Version
c7-sw2 - VTP Service	Server	Running	false	273	1
c7-sw3 - VTP Service	Transparent	Running	false	0	1
c7-sw6 - VTP Service	Server	Running	false	273	1
7-sw7 - VTP Service	Transparent	Running	false	0	1

Figure 18-38 VTP Domain Properties Window in Logical Inventory

Table 18-39 describes the information that is displayed in the VTP Domain Properties window.

Field	Description				
Managed Element	Managed element name, hyperlinked to VTP in logical inventory.				
Operating Mode	VTP operating mode:				
	• Server—Allows VLAN creation, modification, and deletion, and specification of other configuration parameters for the entire VTP domain. Server is the default mode.				
	• Client—Same behavior as VTP server, except VLANs cannot be created, changed, or deleted.				
	• Transparent—The device does not participate in the VTP. The device does not advertise its VLAN configuration and does not synchronize its VLAN configuration based on received advertisements.				
	However, the device forwards received VTP advertisements out of their trunk ports in VTP Version 2.				
	• Off—The device does not participate in VTP and does not forward VTP advertisements.				
Process Status	Status of the VTP process: Running or Disabled.				
Authentication Enabled	Whether or not VTP authentication is enabled: True or False.				
	Authentication ensures authentication and integrity of switch-to-switch VTP messages. VTP Version 3 introduces an additional mechanism to authenticate the primary VTP server as the only device allowed to change the VLAN configuration on a network-wide basis.				
Configuration Revision	32-bit number that indicates the level of revision for a VTP packet.				
	Each VTP device tracks the VTP configuration revision number that is assigned to it. Most VTP packets contain the VTP configuration revision number of the sender.				
Version	VTP version: 1, 2, or 3.				

Table 18-39VTP Domain Properties Window

Step 3 To view the VTP properties at the device, double-click the VTP domain.

Table 18-40 describes the VTP information that is displayed in the inventory window content pane.

Field	Description
Operating Mode	VTP operating mode: Server, Client, Transparent, or Off.
Domain Name	VTP domain name.
Version	VTP version: 1, 2, or 3.
Pruning	<ul><li>Whether or not VTP pruning is enabled: True or False.</li><li>VTP pruning increases available bandwidth by restricting flooded traffic to those trunk links that the traffic must use to access the appropriate network devices.</li></ul>

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Table 18-40VTP Properties in Inventory

Field	Description
Configuration Revision	32-bit number that indicates the level of revision for a VTP packet.
Authentication	Whether or not VTP authentication is enabled: True or False.

 Table 18-40
 VTP Properties in Inventory (continued)

Step 4 When finished, press Ctrl + F4 to close each VTP properties window.

# **Viewing VLAN Bridge Properties**

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You can view VLAN bridges provisioned on a device by displaying the device in the Vision client inventory window and choosing Bridges in logical inventory.

To view VLAN bridge properties:

- Step 1 In the Vision client, double-click the device containing the VLAN bridges you want to view.
- **Step 2** In the **Inventory** window, choose **Logical Inventory** > **Bridges** > *bridge*.

VLAN bridge properties are displayed as shown in Figure 18-39.

- L	Bridges A	Poll Nova							
	Bridge (1) default		)						
22	Bridge (483) VLAN0483	Name:	(701) VLAN0701	Type:	Regula	ar			
22	Bridge (701) VLAN0701	VLAN ID:	701	Stp Instance:	c7-su	10(STP Service)			
23	Bridge (702) VLAN0702	VLAN ID:	701	Stp Instance:	CT-SW	IO(31F Service)			
	Bridge (703) VLAN0703								
	Bridge (704) VLAN0704 Bridge (705) VLAN0705								
10.00 (0.00	Bridge (706) VLAN0706	Interfaces							
	Bridge (707) VLAN0708		-14	A1 19					
	Bridge (708) VLAN0708	Find :		회 💎 🏲	当点				
	Bridge (709) VLAN0709	ID 👻 🗸		Туре	Mode	Native VLAN ID	VLAN Encapsulation Type	Allowed VLANs	VLAN Encapsulation Admin T
23	Bridge (710) VLAN0710	c7-sw10#0:	GigabitEthernet1/0/2	Layer 2 VLAN	Trunk	1	IEEE802.1Q	[1-4094]	IEEE802.1Q
22	Bridge (711) VLAN0711	c7-sw10#1;	GigabitEthernet1/1/1	Layer 2 VLAN	Trunk	1	IEEE802.1Q	[1-4094]	IEEE802.1Q
	Bridge (712) VLAN0712		GigabitEthernet1/1/2			1	IEEE802.10	[1-1700], [1730-1733],	
	Bridge (713) VLAN0713	C7-5W10#1.	agabice in internation	Edyci 2 VEMIN	TUIN		1000001102	[1-1/00], [1/00-1/00],	100002.102
	Bridge (714) VLAN0714								
	Bridge (715) VLAN0715 Bridge (716) VLAN0716	1							
10 10 10 10	Bridge (717) VLAN0717 Bridge (717) VLAN0717								
	Bridge (718) VLAN0718								
	Bridge (719) VLAN0719								
	Bridge (720) VLAN0720								
22	Bridge (721) VLAN0721								
22	Bridge (722) VLAN0722								
22	Bridge (723) VLAN0723								
22	Bridge (724) VLAN0724								
		-							
Device Zoom	Best Fit								
									Line 0 (Size 3)
									1
ind :	🔛 🔁 🗸 💎 🎙								
					-	· · ·		1	e
	ork Events    Provisioning Event								

Table 18-41 describes the information that is displayed. Depending on the bridge configuration, any of the tabs might be displayed for the selected bridge.

Field	Description					
Name	VLAN bridge name.					
Туре	VLAN bridge type.					
MAC Address	VLAN bridge MAC address.					
VLAN ID	VLAN bridge VLAN identifier.					
STP Instance	STP instance information, hyperlinked to the STP entry in logical inventory.					
Bridge Table Tab						
MAC Address	Bridge MAC address.					
Port	Port associated with the bridge, hyperlinked to the interface in physical inventory.					
Interfaces Tab						
ID	VLAN interface identifier, hyperlinked to the interface in physical inventory.					
Туре	VLAN interface type, such as Layer 2 VLAN.					
Mode	VLAN interface configuration mode:					
	• Unknown—The interface is not VLAN aware.					
	• Access—Puts the interface into permanent nontrunking mode and negotiates to convert the link into a nontrunk link. The interface becomes nontrunking.					
	• Dynamic Auto—The interface can convert the link to a trunk link. The interface becomes a trunk if the neighbor interface is set to Trunk or Dynamic Desirable mode.					
	• Dynamic Desirable—The interface actively attempts to convert the link to a trunk link. The interface becomes a trunk if the neighboring interface is set to Trunk, Dynamic Desirable, or Dynamic Auto mode. Dynamic Desirable is the default mode for all Ethernet interfaces.					
	• Trunk—Puts the interface into permanent trunking mode and negotiates to convert the link into a trunk link. The interface becomes a trunk interface even if the neighbor interface is not a trunk interface.					
	• Dot1Q Tunnel—Configures the interface as a tunnel (nontrunking) port to be connected in an asymmetric link with an 802.1Q trunk port. 802.1Q tunneling is used to maintain customer VLAN integrity across a service provider network.					
Native VLAN ID	VLAN Identifier (VID) associated with this VLAN. The range of the VLAN ID is 1 to 4067.					
VLAN Encapsulation Type	Type of encapsulation configured on the VLAN, such as IEEE 802.1Q.					

Table 18-41VLAN Bridge Properties

Field	Description		
Allowed VLANs	List of the VLANs allowed on this VLAN interface.		
VLAN Encapsulation Admin Type	VLAN administration encapsulation type, such as IEEE 802.1Q.		
EFPs Tab			
EFP ID	EFP identifier.		
Operational State	EFP operational state.		
VLAN	VLAN identifier.		
Inner VLAN	CE-VLAN identifier.		
Translated VLAN	Translated VLAN identifier.		
Translated Inner VLAN	Translated CE-VLAN identifier.		
Binding Port	Hyperlinked entry to the port in physical inventory.		
Description	Brief description of the EFP.		
Pseudowires Tab			
ID	Pseudowire identifier, hyperlinked to the VLAN entry in Bridges in logic inventory.		
Peer	Identifier of the pseudowire peer, hyperlinked to the entry in the Pseudowire Tunnel Edges table in logical inventory.		
Tunnel ID	Tunnel identifier.		
Tunnel Status	Status of the tunnel: Up or Down.		
Peer Router IP	IP address of the peer router for this pseudowire.		
Sub Interfaces Tab			
BER VLAN bit error rate.			
Interface Name	Interface on which the VLAN is configured.		
VLAN Type	Type of VLAN, such as Bridge or IEEE 802.1Q.		
Operational State	Subinterface operational state.		
VLAN ID	VLAN identifier.		
Inner VLAN	CE-VLAN identifier.		

Table 18-41	VLAN Bridge Properties (continued)
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Step 3 When finished, press Ctrl + F4 to close each VLAN Bridge properties window.

# Using Commands to Work With VLANs

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The following commands can be launched from the physical inventory by right-clicking an Ethernet slot and choosing **Commands > Configuration**. Your permissions determine whether you can run these commands (see Permissions for Managing Carrier Ethernet, page B-12). To find out if a device supports these commands, see the *Cisco Prime Network 5.0 Supported Cisco VNEs*.

Command	Inputs Required and Notes		
Create VLAN	VLAN ID, VLAN Context Name, Bind Interface Name, Status		
Modify VLAN	VLAN ID, Delete Bind Interface, Context Name, Bind Interface Name, Status		
Delete VLAN	VLAN ID		

# **Understanding Unassociated Bridges**

Some switching entities might not belong to a flow domain, such as a network VLAN, a VPLS instance, or a network pseudowire. These switching entities are referred to as *unassociated bridges*.

In addition, a switching entity that belongs to a network VLAN is considered an unassociated bridge if it meets both of the following criteria:

- The network VLAN contains a null Ethernet flow domain (EFD).
- The switching entity contains no switch ports.

Unassociated bridge switching entities can hold Ethernet flow points that serve as termination points on different network VLANs. If these switching entities are added to a map with the relevant VLANs, the links are displayed in the Vision client map.

## **Adding Unassociated Bridges**

The Vision client enables you to add unassociated bridges to maps and to view their properties.

To add an unassociated bridge to a map:

- **Step 1** In the Vision client, select the required map or domain.
- **Step 2** Open the Add Unassociated Bridge dialog box in one of the following ways:
  - Choose File Add to Map > Unassociated Bridge.
  - In the toolbar, click Add to Map and choose Unassociated Bridge.

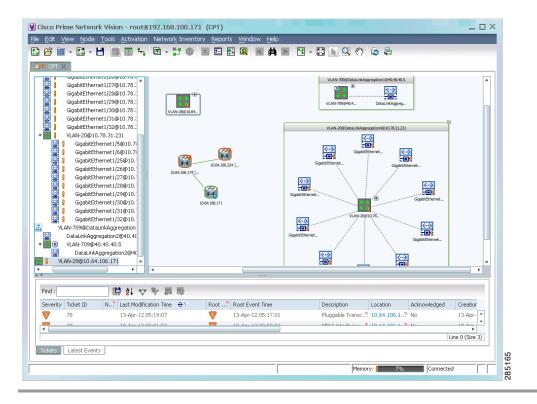
Figure 18-40 shows an example of the Add Unassociated Bridge dialog box.

Γ

⊙ s	earch Name 🔻	Go				
O Show All						
Available Unassociated Bridges as of [03-Nov-10 16:34] 🔞						
Vame	<del>6</del> 7	System Name	Description			
::	VLAN-910@PE-7604-WEST	VLAN-910@PE-7604-WEST				
::	VLAN-901@PE-7604-WEST	VLAN-901@PE-7604-WEST				
::	VLAN-874@sol-dist-2	VLAN-874@sol-dist-2				
::	VLAN-400@PE-7604-WEST	VLAN-400@PE-7604-WEST				
\$\$	VLAN-323@sol-dist-2	VLAN-323@sol-dist-2				
**	VLAN-101@sol-dist-2	VLAN-101@sol-dist-2				
::	VLAN-100@PE-7604-WEST	VLAN-100@PE-7604-WEST				
::	VLAN-77@sol-dist-2	VLAN-77@sol-dist-2				
::	VLAN-43@sol-dist-2	VLAN-43@sol-dist-2				
::	VLAN-6@PE-7604-WEST	VLAN-6@PE-7604-WEST				
::	VLAN-1@sol-dist-2	VLAN-1@sol-dist-2				
::	VLAN-1@PE-7604-WEST	VLAN-1@PE-7604-WEST				
::	Grace9@Grace9@asr-9k-auto1	Grace9@Grace9@asr-9k-auto1				
**	bd_sagay8@bg_sagay8@asr-9k-auto1	bd_sagay8@bg_sagay8@asr-9k-auto1				
::	bd_sagay6@bg_sagay6@asr-9k-auto1	bd_sagay6@bg_sagay6@asr-9k-auto1				
•			Þ			
		Line	9 (1 / 15 Selected)			
		C	K Cancel			

#### Figure 18-40 Add Unassociated Bridge Dialog Box

Step 3 In the Add Unassigned Bridge to *domain* dialog box, select the required bridge and click OK.The map is refreshed and displays the newly added bridge as shown in Figure 18-41.



#### Figure 18-41 Unassociated Bridge in the Vision Window

# Working with Ethernet Flow Point Cross-Connects

Prime Network automatically discovers Ethernet flow point (EFP) cross-connects, also known as locally switched EFPs. Prime Network also identifies changes in already identified EFP cross-connects, such as cross-connect deletions or changes. Cross-connect changes can occur when one side of the cross-connect is removed or replaced.

Prime Network also associates the VLANs that contain the EFPs that are part of the cross-connects. If the cross-connect contains a range EFP, which represents a range of VLANs, and you add the related VLANs to a map, the Vision client displays the links between them and the cross-connect as well.

The Vision client enables you to add EFP cross-connects to maps and to view their properties in inventory, as described in the following topics:

- Adding EFP Cross-Connects, page 18-92
- Viewing EFP Cross-Connect Properties, page 18-93

### Adding EFP Cross-Connects

To add an EFP cross-connect to a map:

- Step 1 In the Vision client, select the map to which you wish to add the cross-connect.
- Step 2 Open the Add EFP Cross-Connect dialog box in one of the following ways:

- Choose File Add to Map > Cross Connect.
- In the toolbar, click Add to Map and choose Cross Connect.
- Step 3 In the Add EFP Cross Connect to *domain* dialog box, select the required EFP cross-connect and click OK.

The map is refreshed and displays the newly added EFP cross-connect.

## **Viewing EFP Cross-Connect Properties**

To view EFP cross-connect properties in the Vision client, do either of the following:

- Select the EFP cross-connect with the properties you want to view, and choose **Node > Properties**.
- Double-click the device configured with an EFP cross-connect and, in the inventory window, choose Logical Inventory > Local Switching > Local Switching Entity.

The information that is displayed for EFP cross-connects is the same in both the Local Switching Entry Properties window and in the Local Switching Table in logical inventory (as shown in Figure 18-42).

🖄 🖤 c4-	npe1-76 [2M+]	Poll N	ow				
	Logical Inventory [21N]						
	Access Lists	Local Sw	ritching Table				
	ATM Traffic Profiles	Find :		日本マヤ原屋			
•	Bidirectional Forwarding Detecti	Key	Entry Status	Segment 1	Segment 1 Port Name	Segment 1 Status	Segment 2
	Bridges CEM	1-alina3	Up	c4-npe1-76#4.0;GigabitEthernet4/0/3	GigabitEthernet4/0/3	Up	c4-npe1-76#
1	CISCO Discovery Protocol						
	Clock	2-alina	Up	c4-npe1-76#4.0:GigabitEthernet4/0/2.444	GigabitEthernet4/0/2.444		c4-npe1-76#
	Ethernet Link Aggregation	3-alina2	Up	c4-npe1-76#4.0:GigabitEthernet4/0/2 EFP:555	GigabitEthernet4/0/2:555	Up	c4-npe1-76#
	Ethernet LMI						
	Frame Relay Traffic Profiles						
▶ .	IS-IS						
-	Local Switching						
		1					
Þ	LSEs	1					
>	MPBGPs						
	OAM						
	Operating System OSPF Processes						
► <b>1</b>	Routing Entities	9					
•	Spanning Tree Protocol						
	Traffic Engineering Tunnels						
	Tunnel Traffic Descriptors						
•	WC Switching Entities	<u>-</u>					
	•						
Device Zoo	m 🐼 Best Fit						
							+
							Line 0 (Size 3)
ind :							
	2 V V T	the will					
	1.75						

Figure 18-42 Local Switching Table in Logical Inventory

Table 18-43 describes the information displayed for the EFP cross-connects in the Local Switching Table.

 Table 18-43
 EFP Cross-Connect Properties in Local Switching Table

Field     Description	
Кеу	Entry key for the cross-connect group.
Entry Status	Status of the cross-connect: Down, Unresolved, or Up.

Field	Description
Segment 1	Identifier of the first cross-connect segment, hyperlinked to the relevant entry in physical inventory.
Segment 1 Port Name	Identifier of the first cross-connect segment port.
Segment 1 Status	Status of the first cross-connect segment, such as Admin Up, Admin Down, Oper Down, or Up.
Segment 2	Identifier of the second cross-connect segment, hyperlinked to the relevant entry in physical inventory.
Segment 2 Port Name	Identifier of the second cross-connect segment port.
Segment 2 Status	Status of the second cross-connect segment, such as Admin Up, Admin Down, Oper Down, or Up.

Table 18-43         EFP Cross-Connect Properties in Local Switching Table (continu
--

# Working with VPLS and H-VPLS Instances

Virtual Private LAN Service (VPLS) is a Layer 2 VPN technology that provides Ethernet-based multipoint-to-multipoint communication over MPLS networks. VPLS allows geographically dispersed sites to share an Ethernet broadcast domain by connecting sites through pseudowires. The network emulates a LAN switch or bridge by connecting customer LAN segments to create a single bridged Ethernet LAN.

Hierarchical VPLS (H-VPLS) partitions the network into several edge domains that are interconnected using an MPLS core. The edge devices learn only of their local N-PE devices and therefore do not need large routing table support. The H-VPLS architecture provides a flexible architectural model that enables Ethernet multipoint and point-to-point Layer 2 VPN services, as well as Ethernet access to Layer 3 VPN services, enabling service providers to offer multiple services across a single high-speed architecture.

Prime Network discovers the following VPLS-related information from the network and constructs VPLS instances:

- VSIs
- Pseudowires
- EFPs
- Switching entities

The Vision client enables you to:

- Add VPLS instances to a map—See Adding VPLS Instances to a Map, page 18-95.
- Apply VPLS overlays—See Applying VPLS Instance Overlays, page 18-96.
- View link details in VPLS overlays—See Viewing Pseudowire Tunnel Links in VPLS Overlays, page 18-97.

- View VPLS-related properties—See the following topics:
  - Viewing VPLS Instance Properties, page 18-99
  - Viewing Virtual Switching Instance Properties, page 18-100

- Viewing VPLS Core or Access Pseudowire Endpoint Properties, page 18-102
- Viewing VPLS Access Ethernet Flow Point Properties, page 18-104
- Configure VFI Autodiscovery and Signaling—Configuring VFI Autodiscovery and Signaling, page 18-105

You can delete a VPLS forward from the Vision client if it is displayed with the reconciliation icon.

# **Adding VPLS Instances to a Map**

You can add the VPLS instances that Prime Network discovers to maps as required.

To add a VPLS instance to a map:

- Step 1 In the Vision client, select the required map or domain.
- Step 2 Open the Add VPLS Instance to *map* dialog box in either of the following ways:
  - In the toolbar, choose Add to Map > VPLS.
  - In the menu bar, choose File > Add to Map > VPLS.
- Step 3 In the Add VPLS Instance dialog box, do either of the following:
  - To search for specific elements:

a. Choose Search.

**b.** To narrow the display to a range of VPLS instances or a group of VPLS instances, enter a search string in the search field.

c. Click Go.

For example, if you enter **VPLS1**, the VPLS instances that have names containing the string VPLS1 are displayed.

• To view all available VPLS instances, choose Show All and click Go.

The VPLS instances that meet the specified search criteria are displayed in the Add VPLS Instance dialog box in table format. The dialog box also displays the date and time at which the list was generated. To update the list, click **Refresh**.



Note If an element is not included in your scope, it is displayed with the locked device icon.

For information about sorting and filtering the table contents, see Viewing a Table of NEs and Their Properties (List View), page 7-7.

- Step 4 In the Add VPLS Instance dialog box, select the instances that you want to add. You can select and add multiple instances by pressing Ctrl while selecting individual instances or by pressing Ctrl +Shift to select a group of instances.
- Step 5 Click OK.

The VPLS instance is displayed in the navigation pane and in the content area. In addition, any associated tickets are displayed in the ticket pane.

The VPLS instance information is saved with the map in the Prime Network database.

# **Applying VPLS Instance Overlays**

An VPLS instance overlay allows you to isolate the parts of a network that are being used by a specific VPLS instance.

To apply a VPLS instance overlay:

- Step 1 In the Vision client, choose the map in which you want to apply an overlay.
- **Step 2** From the toolbar, choose **Choose Overlay Type > VPLS**.

Figure 18-43 shows an example of the Select VPLS Instance Overlay for *map* dialog box.

Figure 18-43 Select VPLS Instance Overlay Dialog Box

~	how All	Go	
Availa	able Vpls Instances as of [04-Nov-10 14:37	1 🕲	
Find :	🟥 🛃 🔽 🕏 🐺		
Name	€∧	System Defined Name	Vpn Id
	A:DomainA@GroupA@10.56.101.153	A:DomainA@GroupA@10.56.101.153	1
	C:DomainC@GroupC@10.56.101.153	C:DomainC@GroupC@10.56.101.153	4
	cisco@c7-npe1-76	cisco@c7-npe1-76	991
	EFPs_Test:(778) VLAN0778@c1-npe1-76	EFPs_Test:(778) VLAN0778@c1-npe	778
<b>.</b>	omar:(999) VLAN0999@10.56.101.75	omar:(999) VLAN0999@10.56.101.75	666
	Oren_Test:(987) VLAN0987@c1-npe1-76	Oren_Test:(987) VLAN0987@c1-npe	987
	QHVPLS:481781181:(2081) VLAN2081@10.56.1017	QHVPLS:481781181:(2081) VLAN208	481781181
	QHVPLS:481781181:(2081) VLAN2081@c1-npe1-76	QHVPLS:481781181:(2081) VLAN2087	481781181
	QinQ_VFI:(200) VLAN0200@10.56.101.75	QinQ_VFI:(200) VLAN0200@10.56.1	200
	QVPLS:482782182:(2082) VLAN2082@10.56.101.75	QVPL5:482782182:(2082) VLAN2082	482782182
	QVPLS:482782182:(2082) VLAN2082@c1-npe1-76	QVPL5:482782182:(2082) VLAN2082	482782182
	Service1:(477) VLAN0477@10.56.101.75	Service1:(477) VLAN0477@10.56.10	777
	Service2:(853) VLAN0853@c1-npe1-76	Service2:(853) VLAN0853@c1-npe1-76	1010
	ServiceD:(426) VLAN0426@10.56.101.75	ServiceD:(426) VLAN0426@10.56.10?	26
	ServiceD@c1-npe1-76	ServiceD@c1-npe1-76	1001
	VFI7:(307) VLAN0307@c3-npe1-76	VFI7:(307) VLAN0307@c3-npe1-76	99007
	VFI7:(407) VLAN0407@10.56.101.75	VFI7:(407) VLAN0407@10.56.101.75	99007
			Line 0 (Size 24)
			OK Cancel

- **Step 3** Select the required VPLS instance for the overlay.
- Step 4 Click OK.

The elements being used by the selected VPLS instance are highlighted in the map while the other elements are dimmed, as shown in Figure 18-44.

🖸 🖨	it <u>V</u> iew (			-	ory Reports Window		) 🗔 🛱	Vpls Instance	Overlay from 27-Jun-	11 13:1
	♥ c4-n; ♥ © c2-n; ♥ © c2-n; ♥ © c2-n; ♥ Demn ♥ Demn ♥ Demn ♥ Demn ♥ Demn ♥ Demn ♥ Demn ♥ G € € G	[210M+] le1-76 [6M] le1-crs [54M] le1-crs [54M] le1-sk [69M+] re1 [1M+] ELan:242BD@242 amo_ELan:242BD@ 0/7/0/1.242@c2-nq gabitEthernet4/0/5 gabtEthernet4/0/5 ggate [6M+]	AND442@c4-npe 242BG@c2-npe ie1-crs EFP: 442@c4-r 3BG@c2-npe1- LAND443@c4-n p243BG@c2-np ie1-crs	e1-76 1-crs pe1-76 crs [2M] pe1-76 e1-crs [	c2-corel	C2-rps1-crs [540]	c+frpe1-76 [	Aggregate	L. E.	
Find :		<b>11</b> 2↓	7 † ₽	· · ·	[					
Find : Severity	Ticket ID	Last Modificati	on Time 👌 🗸	Root .	Noot Event Time	Description	Location	Acknowledged	Creation Time	•
Find : Severity	360001	Last Modificati 27-Jun-11 13:	on Time	Root .	26-Jun-11 19:49:39	Description CPU utilization ex	c4-upe8	No	26-Jun-11 19:49:39	
Find :	360001 460001	Last Modificati 27-Jun-11 13: 27-Jun-11 13:	on Time	Root . V	26-Jun-11 19:49:39 27-Jun-11 12:16:40	Description CPU utilization ex CPU utilization ex	c4-upe8 c4-upe4	No	26-Jun-11 19:49:39 27-Jun-11 12:16:40	•
Find : Severity	360001 460001 440001	Last Modificati 27-Jun-11 13: 27-Jun-11 13: 27-Jun-11 13:	on Time	Root . V V	26-Jun-11 19:49:39 27-Jun-11 12:16:40 27-Jun-11 09:11:09	Description CPU utilization ex <sup>7</sup> CPU utilization ex <sup>7</sup> Port down due to. <sup>3</sup>	c4-upe8 c4-upe4 c2-core1#1	No No No	26-Jun-11 19:49:39 27-Jun-11 12:16:40 27-Jun-11 09:13:12	•
Find :	360001 460001	Last Modificati 27-Jun-11 13: 27-Jun-11 13:	n Time	Root . V	26-Jun-11 19:49:39 27-Jun-11 12:16:40	Description CPU utilization ex CPU utilization ex	c4-upe8 c4-upe4 c2-core1#1? c4-upe6	No	26-Jun-11 19:49:39 27-Jun-11 12:16:40	

Figure 18-44 VPLS Instance Overlay in Vision Window

- Step 5 To hide and view the overlay, click **Hide Overlay/Show Overlay** in the toolbar. The button toggles depending on whether the overlay is currently displayed or hidden.
- Step 6 To remove the overlay, choose Choose Overlay Type > None.

## **Viewing Pseudowire Tunnel Links in VPLS Overlays**

When a VPLS overlay is applied to a map in the Vision client, you can view the details of the pseudowires that are interconnected through selected links.

To view unidirectional or bidirectional pseudowire traffic links when a VPLS overlay is applied to a map:

Step 1 Right-click the required link in the overlay, and choose Show Callouts. The link must be visible (not dimmed) in the map.

Link information is displayed as shown in Figure 18-45.

Figure 18-45	Link Callout Window	for a VPLS Overlay

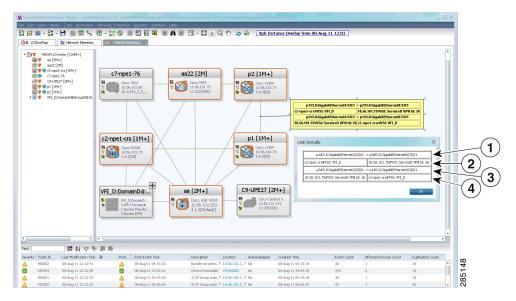
p1#3.0:GigabitEthernet0/3/0/6 -> c2-np	pe1-crs#0.7.0:GigabitEthernet0/7/0/0	1
c1-npe1-76#VSI: vl2051 VPN Id: 2051	c2-npe1-crs#VSI: vfi2051 VPN Id: 5	
c2-npe1-crs#0.7.0:GigabitEthernet0/7/0	)/0 -> p1#3.0:GigabitEthernet0/3/0/6	
c2-npe1-crs#VSI: vfi2051 VPN Id: 5 c2-npe1-crs#VSI: vfi2051 VPN Id: 5	c7-npe1-76#VSI: vl2051 VPN Id: 2051 c1-npe1-76#VSI: vl2051 VPN Id: 2051	037516

The callout window displays the following information for each link represented by the selected link:

- Link details and direction.
- Details of the sites using the link and the interlinks.
- **Step 2** To view the pseudowire link details, double-click the yellow callout window.

The details about the link are displayed in the Link Details window as shown in Figure 18-46.

Figure 18-46 Link Details Window for a VPLS Overlay



The Link Details window provides the following information:

1	Link details and direction. In this example, the link is from p1 to p2.
3	Link details and direction. In this example, the link is from p2 to p1.
2 and 4	Details of the pseudowire tunnel traversing this link.

**Step 3** Click **OK** to close the Link Details window.

Step 4 To close the link callout window, right-click the selected link, then choose Hide Callouts.

## **Viewing VPLS-Related Properties**

The Vision client enables you to view the properties of the following VPLS-related elements:

- VPLS instances—See Viewing VPLS Instance Properties, page 18-99.
- Virtual Switching Instances—Viewing Virtual Switching Instance Properties, page 18-100
- Tunnels—See Viewing VPLS Core or Access Pseudowire Endpoint Properties, page 18-102.
- Port connectors—See Viewing VPLS Access Ethernet Flow Point Properties, page 18-104.

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### **Viewing VPLS Instance Properties**

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To view the properties of a VPLS instance in the Vision client, open the VPLS Instance Properties window in either of the following ways:

- In the navigation pane or the map pane, right-click the VPLS instance and choose Properties.
- In the navigation pane or the map pane, select the VPLS instance and choose Node > Properties.

Figure 18-47 shows an example of the VPLS Instance Properties window.

Figure 18-47VPLS Instance Properties Window

pls For	wards 🛛 Access Pseudowires 🗍 Access	Flow Points			
		System Name	Bridge	VSI	Vpn Id
1	Service1:(477) VLAN0477@10.56.101.75	Service1:(477) VLAN0477@10.56.101.75	10.56.101.75 [Default context] (477) VLAN0477	10.56.101.75#V5I: Service1 VPN Id: 777	777
	Service1:(777) VLAN0777@c7-npe1-76	Service1:(777) VLAN0777@c7-npe1-76	c7-npe1-76 [Default context] (777) VLAN0777	c7-npe1-76#VSI: Service1 VPN Id: 777	777
	Service1:(852) VLAN0852@c1-npe1-76	Service1:(852) VLAN0852@c1-npe1-76	c1-npe1-76 [Default context] (852) VLAN0852	c1-npe1-76#VSI: Service1 VPN Id: 777	777
	Service1:DomainA@GroupA@c2-npe1-crs	Service1:DomainA@GroupA@c2-npe1-crs	c2-npe1-crs [Default context] DomainA@GroupA	c2-npe1-crs#VSI: Service1 VPN Id: 2	2

 Table 18-44 describes the information that is displayed for VPLS instance properties.

The tabs that appear in the window depend on the VPLS instance and its configuration.

Field	Description		
System Name	Name that Prime Network assigns to the VPLS instance.		
Name	User-defined name of the VPLS instance.		
	When the VPLS instance is created, the system name and this name are the same. If you change the name of the VPLS instance (right-click, then choose <b>Rename</b> ), the changed name appears in this field whereas the system name retains the original name.		
VPN ID	VPN identifier used in an MPLS network to distinguish between different VPLS traffic.		
VPLS Forwards Tab			
Name	User-defined name of the VPLS forward.		
System Name	Name that Prime Network assigns to the VPLS forward.		
Bridge	Bridge that the VSI is configured to use, hyperlinked to the bridge table in logical inventory.		
VSI	VSI hyperlinked to the relevant entry in logical inventory.		
VPN ID	VPN identifier for the VSI.		

 Table 18-44
 VPLS Instance Properties

Field	Description	
Access Pseudowires Tab		
Name	Pseudowire name.	
Port	VSI on which the pseudowire is configured, hyperlinked to the entry in logical inventory.	
Local Router IP	Local router IP address on which the pseudowire is configured.	
Tunnel ID	Virtual circuit identifier of the pseudowire.	
PTP Tunnel	Hyperlinked entry to the pseudowire properties in logical inventory.	
Peer Router IP	Peer router IP address on which the pseudowire is configured.	
Peer OID	Hyperlinked entry to the pseudowire properties of the peer.	
Pseudowire Type	Type of pseudowire, such as Ethernet, Ethernet Tagged, CESoPSN Basic, PPP, or SAToP.	
Pseudowire Edge Binding	Pseudowire endpoint association:	
Туре	• 0—Unknown	
	• 1—Connection termination point	
	• 2—Ethernet flow point	
	• 3—Switching entity	
	• 4—Pseudowire switching entity	
	• 5—VPLS forward	
Access Flow Points Tab		
Name	Access flow point name. Double-click to view port connector properties.	
Port	Interface configured as a flow point, hyperlinked to the interface in physical inventory.	

Table 18-44VPLS Instance Properties (continued)

### **Viewing Virtual Switching Instance Properties**

To view VSI properties in the Vision client, open the VSI properties window in either of the following ways:

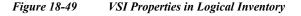
- Double-click the required device and, in the **Inventory** window, choose **Logical Inventory** > **VSIs** > *vsi*.
- In the navigation pane, expand the VPLS instance, right-click the required VPLS forward, and choose **Inventory** or **Properties**. (See Figure 18-48.)

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Figure 18-48	8 VPLS Forward in Vision Window Navigation Pane
<b>▼ Ⅲ ♥</b>	Service1:DomainA@GroupA@c2-npe1-crs [5M] 777@c9-npe1-9K
, <b></b> ,	7777@c4-npe1-76 A:DomainA@GroupA@c9-npe1-9K [2M]
	GigabitEthernet4/0/5 EFP: 477@c4-npe1-76 Service1:(477) VLAN0477@c4-npe1-76 Service1:DomainA@GroupA@c2-npe1-crs [1M]

If you right-click the VPLS forward and choose **Inventory**, the inventory window is displayed. If you right-click the VPLS forward and choose **Properties**, the VSI Properties window is displayed. The information displayed is the same for both options.

VSI properties are displayed as shown in Figure 18-49.



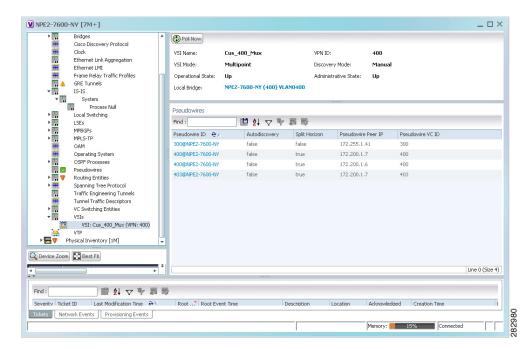


Table 18-45 describes the information that is displayed for the selected VSI.

Field	Description
VSI Name	VSI name.
VPN ID	VPN identifier used in an MPLS network to distinguish between different VPLS traffic.
VSI Mode	VSI mode: Point-to-Point (default) or Multipoint.
Discovery Mode	VSI discovery mode: Manual, BGP, LDP, RADIUS, DNS, MSS/OSS, or Unknown.
Operational State	VSI operational status: Up or Down.
Administrative State	VSI administrative status: Up or Down.
Local Bridge	Local bridge, hyperlinked to the bridge in logical inventory.
Pseudowires Table	· ·
Pseudowire ID	Pseudowire identifier, hyperlinked to the Tunnel Edges table under Pseudowires in logical inventory.
Autodiscovery	Whether the pseudowire was automatically discovered: True or False.
Split Horizon	SSH pseudowire policy that indicates whether or not packets are forwarded to the MPLS core: True or False.
Pseudowire Peer IP	IP address of the pseudowire peer.
Pseudowire VC ID	Pseudowire virtual circuit identifier.

Table 18-45VSI Properties in Logical Inventory

### **Viewing VPLS Core or Access Pseudowire Endpoint Properties**

Pseudowire endpoints are displayed under VPLS Instance (Access) or VPLS Forward (Core) in the Vision client navigation pane.

To view pseudowire endpoint properties for a VPLS instance, right-click the required pseudowire endpoint in the navigation pane, and choose **Properties**. (See Figure 18-50.)

Figure 18-50 VPLS Pseudowire in Vision Window Navigation Pane

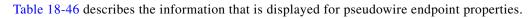
- 📰 🛡	Service1:DomainA@GroupA@c2-npe1-crs [5M]	
۱	777@c9-npe1-9K	
8	7777@c4-npe1-76	
> 🖬 🗸	A:DomainA@GroupA@c9-npe1-9K [2M]	
<->	GigabitEthernet4/0/5 EFP: 477@c4-npe1-76	-
▶ 🎫	Service1:(477) VLAN0477@c4-npe1-76	80
> 🎫 🗸	Service1:DomainA@GroupA@c2-npe1-crs [1M]	2820

Figure 18-51 shows an example of the Tunnel Properties window that is displayed.

Γ

Poll Now				
Port:	AGG-7604-TX#V5I: Cus_3466 VPN Id: 3466	Peer:	3466@NPE1-9K-NGN	
Peer VC Label:	16007	Status:	down	
Local VC Label:	0	Local Router IP:	172.255.3.175	
Peer Router IP:	172.200.1.1	Local MTU:		
Remote MTU:	1500	Pseudowire Type:	Ethernet	
Pseudowire Role:				
			Memory: 11% Con	nected

#### Figure 18-51 VPLS Tunnel Properties Window



Field	Description
Port	VSI on which the pseudowire is configured, hyperlinked to the VSI in logical inventory.
Peer	Hyperlinked entry to the pseudowire endpoint peer pseudowires in logical inventory.
Peer VC Label	MPLS label that is used by this router to identify or access the tunnel. It is inserted into the MPLS label stack by the peer router.
Tunnel Status	Operational state of the tunnel: Up or Down.
Local VC Label	MPLS label that is used to identify or access the tunnel. It is inserted into the MPLS label stack by the local router.
Local Router IP	IP address of this tunnel edge, which is used as the MPLS router identifier.
Tunnel ID	Identifier that, along with the router IP addresses of the two pseudowire endpoints, identifies the PWE3 tunnel.
Peer Router IP	IP address of the peer tunnel edge, which is used as the MPLS router identifier.
Local MTU	Size, in bytes, of the MTU on the local interface.
Remote MTU	Size, in bytes, of the MTU on the remote interface.
Signaling Protocol	Protocol used by MPLS to build the tunnel, such as LDP or TDP.
Pseudowire Type	Type of pseudowire, such as Ethernet, Ethernet Tagged, CESoPSN Basic, PPP, or SAToP.

Table 18-46Tunnel Properties Window

### Viewing VPLS Access Ethernet Flow Point Properties

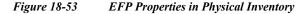
The ports that represent the attachment circuits to VPLS instances are displayed under VPLS instances in the Vision client navigation pane.

To view the properties for the Access Ethernet Flow Points configured for a VPLS instance, right-click the required interface in the navigation pane, and choose **Inventory**. (See Figure 18-52.)

Figure 18-52 VPLS Interface in Vision Window Navigation Pane



Figure 18-53 shows an example of the information displayed for the interface in physical inventory.



	Slot 2: Card - 7600-SIP-400	Pol No					
*	Subslot 0: Subcard - SPA-24CHT						
P	Slot 3: Card - WS-X6748-GE-TX	-Location I	nformation				
	Slot 4: Card - 76-E5+XC-40G3C [3M	Type:	Pluggab	le Location:	4.GigabitEthernet4/2		
	Subslot 3: Subcard - 7600-ES+4	Contra		Port Alias:	ci-hant tain		
	Subslot 6: Subcard - 7600-ES+3	Sending	Alarms: true	Port Allas:	GigabitEthernet4/2		
-15	GigabitEthernet4/1	Manager	d: true	Status:	OK		
-15	GigabitEthernet4/2						
5	GigabitEthernet4/3 - No Transce	a Disal	ole Sending Alarms				
15	GigabitEthernet4/4 - No Transce	Thursday 1	Transceiver				
15	GigabitEthernet4/5 - No Transce	Pluggable	Transceiver				
-6		Connect	or Type:	Fiber Optic	Pluggable Type: SFP		
1	GigabitEthernet4/7 - No Transce	Connect	or Description:	T 10	00Base5X Gi4/2 PID: SFP-I	55 G	
-16	GigabitEthernet4/8 - No Transce					uc-3	
-16	GigabitEthernet4/9	Connect	or Serial Number:	FN51347118X	Pluggable Port State: In		
-15	GigabitEthernet4/10						
-16	GigabitEthernet4/11 - No Transc						
-6	GigabitEthernet4/12 - No Transc						
-63	GigabitEthernet4/13 - No Transc	-Gigabit Et	hernet				
-6	GigabitEthernet4/14 - No Transc	MAC Add	tress: 00 1E F7 F	6 C 5 00 Ether	net LMI Enabled: false		
-16	GigabitEthernet4/15 - No Transc						
12.0							
-6	GigabitEthernet4/16 - No Transc						
- 6	GigabitEthernet4/16 - No Transc GigabitEthernet4/17						
· [6	GigabitEthernet4/16 - No Transc GigabitEthernet4/17 GigabitEthernet4/18 - No Transc	-Discovery	Protocols				
ی- ای- ای-	GigabitEthernet4/16 - No Transc GigabitEthernet4/17 GigabitEthernet4/18 - No Transc GigabitEthernet4/19	Discovery	Protocols				
3)- 31- 31- 31- 31- 31- 31- 31- 31- 31- 31	GigabitEthernet4/16 - No Transc GigabitEthernet4/17 GigabitEthernet4/18 - No Transc GigabitEthernet4/19 GigabitEthernet4/20						
	GigabitEthernet4/16 - No Transc GigabitEthernet4/17 GigabitEthernet4/18 - No Transc GigabitEthernet4/19 GigabitEthernet4/20 7 TenGigabitEthernet4/21 - No Tra	End		<b>₫ <u>१</u> ⊽</b> 1	1 章 章		
3)- 31- 31- 31- 31- 31- 31- 31- 31- 31- 31	GigabitEthernet4/16 - No Transc GigabitEthernet4/17 GigabitEthernet4/18 - No Transc GigabitEthernet4/19 GigabitEthernet4/20 7 TenGigabitEthernet4/21 - No Tra	Find :			レント 日本 日本 Alexandra Ale	Binding ⊕∕.	Description
6) 6) 6) 7 6) 7 6)	GigabiEthernet4/16 - No Transc GigabiEthernet4/17 GigabiEthernet4/19 GigabiEthernet4/20 TerGigabiEthernet4/20 TerGigabiEthernet4/22 - No Tra TerGigabiEthernet4/22 - No Tra	Find :				Binding	Description
	GigabiEthernet4/16 - No Transc GigabiEthernet4/17 GigabiEthernet4/19 GigabiEthernet4/20 TerGigabiEthernet4/20 TerGigabiEthernet4/22 - No Tra TerGigabiEthernet4/22 - No Tra	Find : EFP ID 3450	Operational State	VLAN Inner		3450@AGG-7606-TX	Description
6) 6) 6) 7 6) 7 6)	GigabiEthernet4/16 - No Transc GigabiEthernet4/17 GigabiEthernet4/19 GigabiEthernet4/20 TerGigabiEthernet4/20 TerGigabiEthernet4/22 - No Tra TerGigabiEthernet4/22 - No Tra	Find : EFP ID 3450	Operational State Up	VLAN Inner V 3450			Description
6) 6) 6) 7 6) 7 6)	GigabiEthernet4/16 - No Transc GigabiEthernet4/17 GigabiEthernet4/19 GigabiEthernet4/20 TerGigabiEthernet4/20 TerGigabiEthernet4/21 - No Tra TerGigabiEthernet4/22 - No Tra	Find : EFP ID 3450	Operational State Up	VLAN Inner V 3450		3450@AGG-7606-TX	Description
6) 6) 6) 7 6) 7 6)	GgobbEthmen4/16 - No Tranc GgobbEthmen4/17 GgobbEthmen4/17 GgobbEthmen4/18 - No Trans GgobbEthmen4/19 TencigobbEthmen4/12 - No Tra PendigbbEthmen4/12 - No Tra Best Fr	Find : EFP ID 3450	Operational State Up	VLAN Inner V 3450		3450@AGG-7606-TX	
6) 6) 6) 7 6) 7 6)	GigabiEthernet4/16 - No Transc GigabiEthernet4/17 GigabiEthernet4/19 GigabiEthernet4/20 TerGigabiEthernet4/20 TerGigabiEthernet4/21 - No Tra TerGigabiEthernet4/22 - No Tra	Find : EFP ID 3450 3451	Operational State Up	VLAN Inner V 3450		3450@AGG-7606-TX	
6) 6) 6) 7 6) 7 6)	GgobbEthmen4/16 - No Tranc GgobbEthmen4/17 GgobbEthmen4/17 GgobbEthmen4/18 - No Trans GgobbEthmen4/19 TencigobbEthmen4/12 - No Tra PendigbbEthmen4/12 - No Tra Best Fr	Find : EFP ID 3450	Operational State Up	VLAN Inner V 3450		3450@AGG-7606-TX	Description
6) 6) 6) 7 6) 7 6)	GgobbEthmen4/16 - No Tranc GgobbEthmen4/17 GgobbEthmen4/17 GgobbEthmen4/18 - No Trans GgobbEthmen4/19 TencigobbEthmen4/12 - No Tra PendigbbEthmen4/12 - No Tra Best Fr	Find : EFP ID 3450 3451	Operational State Up	VLAN Inner V 3450		3450@AGG-7606-TX	
evice Zoom	Ggdb82thmer4/16 - No Trans Ggdb82thmer4/17 Ggdb82thmer4/18 - No Trans Ggdb82thmer4/18 - No Trans Ggdb82thmer4/19 TerrGgdb82thmer4/22 - No Tre TerrGgdb82thmer4/22 - No Tre Best Fil	Find : EFP ID 3450 3451 EFPs	Operational State Up	VLAN Inner V 3450		3450@AGG-7606-TX	
6) 6) 6) 7 6) 7 6)	GgobbEthmen4/16 - No Tranc GgobbEthmen4/17 GgobbEthmen4/17 GgobbEthmen4/18 - No Trans GgobbEthmen4/19 TencigobbEthmen4/12 - No Tra PendigbbEthmen4/12 - No Tra Best Fr	Find : EFP ID 3450 3451 EFPs	Operational State Up Up	VLAN Inner V 3450	ILAN Translated VLAN Translated Inner VLAN	3450@AGG-7606-TX AGG-7606-TX (3451) VLAN3451	Line 0 (Size 2
evice Zoom	Gigabitithmen4/16 - No Trans Gigabitithmen4/17 Gigabitithmen4/18 - No Trans Gigabitithmen4/18 - No Trans Gigabitithmen4/19 Tendigabitithmen4/122 - No Tra Best Fe	Find : EFP ID 3450 3451 EFPs	Operational State Up Up	VLAN Inner V 3450		3450@AGG-7606-TX AGG-7606-TX (3451) VLAN3451	

The information displayed in this window is the same as that displayed when the interface is selected in physical inventory.

The following information is displayed, depending on the interface and its configuration:

- Location and interface details.
- Technology-related information, such as Ethernet CSMA/CD or ATM IMA properties.
- VLAN configuration details.
- List of the configured subinterfaces on the port. For more information on the Subinterfaces table, see Drilling Down Into a Port's Configuration Details (Including Services and Subinterfaces), page 8-17.

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- List of the configured EFPs on the port. For more information on the EFPs table, see Viewing EFP Properties, page 18-51.
- List of VLAN mappings configured on the port. For more information about the VLAN Mappings table, see Viewing VLAN Mappings, page 18-70.

# **Configuring VFI Autodiscovery and Signaling**

The following commands enable you to configure VFI autodiscovery and signalling at the device level or at the VSI Level. To find out if a device supports these commands, see the Cisco Prime Network 5.0 Supported Cisco VNEs.

Command	Navigation	Description
Configure VFI Autodiscovery and Signaling	Logical Inventory > right-click the VSI > Commands > Configuration > Configure VFI Autodiscovery and Signaling	Use this command to configure Autodiscovery and Signaling at the VFI level.
	Right-click the ASR 9000 series device > Commands > Configuration > Configure VFI Autodiscovery and Signaling	Use this command to configure Autodiscovery and Signaling at the device level.

# Working with Pseudowires

Prime Network supports the discovery and modeling of Any Transport over MPLS (AToM) and Ethernet over MPLS (EoMPLS) domains that span multisegment pseudowires. After discovery is complete, you can add any of the pseudowires to a map, view their properties in logical inventory, or view their redundancy status. For information on the devices that support pseudowire technology, refer to *Cisco Prime Network 5.0 Supported Cisco VNEs*.

The following topics describe the options available to you for working with pseudowires in Prime Network:

- Adding Pseudowires to a Map, page 18-106
- Viewing Pseudowire Properties, page 18-108
- Displaying Pseudowire Information, page 18-110
- Viewing Pseudowire Redundancy Service Properties, page 18-111
- Applying Pseudowire Overlays, page 18-113
- Monitoring the Pseudowire Headend, page 18-115

# Adding Pseudowires to a Map

You can add a pseudowire that Prime Network discovers to maps as required. To add a pseudowire to a map:

- **Step 1** In the Vision client, select the required map or domain.
- Step 2 Open the Add Pseudowire to *map* dialog box in either of the following ways:
  - In the toolbar, choose Add to Map > Pseudowire.
  - In the menu bar, choose File > Add to Map > Pseudowire.

Figure 18-54 shows an example of the Add Pseudowire dialog box.

Figure 18-54 Add Pseudowire Dialog Box

⊙ Sh		I-npe1-76	Go
Availa	ble Pseudowires as of [17-Jun-11	15:14] 🕲	
Find :	1 2 7	12 12	
Name		System Name 🛛 🔂 🛆	Descrip
2	5@c1-npe1-76	5@c1-npe1-76	
2	8@c1-npe1-76	8@c1-npe1-76	
2	99@C9-AGG20	99@C9-AGG20	
2	234@10.56.101.75	234@10.56.101.75	
2	333@10.56.101.75	333@10.56.101.75	
8	666@c9-npe1-9K	666@c9-npe1-9K	
2	777@c9-npe1-9K	777@c9-npe1-9K	
8	1231@c1-npe1-76	1231@c1-npe1-76	
8	1234@c1-npe1-76	1234@c1-npe1-76	
8	1900@C9-AGG20 1900@c9-npe1-9K	1900@C9-AGG20 1900@c9-npe1-9K	
2	2350@c1-npe1-76	2350@c1-npe1-76	
8	2450@c1-npe1-76	2450@c1-npe1-76	
8	9999@c1-npe1-76	9999@c1-npe1-76	
8	12345@10.56.101.75	12345@10.56.101.75	
8	23972@10.56.101.75	23972@10.56.101.75	
8	23972@c1-nne1-76	23972@c1-ppe1-76	
•		Line (	(Size 271)
		ОК	Cancel



- To search for specific elements:
  - a. Choose Search.

**b.** To narrow the display to a range of pseudowire or a group of pseudowires, enter a search string in the search field.

c. Click Go.

For example, if you enter pseudo1, the pseudowires that have names containing the string "pseudo1" are displayed.

• To view all available pseudowires, choose Show All and click Go.

The pseudowires that meet the specified search criteria are displayed in the Add Pseudowire dialog box in table format. The dialog box also displays the date and time at which the list was generated. To update the list, click **Refresh**.

**Note** If an element is not included in your scope, it is displayed with the locked device icon.

For information about sorting and filtering the table contents, see Viewing a Table of NEs and Their Properties (List View), page 7-7.

- Step 4 In the Add Pseudowire dialog box, select the pseudowires that you want to add. You can select and add multiple pseudowires by pressing Ctrl while selecting individual pseudowires or by pressing Ctrl +Shift to select a group of pseudowires.
- Step 5 Click OK.

The pseudowire is displayed in the navigation pane and in the content area. In addition, any associated tickets are displayed in the ticket pane. See Figure 18-55.

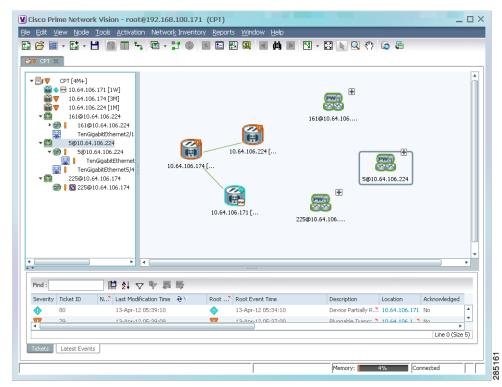


Figure 18-55 Pseudowire in Vision Map

**Step 6** Click the pseudowire in the navigation pane or double-click the pseudowire in the map pane to view the pseudowire components, such as pseudowire endpoints, pseudowire switching entities, and terminating interfaces.

Figure 18-56 shows an example of an expanded pseudowire in the Vision client.

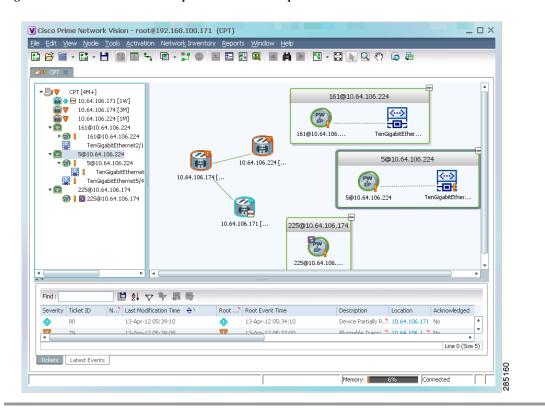


Figure 18-56 Pseudowire Components in Vision Maps

The pseudowire information is saved with the map in the Prime Network database.

### **Pseudowire discovery**

As explained earlier, a pseudowire is a point-to-point connection between pairs of provider edge (PE) routers.

In a PW-HE configuration, the network PseudoWire service will include pseudowire edges. One of these edges will be connected to a dedicated ethernet flow point that will represent the pseudowire headend port.

## **Viewing Pseudowire Properties**

To view pseudowire properties:

- **Step 1** In the Vision client, select the required map or domain.
- Step 2 To view pseudowire endpoint properties configured on an element:
  - a. In the navigation or map pane, right-click the required element and then choose Inventory.
  - **b.** In the **Inventory** window, choose **Logical Inventory** > **Pseudowires**.

The Tunnel Edges table is displayed, listing the pseudowire endpoints configured on the selected element. For a description of the information contained in the Pseudowires Tunnel Edges table, see Table 17-29.

- **Step 3** To view the properties of a pseudowire that you added to a map, do either of the following:
  - If the pseudowire icon is of the largest size, click the **Properties** button.
  - Right-click the element, and then choose Properties.

The Pseudowire Properties window is displayed as shown in Figure 18-57.

#### Figure 18-57 Pseudowire Properties Window

230@MW2	941-5 230@sol-dist-1 - Pseudo	wire Properties		_ 🗆 ×
Name: System Name:	230@MW2941-5 230@sol-dist-1 230@MW2941-5 230@sol-dist-1	Multisegment Pseudowire: Pseudowire Type:	false SAToP E1	
				ç
			Memory: 4% Connect	ed 🚺

Table 18-47 describes the information presented in the Pseudowire Properties window.

#### Table 18-47Pseudowire Properties Window

Field	Description
Name	Name of the pseudowire.
Multisegment Pseudowire	Whether or not the pseudowire is multisegment: True or False.
System Name	Internal or system-generated name of the pseudowire.
Pseudowire Type	Type of pseudowire, such as Ethernet, Ethernet Tagged, CESoPSN Basic, PPP, or SAToP.

**Step 4** To view the properties of a pseudowire endpoint associated with a pseudowire, right-click the required pseudowire endpoint, and then choose **Properties**.

The Tunnel Properties window containing the pseudowire endpoint properties is displayed as shown in Figure 18-51 and described in Table 18-46.

**Step 5** To view the properties of a pseudowire switching entity associated with the pseudowire, select the switching entity, and then choose **Node > Inventory**.

The Local Switching table is displayed as shown in Figure 18-42.

Table 18-43 describes the information displayed in the Local Switching table.

**Step 6** To view the properties of the pseudowire endpoint that terminates on the subinterface, right-click the required interface, and then choose **Properties**.



**Note** The selected port must be an Ethernet subinterface for the Contained Current CTPs table to be displayed.

Table 18-48 describes the information displayed in the Contained Current CTPs table.

Field	Description
Local Interface	The name of the subinterface or port, hyperlinked to the interface in physical inventory.
ID	The tunnel identifier, hyperlinked to Pseudowires Tunnel Edges table in logical inventory.
Peer	The peer tunnel identifier, hyperlinked to the peer pseudowire tunnel in logical inventory.
Tunnel ID	The identifier that, along with the router IP addresses of the two tunnel edges, identifies the tunnel.
Tunnel Status	The operational state of the tunnel: Up or Down.
Local Router IP	The IP address of this tunnel edge, which is used as the router identifier.
Peer Router IP	The IP address of the peer tunnel edge, which is used as the router identifier.
Pseudowire Type	Type of pseudowire, such as Ethernet, Ethernet Tagged, CESoPSN Basic, PPP, or SAToP.
Local MTU	The size, in bytes, of the MTU on the local interface.
Remote MTU	The size, in bytes, of the MTU on the remote interface.
Local VC Label	The MPLS label that is used by this router to identify or access the tunnel. It is inserted in the MPLS label stack by the local router.
Peer VC Label	The MPLS label that is used by this router to identify or access the tunnel. It is inserted in the MPLS label stack by the peer router.
Signaling Protocol	The protocol used to build the tunnel, such as LDP or TDP.
Preferred Path Tunnel	The path to be used for pseudowire traffic.

	Table 18-48	Contained Current CTPs Table
--	-------------	------------------------------

Step 7 To view the properties of an Ethernet flow point associated with the pseudowire, right-click the EFP and then choose Properties.

See Viewing EFP Properties, page 18-51 for the information that is displayed for EFPs.

## **Displaying Pseudowire Information**

Use the following procedure to view Virtual Circuit Connectivity Verification (VCCV) and Control Channel (CC) information for a pseudowire endpoint. Your permissions determine whether you can run these commands (see Permissions for Managing Carrier Ethernet, page B-12). To find out if a device supports these commands, see the *Cisco Prime Network 5.0 Supported Cisco VNEs*.

- **Step 1** In the require map, double-click the required device configured for pseudowire.
- Step 2 In the Inventory window, choose Logical Inventory > Pseudowire.
- Step 3 In the Tunnel Edges table, right-click the required interface and choose Commands > Show > Display Pseudowire.

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- **Step 4** In the Display Pseudowire dialog box, preview or execute the command. The following information is displayed:
  - The element name.
  - The command issued.
  - The results, including:
    - VCCV: CC Type—The types of CC processing that are supported. The number indicates the position of the bit that was set in the received octet. The available values are:
      - CW [1]-Control Word
      - RA [2]—Router Alert
      - TTL [3]—Time to Live
      - Unkn [x]—Unknown
    - Elapsed time—The elapsed time, in seconds.
- Step 5 Click Close to close the Display Pseudowire dialog box.

### Viewing Pseudowire Redundancy Service Properties

If a pseudowire is configured for redundancy service, a redundancy service badge is applied to the secondary (backup) pseudowire in the navigation and map panes in the Vision client. Additional redundancy service details are provided in the inventory window for the device on which the pseudowire is configured.

To view redundancy service properties for pseudowires:

**Step 1** To determine if a pseudowire is configured for redundancy service, expand the required pseudowire in the navigation or map pane.

If the pseudowire is configured for redundancy service, the redundancy service badge appears in the navigation and map panes as shown in Figure 18-58.

Edit <u>V</u> iew <u>N</u>	ode <u>T</u> ools <u>A</u> ctivation Netv	vor <u>k</u> Invento	ry <u>R</u> eports <u>W</u> indow <u>H</u> elp					
🔗 🔛 - 💾	N 🗉 🖌 🖻 - 📰	🕼 t 🗄	: 🖽 🔍 🔳 🏘 💌 🖻 -	- 🖾 🕟 🔍 🥙	) 🗔 🛱			
34640           33660           33660           34640           33660           34640           33660           34610           34610           34610           34610           34610           34610           34610           34610           34610           34610           34610           34610           34650<	AGG: 7006-TX - 3464@NPE2-9K-N NPE1-9K-NSH NPE1-9K-NSH NPE2-9K-NSH NPE2-9K-NSH NPE2-9K-NSH MACP_CL3464@EOMPLS@NPE2- EatinkAggregation20 EFP: 3464 NGG: 7606-TX - 3464@EOMPLS@NPE2- DataLinkAggregation20 EFP: 3464 NGG: 7606-TX - 3465@NPE2-9K-N NPE1-9K-NSH NPE2-9		3464@NPE2-	172.255.3 172.200.1.2			AkAggregation2 Service Instance dottq 3464 CLus3464@EO MLACP_Cus3464@EC	•
:	Last Modification Time		Root Event Time	B 111	1			- 1 C
		Root	ROOT EVENT TIME	Description	Location	Acknowledged	Creation Time	Event C
arity Ticket ID	-		10-3d-11 12(4E)22	CPI Lutilization le 🚿	DE2-TV-7201	No	19.34.1112/45/22	10
rity Ticket ID 190018 160026	18-Jul-11 14:17:53 18-Jul-11 14:17:09	<ul> <li></li> <li></li> </ul>	18-Jul-11 13:45:22 18-Jul-11 05:22:03	CPU utilization le		No	18-Jul-11 13:45:22 18-Jul-11 05:24:03	10 240

Figure 18-58 Pseudowire Redundancy Service Badge in a Map

Step 2 To view additional details, in the map, double-click the element with the redundancy service badge.The PTP Layer 2 MPLS Tunnel Properties window is displayed as shown in Figure 18-59 and shows that the selected pseudowire has a Secondary role in a redundancy service.

Figure 18-59 Layer 2 MPLS Tunnel Properties for Pseudowire Redundancy Service

Poll Now		IPLS Tunnel Properti					_ 🗆 ×
POILING							
Port:	AGG-7604-TX#Aggrega	tion Group 20 EFP:3464	Peer:		3464@NPE2-9K-NGN		
Peer VC Label:	17368		Status:		down		
Local VC Label:	77		Local Router IP:		172.255.3.175		
Peer Router IP:	172.200.1.2		Local MTU:		1500		
Remote MTU:	1500		Pseudowire Type:		Ethernet Tagged		
Pseudowire Role:	Secondary						
Associated Pseudo			*****				
Find :	owires ∎ ⊉↓ ▽ ♥						
							1
Local Interface 🛛 😌				Status		Preferred Path Tunnel	Local Ro
AGG-7604-TX#Aggr	egation Group 20 EFP:3464	3464@AGG-7604-TX	3464@NPE2-9K-NGN	down	Secondary		172.255
4							Þ
•						Line	0 (Size 1)
				M	emory: 9%	Connected	

Step 3 In the PTP Layer 2 MPLS Tunnel Properties window, click the VC ID hyperlink.

The Tunnel Edges table in logical inventory is displayed, with the local interface selected in the table. (See Figure 18-60.)

🖄 🖤 🛛 AGG	5-7604-TX [5M]	*	Poll Now				
<u> </u>	Logical Inventory [2M]						
>	Access Gateway		Tunnel Edges				
	Access Lists		Find : 📑 🛃 💎 🧤 🖡	- <b>-</b>			
	ATM Traffic Profiles Bidirectional Forwarding Detection		Local Interface	VCID 0	Peer	Status	Pseudowire Role
▶ ■	Bridges		AGG-7604-TX#2.0:GigabitEthernet2/0/0 EFP:3450	3450@AGG-7604-TX	3450@NPE2-9K-TX	down	
	Cisco Discovery Protocol		AGG-7604-TX#VSI: Cus 3456 VPN Id: 3456	3456@AGG-7604-TX	3456@AGG-7606-TX	up	
۳ 🌉 ۲	Clock [2M]		AGG-7604-TX#VSI: Cus 3456 VPN Id: 3456	3456@AGG-7604-TX	3456@NPE1-9K-NGN	up	
55	Ethernet Link Aggregation Ethernet LMI		AGG-7604-TX#V5I: Cus 3456 VPN Id: 3456	3456@AGG-7604-TX	3456@NPE2-9K-NGN	up	
	Frame Relay Traffic Profiles		AGG-7604-TX#VSI: Cus 3457 VPN Id: 3457	3457@AGG-7604-TX	3457@AGG-7606-TX	up	
•	ICCP Redundancy		AGG-7604-TX#V5I: Cus_3457 VPN Id: 3457	3457@AGG-7604-TX	3457@NPE1-9K-NGN	up	
▶ ■	IS-IS		AGG-7604-TX#V51: Cus_3457 VPN Id: 3457	3457@AGG-7604-TX	3457@NPE2-9K-NGN	up	
	Local Switching					1	
) 	LDES MPBGPs		AGG-7604-TX#V5I: Cus_3461 VPN Id: 3461	3461@AGG-7604-TX	3461@NPE2-9K-NGN	up	
►	MPLS-TP		AGG-7604-TX#V5I: Cus_3461 VPN Id: 3461	3461@AGG-7604-TX	3461@AGG-7606-TX	up	
	OAM		AGG-7604-TX#V5I: Cus_3461 VPN Id: 3461	3461@AGG-7604-TX	3461@NPE1-9K-NGN	up	
	Operating System			3462@AGG-7604-TX	3462@NPE1-9K-NGN	up	Primary
<u>ا</u>	OSPF Processes		AGG-7604-TX#Aggregation Group 20 EFP:3462	3462@AGG-7604-TX	3462@NPE2-9K-NGN	up	Secondary
Pseudowires     Resilient Ethernet Protocol			3463@AGG-7604-TX	3463@NPE1-9K-NGN	up	Primary	
•	Routing Entities		AGG-7604-TX#Aggregation Group 20 EFP:3463	3463@AGG-7604-TX	3463@NPE2-9K-NGN	up	Secondary
•	Spanning Tree Protocol	U	AGG-7604-TX#Aggregation Group 20 EFP:3464	3464@AGG-7604-TX	3464@NPE2-9K-NGN	down	Secondary
••	Traffic Engineering Tunnels			3464@AGG-7604-TX	3464@NPE1-9K-NGN	standby	Primary
•	Tunnel Traffic Descriptors VC Switching Entities			3465@AGG-7604-TX	3465@NPE1-9K-NGN	standby	Primary
' ER	VC SWitching Endlies	•	AGG-7604-TX#Aggregation Group 20 EFP:3465	3465@AGG-7604-TX	3465@NPE2-9K-NGN	down	Secondary
Device Zoon	n 💽 Best Fit		AGG-7604-TX#V5I: Cus_3466 VPN Id: 3466	3466@AGG-7604-TX	- 3466@AGG-7606-TX	standby	
)			AGG-7604-TX#V5I: Cus 3466 VPN Id: 3466	3466@AGG-7604-TX	3466@NPE1-9K-NGN	standby	
			AGG-7604-TX#V51: Cus_3466 VPN Id: 3466	3466@AGG-7604-TX	3466@NPE2-9K-NGN	standby	
			AGG/004-1X#V51: Cds_5466 VPN 10: 5466	3400@AGG-7604-1X	2400@IWPE2-9K-IVGIV	scalluby	•
4		Þ					Line 22 (1 / 22 Selecte
Find :	副外文学家		L				
	work Events Provisioning Events						

Figure 18-60 Pseudowire Redundancy Service in Logical Inventory

The entries indicate that the selected tunnel edge has a Secondary role in the first VC and a Primary role in the second VC.

For more information about the Pseudowires Tunnel Edges table, see Table 17-29.

# **Applying Pseudowire Overlays**

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A pseudowire overlay allows you to isolate the parts of a network that are used by a specific pseudowire. To apply a pseudowire overlay:

Step 1 In the Vision client, choose the map in which you want to apply an overlay.

**Step 2** From the toolbar, choose **Choose Overlay Type > Pseudowire**.

Figure 18-61 shows an example of the Select Pseudowire Overlay for map dialog box.

Amaila	ble Pseudowires as of [23-Jun-11 14	usol 🙆	
Find :			
Name	,	System Name De	escri
8	63@CR5_Sim	63@CR5_Sim	
2	99@C9-AGG20	99@C9-AGG20	
8	102@CR5_Sim	102@CR5_Sim	
8	103@CR5_Sim	103@CR5_Sim	
8	234@c4-npe1-76	234@c4-npe1-76	
8	333@c4-npe1-76	333@c4-npe1-76	
8	666@c9-npe1-9K	666@c9-npe1-9K	
8	777@10.56.101.137	777@10.56.101.137	
2	777@c9-npe1-9K	777@c9-npe1-9K	
8	988@10.56.101.137	988@10.56.101.137	
2	1900@C9-AGG20 1900@c9-npe1-9K	1900@C9-AGG20 1900@c9-npe1-9K	
2	2350@10.56.101.137	2350@10.56.101.137	
2	2450@10.56.101.137	2450@10.56.101.137	
2	3400@10.56.101.137	3400@10.56.101.137	
2	3401@10.56.101.137	3401@10.56.101.137	
8	12345@c4-npe1-76	12345@c4-npe1-76	

#### Figure 18-61 Select Pseudowire Overlay Dialog Box

**Step 3** Select the required pseudowire for the overlay.

#### Step 4 Click OK.

The elements being used by the selected pseudowire are highlighted in the map while the other elements are dimmed, as shown in Figure 18-62.

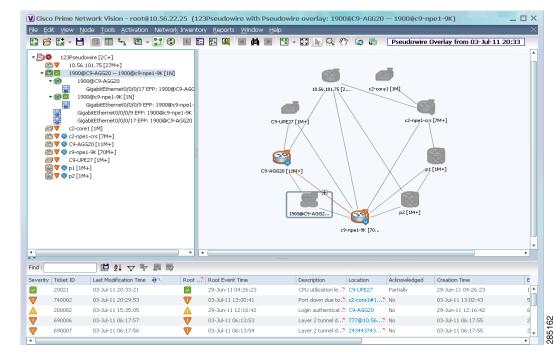


Figure 18-62 Pseudowire Overlay in Vision Window

- Step 5 To hide and view the overlay, click **Hide Overlay/Show Overlay** in the toolbar. The button toggles depending on whether the overlay is currently displayed or hidden.
- Step 6 To remove the overlay, choose Choose Overlay Type > None.

## **Monitoring the Pseudowire Headend**

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A pseudowire (PW) is an emulation of a point-to-point connection over a packet-switching network (PSN). It operates over a uniform packet-based access/aggregation network. The composite L2 AC and the PW segment together form a point-to-point virtual CE-PE link that functions like a traditional CE-PE link technology.

Figure 18-63 displays a typical pseudowire deployment over core network and Figure 18-64 displays a pseudowire deployment over access network.

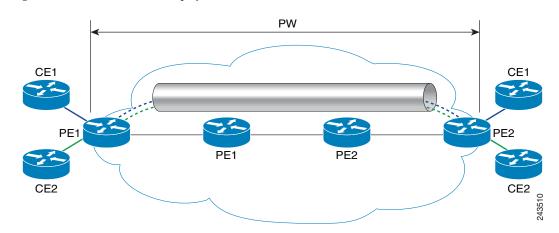
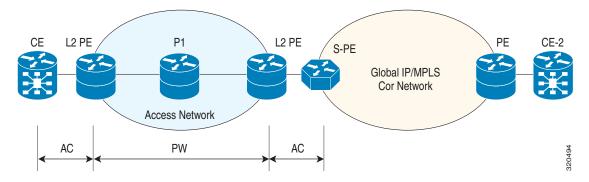


Figure 18-63 Pseudowire Deployment Over Core Network

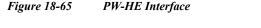
Figure 18-64 Pseudowire Deployment Over Access Network

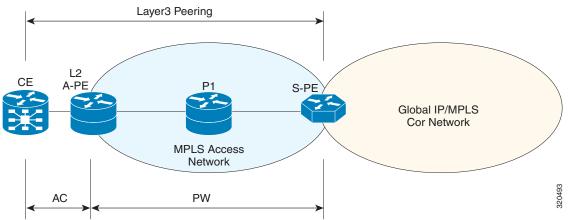


A pseudowire headend (PW-HE) virtual interface originates as a PW on an access node and terminates on a Layer 3 service instance on the service provider router. For example, a PWHE can originate on the Layer 2 PW feeder node and terminate on a VRF instance on the Cisco CRS Router. You can configure all ingress and egress QoS function on the PW-HE interface, including policing, shaping, queuing, and hierarchical policies.

In other words, the PW-HE is a technology that allows termination of access or aggregation pseudowires into an L2 or L3 domain. It allows us to replace a 2-node solution with a 1-node solution. Without a PW-HE, a L2 PE node must terminate a PW and then handoff the data to a S-PE via an Access Circuit.

The following figure displays the PW-HE interface:





The PW-HE interface is treated like any existing L3 interface and operates on one of the following nodes:

- Bridged interworking (VC type 5 or 4) node—PW will carry customer Ethernet frames with IP payload. The S-PE device must perform ARP resolution for customer IP addresses learnt over PW-HE, which acts as a broadcast interface.
- IP interworking node (VC type 11)—The PW-HE acts as a point-to-point interface. Hence, there will be two types of PW-HE interface-PW-Ether and PW-IW. These PW's can terminate into a VRF or the IP global table on SP-E.

### **Viewing the PW-HE configuration**

To view the PW-HE configuration:

- Step 1 Right-click the required device in the Vision client and choose Inventory.
- **Step 2** In the logical inventory window, choose **Logical Inventory > PW-HE**. The list of PW-HE interfaces configured in Prime Network are displayed in the content pane.
- Step 3 From the **PW-HE** node, choose a PW-HE interface. The PW-HE interface details are displayed in the content pane as shown in Figure 18-66.

asr9k satellit						_ 🗆 ×
	BNG	Poll Now				
	Bridges Cisco Discovery Protocol		BUL BI 100			
	Clock	Interface Name	PW-Ether100	Admin State:	Down	
•	Dynamic Config Templates	Oper State:	Down	IP Interface:	asr9k satellite VRF Cust_1 IP:PW-Ether100	
	Ethernet Link Aggregation	Pseudowire:	100@asr9k satellite	Generic Interface List:	Cust_1	
	Ethernet LMI	MTU:	1514	Bandwidth:	10.0 Mbps	
	IP Pools					
	IS-IS Link Layer Discovery Protocol	MAC Address:	D8 67 D9 14 DD FD	Label:	16000	
	Link Layer Discovery Protocol	L2 Overhead:	0			
	LSEs					
	Modular OS					
	MPBGPs					
► <b>■</b>	MPLS-TP					
► <b>■</b>	Multicast					
	OAM					
►	OSPE Processes					
	Policy Container					
	Pseudowires	1				
- 🔳 😈	PW HE					
	PW-Ether13					
	PW-Ether100					
III 🐨	PW-Ether200					
	PW-Ether300					
<b>. . .</b>						
> 🗮 👘	PW-HE Generic Interfaces Lists					
•	Qo5					
	Routing Entities					
		<u> </u>				
Device Zoom	St Best Fit					
		-				
		• •				
Find :	🏥 🋃 🗸 🎙 🎜	5				
	• In No. 140 10 10		le re re	n : r	la se les se les sons	
Tickets Networ	rk Events Provisioning Events					
					Memory: 9% Connected	
				1	, , ,,	1.1

Figure 18-66 PW-HE Configuration Details

Table 18-49 displays the PW-HE interface details.

Field	Description
Interface Name	The unique name to identify the PW-HE interface.
Admin State	The administrative state of the PW-HE, which can be any one of the following: • Up
	• Down
Oper State	The operational state of the PW-HE, which can be any one of the following:
	• Up
	• Down
IP Interface	The IP interface for the PW-HE, which when clicked will take you either to the associated VRF interface site under the VRF node or the associated IP Interface under the Routing Entity node.
Pseudowire	The pseudowire to which the PW-HE is associated with, which when clicked will take you to the <b>Pseudowire</b> node.
Generic Interface List	The generic interface list linked to the PW-HE, which when clicked will take you to the relevant node under the <b>PW-HE Generic Interfaces Lists</b> node.
MTU	The maximum number of transmission units (in bytes) for the PW-HE interface.
Bandwidth	The bandwidth (in kbits) for the PW-HE interface.
MAC Address	The MAC address specified for the PW-HE interface, which is generally in the xxx.xxx format.
Label	The MPLS label for the PW-HE interface.
L2 Overhead	The layer 2 overhead (in bytes) configured on the PW-HE interface, which can be any value between 0 and 64. This field defaults to 0.

Table 18-49	<b>PW-HE Interface Details</b>
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You can also view the following configuration details for a PW-HE interface:

- Viewing PW-HE Configured as a Local Interface under Pseudowire, page 18-119
- Viewing PW-HE L2 Sub-Interface Properties, page 18-120
- Viewing PW-HE L3 Sub-interface Properties, page 18-120
- Viewing PW-HE Generic Interface List, page 18-121
- Viewing PW-HE as an Associated Entity for a Routing Entity, page 18-122
- Viewing PW-HE as an Associated Entity for a VRF, page 18-122

### Viewing PW-HE Configured as a Local Interface under Pseudowire

To view the local interface details:

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Step 1 Right-click the required device in the Vision client and choose Inventory.

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Step 2 In the logical inventory window, choose Logical Inventory > Pseudowire. The list of Pseudowire interfaces configured in Prime Network are displayed in the content pane. For more information on Pseudowire properties, see Viewing Pseudowire Properties, page 18-108.

### **Viewing PW-HE L2 Sub-Interface Properties**

To view the L2 Sub-Interface details:

- Step 1 Right-click the required device in the Vision client and choose Inventory.
- **Step 2** In the logical inventory window, choose **Logical Inventory** > **PW HE** > *PW-Ether interface*. The list of PW-HE interfaces configured in Prime Network are displayed in the content pane.
- **Step 3** Choose the EFPs tab of an interface to view the details.

Table 18-50 displays the PW-HE L2 Sub-Interface details.

Field	Description
EFPs tab	
EFP ID	EFP identifier.
Operational State	EFP operational state: Up or Down.
VLAN	VLAN associated with this EFP.
Inner VLAN	CE-VLAN identifier.
Translated VLAN	Translated, or mapped, VLAN identifier.
Translated Inner VLAN	Translated, or mapped, inner VLAN identifier.
Binding	Hyperlinked entry to the specific bridge in logical inventory.
Description	Description for the EFP.
Ingress Policy	The name of the ingress service policy associated with the subscriber template. This field is applicable only for IP Subscriber and Service templates.
Egress Policy	The name of the egress service policy associated with the subscriber template. This field is applicable only for IP Subscriber and Service templates.
Service Control Policy	Specifies the policy for a port or operation.

Table 18-50PW-HE L2 Sub-Interface Details

### **Viewing PW-HE L3 Sub-interface Properties**

To view the L3 Sub-Interface details:

- Step 1 Right-click the required device in the Vision client and choose Inventory.
- **Step 2** In the logical inventory window, choose **Logical Inventory** > **PW HE** > *PW-Ether interface*. The list of PW-HE interfaces configured in Prime Network are displayed in the content pane.
- Step 3 Choose the Sub Interfaces tab of an interface to view the details.

Table 18-51 displays the PW-HE L3 Sub-Interface details.

Field	Description
Sub Interfaces tab	
Address	EFP identifier.
Mask	The mask of the specific network.
VLAN Type	The VLAN interface type, such as Layer 2 VLAN.
Operational State	EFP operational state: Up or Down.
VLAN ID	VLAN identifier.
Inner VLAN	CE-VLAN identifier.
IP Interface	IP interface, hyperlinked to the VRF properties in the inventory window.
VRF Name	Virtual Routing and Forwarding (VRF) name, if the pool belongs to a VRF.
VC	Virtual connection identifier.
Binding	Hyperlinked entry to the specific bridge in logical inventory.
Description	Description for the EFP.
Ingress Policy The name of the ingress service policy associated with the su template. This field is applicable only for IP Subscriber and S templates.	
Egress Policy	The name of the egress service policy associated with the subscriber template. This field is applicable only for IP Subscriber and Service templates.
Service Control Policy	Specifies the policy for a port or operation.

Table 18-51	<b>PW-HE L3 Sub-Interface Details</b>
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### **Viewing PW-HE Generic Interface List**

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To view the PW-HE generic interface list:

- Step 1 Right-click the required device in the Vision client and choose Inventory.
- **Step 2** In the logical inventory window, choose **Logical Inventory > PW-HE Generic Interface List**. The list of generic interfaces configured in Prime Network are displayed in the content pane.
- **Step 3** From the **PW-HE Generic Interface List** node, choose a generic interface list. The interface details are displayed in the content pane.

Table 18-52 displays the PW-HE Generic Interface List details.

Table 18-52	<b>PW-HE Generic Interface List Details</b>
10010 10-54	1 / -IIL Generic Interface List Details

Field	Description
Generic Interface	The name of the generic interface list.
Interfaces tab	
Interface	The Ethernet Link Aggregation Group (LAG) for the PW-HE service, which when clicked will take you to the <b>LAG</b> node.

### Viewing PW-HE as an Associated Entity for a Routing Entity

To view the routing entity details for a PW-HE:

- Step 1 Right-click the required device in the Vision client and choose Inventory.
- Step 2 In the logical inventory window, choose Logical Inventory > Routing Entities > Routing Entity. The routing entity details for the PW-HE is displayed in the content pane. For more information on Routing entity details, see Viewing Routing Entities, page 17-32.

### Viewing PW-HE as an Associated Entity for a VRF

To view the VRF details for a PW-HE:

- Step 1 Right-click the required device in the Vision client and choose Inventory.
- Step 2 In the logical inventory window, choose Logical Inventory > VRF > PW-HE node. The VRF details for the PW-HE is displayed in the content pane. For more information on VRF details, see Viewing VRF Properties, page 17-28.

# **Working with Ethernet Services**

Ethernet services are created when the following business elements are linked to one another:

- Network VLAN and bridge domain are linked through a shared EFP.
- Network VLAN and VPLS instance are linked through either of the following:
  - A shared, standalone EFP.
  - A shared switching entity.
- Network VLAN and network pseudowire (single or multi-segment) are linked through either of the following:
  - A shared, standalone EFP.
  - A shared switching entity.
- VPLS-EoMPLS connected via a shared access pseudowire endpoint.
- Network VLAN and cross-connect are connected by a shared EFP.
- Network VLAN and service link are connected by a shared EFP.

If a VPLS, network pseudowire, cross-connect, or network VLAN object is not connected to another business element, it resides alone in an Ethernet service.

In releases prior to Prime Network 3.8, EVC multiplex was discovered by means of Ethernet flow point associations. Beginning with Prime Network 3.9, multiplex capabilities were enhanced to distinguish multiplexed services based on the Customer VLAN ID; that is, Prime Network 3.9 is Inner Tag-aware.

As a result, in environments in which service providers have customers with multiplexed services, an EVC can distinguish each service and create its own EVC representation.

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Prime Network discovers Ethernet services and enables you to add them to maps, apply overlays, and view their properties. See the following topics for more information:

- Adding Virtual Connections to a Map, page 18-123
- Applying Ethernet Service Overlays, page 18-124
- Viewing Ethernet Service Properties, page 18-126

## **Adding Virtual Connections to a Map**

You can add the virtual connections that Prime Network discovers to maps as required.

To add a virtual connection to a map:

- **Step 1** In the Vision client, select the required map or domain.
- **Step 2** Open the Add Ethernet Service to *map* dialog box in either of the following ways:
  - In the toolbar, choose Add to Map > Virtual Connection.
  - In the menu bar, choose File > Add to Map > Virtual Connection.
- Step 3 In the Add Virtual Connection dialog box, do either of the following:
  - To search for specific elements:

**a.** Choose **Search**, and then choose a search category: EVC Terminating EFPs, Name, or System Name.

**b.** To narrow the display to a range of virtual connection or a group of virtual connections, enter a search string in the search field.

c. Click Go.

For example, if you choose Name and enter **EFP1**, the network elements that have names beginning with EFP1 are displayed.

• To view all available virtual connections, choose Show All and click Go.

The available elements that meet the specified search criteria are displayed in the Add Virtual Connections dialog box in table format. The dialog box also displays the date and time at which the list was generated. To update the list, click **Refresh**.



If an element is not included in your scope, it is displayed with the locked device icon.

For information about sorting and filtering the table contents, seeViewing a Table of NEs and Their Properties (List View), page 7-7.

- Step 4 In the Add Virtual Connections dialog box, select the elements that you want to add. You can select and add multiple elements by pressing Ctrl while selecting individual elements or by pressing Ctrl +Shift to select a group of elements.
- Step 5 Click OK.

The virtual connection is displayed in the navigation pane and in the content area. In addition, any associated tickets are displayed in the ticket pane. See Figure 18-67.

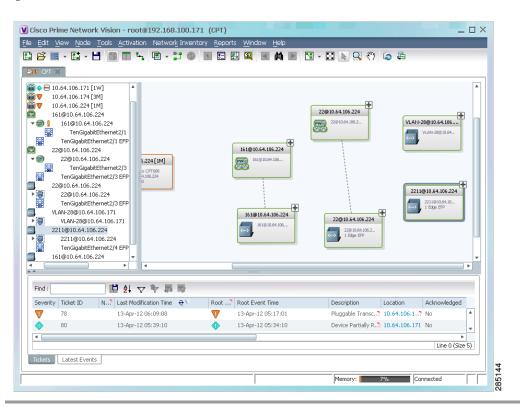


Figure 18-67 Ethernet Service in Prime Vision Window

The Ethernet service information is saved with the map in the Prime Network database.

## **Applying Ethernet Service Overlays**

An Ethernet service overlay allows you to isolate the parts of a network that are being used by a specific Ethernet service.

To apply an Ethernet service overlay:

Step 1 In the Vision client, choose the map in which you want to apply an overlay.

Step 2 From the toolbar, choose Choose Overlay Type > Ethernet Service.

Figure 18-68 shows an example of the Select Ethernet Service Overlay for map dialog box.

Avail	able Ethernet Services as of [05-Nov-10 09:38] 🕲		
ind :	🟥 🛃 🗸 🌾 👼		
lame	€∠	System Name	Description
	Ethernet Service 5002: ServiceD@c1-npe1-76	ServiceD@c1-npe1-76	<u>^</u>
	Ethernet Service 5004: cisco@c7-npe1-76	cisco@c7-npe1-76	
	Ethernet Service 5006: Oren_Test:(987) VLAN0987@c1-npe1-76	Oren_Test:(987) VLAN0987@c1-npe1	
	Ethernet Service 5010: VFI7@c1-npe1-76	VFI7@c1-npe1-76	
	Ethernet Service 5012: VFI7:(307) VLAN0307@c3-npe1-76	VFI7:(307) VLAN0307@c3-npe1-76	
	Ethernet Service 5015: eli@c1-npe1-76	eli@c1-npe1-76	
	Ethernet Service 5018: eli:eli-bd1@eli-group@c2-npe1-crs	eli:eli-bd1@eli-group@c2-npe1-crs	
	Ethernet Service 5020: seliyahu:(83) VLAN0083@c7-npe1-76	seliyahu:(83) VLAN0083@c7-npe1-76	
	Ethernet Service 5022: seliyahu@c1-npe1-76	seliyahu@c1-npe1-76	
	Ethernet Service 5024: VFI7:(707) VLAN0707@c7-npe1-76	VFI7:(707) VLAN0707@c7-npe1-76	
	Ethernet Service 5026: vl2051@c3-npe1-76	vl2051@c3-npe1-76	
	Ethernet Service 5032: 777018@10.56.101.75 777018@c1-npe1-76	777018@10.56.101.75 777018@c1	
	Ethernet Service 5033: 777089@c1-npe1-76 777089@c4-upe9	777089@c1-npe1-76 777089@c4-u. 🕈	
	Ethernet Service 5034: 777060@c1-upe2 777060@c4-upe9	777060@c1-upe2 777060@c4-upe9	
	Ethernet Service 5035: 23972@c1-npe1-76 23972@c4-upe9	23972@c1-npe1-76 23972@c4-upe9	
	Ethernet Service 5037: 777110@c1-npe1-76 777110@c4-upe9	777110@c1-npe1-76 777110@c4-u	
	Ethernet Service 5039: 777067@c1-upe2 777067@c3-npe1-76	777067@c1-upe2 777067@c3-npe	-

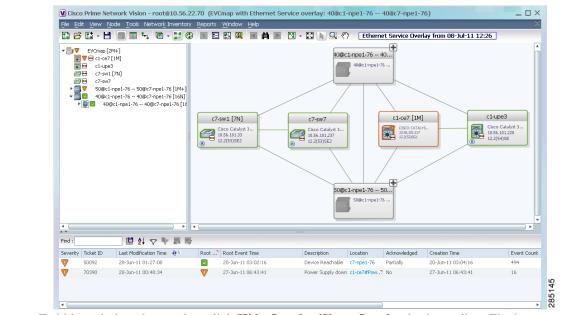
#### Figure 18-68 Select Ethernet Service Overlay Dialog Box

- **Step 3** Select the required Ethernet Service for the overlay.
- Step 4 Click OK.

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The elements being used by the selected Ethernet service are highlighted in the map while the other elements are dimmed, as shown in Figure 18-69.

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#### Figure 18-69 Ethernet Service Overlay in Vision Window

Step 5 To hide and view the overlay, click Hide Overlay/Show Overlay in the toolbar. The button toggles depending on whether the overlay is currently displayed or hidden.

**Step 6** To remove the overlay, choose **Choose Overlay Type > None**.

## **Viewing Ethernet Service Properties**

To view Ethernet service properties:

- **Step 1** In the Vision client, select the map containing the required Ethernet service.
- **Step 2** In the navigation or map pane, right-click the Ethernet service and choose **Properties**.

Figure 18-70 shows an example of an Ethernet Service Properties window with the EVC Terminating table. Depending on the types of service in the EVC, tabs might be displayed. For example, if the EVC contains two network VLANs and a VPLS, tabs are displayed for the following:

- EVC Terminating table
- Network VLANs
- VPLS

Γ

Name:		e1-76 System Name:	DDemo:(500) ¥LAN0500@c7-npe1-	76
Evc:	EVC			
Evo Te	erminating			
Find :	1 🖬 🛃 🗸 1	で調査		
Name		Port	Binding Type	
<>	DataLinkAggregation10@c7-sw1	c7-sw1#Aggregation Group	10	
<>	DataLinkAggregation11@c7-sw1	c7-sw1#Aggregation Group	11	
<>	GigabitEthernet1/0/7@c7-sw1	c7-sw1#1:GigabitEthernet1/	0/7	
<->	GigabitEthernet3/6@c7-npe1-76	c7-npe1-76#3:GigabitEthern	et3/6	

#### Figure 18-70 Ethernet Service Properties Window

Table 18-53 describes the information that is displayed for an Ethernet service.

Table 18-53	Ethernet Servic	e Properties	Window
-------------	-----------------	--------------	--------

Field	Description	
Name	Ethernet service name.	
System Name	Name that Prime Network assigns to the Ethernet service.	
EVC	Name of the EVC associated with the Ethernet service, hyperlinked to the EVC Properties window.	
EVC Terminating Table		
Name	EVC name, represented by the interface name, EFP, and the EFP name.	
Network Element	Hyperlinked entry to the specific interface and EFP in physical inventory.	
Port	Hyperlinked entry to the specific interface in physical inventory.	

Step 3 To view the EVC Properties window, click the hyperlink in the EVC field.

Figure 18-71 shows an example of the EVC Properties window.

stem Name:	QHVPL5:48178	1181:(2081) V	LAN2081@10.5	6.101.75 Name: QH <sup>4</sup>	/PL5:481781181:(20	181) ¥LAN2081@10.56.10	1.75
						, -	
		\ \					
etwork Vlans	Vpls Instances						
ind :		🛃 💎 🦤	御屋				
lame		ID	EFD Name	EFD System Name	System Name	Description	
VLAN-4	81	481			VLAN-481		
VLAN-2	:081	2081			VLAN-2081		
						Lie	e 0 (Size 2)

#### Figure 18-71 EVC Properties Window

Table 18-54 describes the information that is displayed in the EVC Properties window. The tabs that are displayed depend on the services included in the EVC. For example, if the EVC contains two network VLANs and a VPLS, tabs are displayed for the following:

- EVC Terminating table
- Network VLANs
- VPLS

Field	Description		
System Name	Name of the system on which the EVC is configured.		
Name	EVC name.		
Cross-Connects Table			
Name	Cross-connect name.		
Segment 1	Identifier of the first cross-connect endpoint.		
Segment 2	Identifier of the second cross-connect endpoint.		
System Name	Cross-connect system name.		

Field	Description		
Network VLANs Tab			
Name	VLAN name.		
ID	VLAN identifier.		
EFD Name	Name of the Ethernet flow domain.		
EFD System Name	Name that Prime Network assigns to the EFD.		
System Name	VLAN system name.		
Description	Brief description of the VLAN.		
Network Pseudowires Tab			
Name	Pseudowire name.		
System Name	System on which the pseudowire is configured.		
Description	Brief description of the pseudowire.		
Pseudowire Type	Type of pseudowire.		
Is Multisegment Pseudowire	Whether or not the pseudowire is multisegment: True or False.		
VPLS Instances Tab			
Name	VPLS instance name.		
System Defined Name	Name that Prime Network assigns to the VPLS instance.		
VPN ID	Identifier of associated VPN.		

## **Viewing IP SLA Responder Service Properties**

Cisco IOS Service Level Agreements (SLAs) software allows you to analyze IP service levels for IP applications and services by using active traffic monitoring to measure network performance.

The IP SLA responder is a component embedded in the destination Cisco device that allows the system to anticipate and respond to IP SLAs request packets. The responder provides accurate measurements without requiring dedicated probes. The responder uses the Cisco IOS IP SLAs Control Protocol to provide a mechanism through which it can be notified on which port it should listen and respond.

Two-Way Active Measurement Protocol (TWAMP) defines a standard for measuring round-trip network performance between any two devices that support the protocol.

For information on the devices that support IP SLA Responders, refer to *Cisco Prime Network 4.1 Supported VNEs*.

To view IP SLA Responder service properties:

- **Step 1** In the Vision client, double-click the device configured for IP SLA Responder service.
- Step 2 In the Inventory window, choose Logical Inventory > IP SLA Responder.

IP SLA Responder properties are displayed as shown in Figure 18-72.

▼	IP SLA Responde	r Status: Down IP SLA TWAMP Responder Status:	Unknown	
- Logical Inventory				
Access Lists				
<ul> <li>Bridges</li> <li>Cisco Discovery Protocol</li> </ul>	UDP Echo			
Ethernet Link Aggregation				
Ethernet LMI	Find :	🟥 🏄 🗸 🦤 🗸 👼		
Cisco Discovery Protocol     Cisco Discovery Protocol     Disc	IP Address	Port Number		
IS-IS	10.10.2.33	1		
Local Switching		7		
LSEs				
MPBGPs				
OAM				
Operating System				
Routing Entities				
Spanning Tree Protocol Tunnel Traffic Descriptors				
VC Switching Entities	2			
MP6GPs     OPAM     Operating System     Operating System     Routing Entities     Tunnel Traffic Descriptors     Use Switching Entities     VTP				
Physical Inventory				
Q Device Zoom S Best Fit				
C Device 200m Dest Til				
	<b>A</b>			
2 0				
	<b>v</b>			Line 0 (Size 1

Figure 18-72 IP SLA Responder in Logical Inventory

Table 18-55 describes the properties displayed for IP SLA Responder service.

 Table 18-55
 IP SLA Responder Properties in Logical Inventory

Field	Description					
IP SLA Responder Status	Status of the IP SLA Responder: Up or Down.					
IP SLA TWAMP Responder Status	Status of the IP SLA TWAMP responder: Up or Down.					
UDP Echo Tab						
IP Address	Destination IP address used for the UDP echo operation.					
Port Number	Destination port number used for the UDP echo operation.					
TCP Connect Tab						
IP Address	Destination IP address used for the TCP connect operation.					
Port Number	Destination port number used for the TCP connect operation.					

## **Viewing IS-IS Properties**

Intermediate System-to-Intermediate System (IS-IS) protocol is a routing protocol developed by the ISO. It is a link-state protocol where IS routers exchange routing information based on a single metric to determine network topology. It behaves in a manner similar to OSPF in the TCP/IP network.

IS-IS networks contain end systems, intermediate systems, areas, and domains. End systems are user devices. Intermediate systems are routers. Routers are organized into local groups called areas, and areas are grouped into a domain. For configuring IS-IS, see Configuring IS-IS, page 18-150.

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To view IS-IS properties:

- Step 1 In the Vision client, double-click the device configured for IS-IS.
- Step 2 In the Inventory window, choose Logical Inventory > IS-IS > System.

Figure 18-73 shows an example of the IS-IS window with the Process table in logical inventory.

Figure 18-73 IS-IS Window in Logical Inventory

C9-AGG20 [28M+]							>
🗑 🐺 🤤 C9-AGG20 [28M+]	😧 Poll Nov	v					
▼ ■ Vogical Inventory [15M+]	Version:	1					
Access Gateway	version:	1					
Access Lists							
ATM Traffic Profiles Bidirectional Forwarding Detection	Processes						
Bidrectional Porwarding Detection     Bridges	Find :						
CFM							
Cisco Discovery Protocol	Process ID	<b>€</b> ∧	System ID	IS Type		Manual Area Address	;
ALCESS Use Werky     ALCESS Use Werky     ATM Traffic Profiles     Birdges     Birdges     CFM     CFM     CSco Discovery Protocol     Ethernet Link Aggregation	IGP		0143.0008.0170	level-2		49.1680.0212	
ICCP Redundancy [1m]							
IS-IS	:						
- System							
Process IGP							
<ul> <li>Local Switching</li> <li>LSEs</li> </ul>							
Modular OS							
MPBGPs OAM							
OSPF Processes							
Device Zoom 🔀 Best Fit							
	•						Line 0 (Size 1)
Find :	5						
Severity Ticket ID Last Modification Time	Root	Root Even	t Time	Description	Location	Acknowledged	Creation Tir
ickets Network Events Provisioning Events							
				Memor	/: 16%	Connected	

Table 18-56 describes the information that is displayed in this window and the Processes table.

Table 18-56IS-IS Properties in Logical Inventory - Processes Table

Field	Description					
Version	Version of IS-IS that is implemented.					
Processes Table						
Process ID	Identifier for the IS-IS process.					
System ID	Identifier for this Intermediate System.					
IS Type	Level at which the Intermediate System is running: Level 1, Level 2, or Level 1-2.					
Manual Area Address	Address assigned to the area.					

Step 3 To view IS-IS process information, choose Logical Inventory > IS-IS > Process nnn.
Figure 18-74 shows an example of the information that is displayed for the IS-IS process.

		Process ID: IG IS Type: lev Metrics Interf	vel-2 Manual An		43.0008.0170 1680.0212		
Ethernet Link Aggregation		Find :	<b>1</b>	↓ <b>▽ † #</b>	5		
<ul> <li>ICCP Redundancy [1m]</li> <li>IS-IS</li> </ul>		Туре 🔁 🛆	Metric Style	Metric Value	Address Family		
System		level-2	none	10	IPv6		
Process IGP		level-2	wide	10	IPv4		
<ul> <li>Local Switching</li> <li>LSEs</li> </ul>							
LSEs     Modular OS							
Modular OS							
OAM							
OSPF Processes							
🔣 👽 Pseudowires	-						
Device Zoom							
						L	ine 0 (Size 2).
	•						
Find : 👘 🛃 💎 🎙 🗸		ł					
Severity Ticket ID Last Modification Time		Root Root E	vent Time	Descript	ion Location	Acknowledged	Creation Ti

Figure 18-74 IS-IS Process Properties in Logical Inventory

Table 18-57 describes the information that is displayed for the selected IS-IS process.

<b>Table 18-57</b>	IS-IS Process Properties in Logical Inventory
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Field	Description
Process	Unique identifier for the IS-IS process.
System ID	Identifier for this Intermediate System.
IS Type	Level at which the Intermediate System process is running: Level 1, Level 2, or Level 1-2.
Manual Area Address	Address assigned to the area.
Metrics Tab	
IS Type	Level at which the Intermediate System is running: Level 1, Level 2, or Level 1-2.
Metric Style	Metric style used: Narrow, Transient, or Wide.
Metric Value	Metric value assigned to the link. This value is used to calculate the path cost via the links to destinations. This value is available for Level 1 or Level 2 routing only.
	If the metric style is Wide, the value can range from 1 to 16777214. If the metric style is Narrow, the value can range from 1 to 63.
	The default value for active IS-IS interfaces is 10, and the default value for inactive IS-IS interfaces is 0.
Address Family	IP address type used: IPv4 or IPv6.
Interfaces Tab	· ·
Interface Name	Interface name.
Neighbors Tab	

Field	Description
System ID	Identifier for the neighbor system.
Interface	Neighbor interface name.
IP Address	Neighbor IP address.
Туре	IS type for the neighbor: Level 1, Level 2, or Level 1-2.
SNPA	Subnetwork point of attachment (SNPA) for the neighbor.
Hold Time	Holding time, in seconds, for this adjacency. The value is based on received IS-to-IS Hello (IIH) PDUs and the elapsed time since receipt.
State	Administrative status of the neighbor system: Up or Down.
Address Family	IP address type used by the neighbor: IPv4 or IPv6.

 Table 18-57
 IS-IS Process Properties in Logical Inventory (continued)

# **Viewing OSPF Properties**

Open Shortest Path First (OSPF) is a link-state routing protocol for IP networks. It uses a link state routing algorithm and falls into the group of interior routing protocols, operating within a single autonomous system (AS). It uses the Shortest Path First (SPF) algorithm to calculate the best path for a given destination. OSPF is perhaps the most widely used interior gateway protocol (IGP) in large enterprise networks.

The OSPF topology is a multilink topology, i.e. there can be multiple links from the same OSPF process. It is also a single layer and dynamic topology.

Prime Network supports the following versions of OSPF:

- OSPFv2
- OSPFv3

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Using the Vision client you can view OSPF properties for:

- OSPF processes, including the process identifier and OSPF version.
- OSPF network interfaces, such as the area identifier, network type, and status.
- OSPF neighbors, including the neighbor identifier, neighbor interface address, and status.

You can view the OSPF topological links for neighbors whose status is Full or Two Way.

To view OSPF properties:

- Step 1 In the Vision client, double-click the device configured for OSPF.
- Step 2 To view OSPF processes, choose Logical Inventory > OSPF Processes > OSPF Process (vn) ID where vn represents the OSPF version and ID is the OSPF process identifier.

For example, in Figure 18-75, the entry in the navigation tree is OSPF Process (v2) 10.

	2-7600-NY [7M+]	Pol	Now						
	ogical Inventory [6M+]		rocess Det	nile					
	Access Lists	ODELL	TUCESS DEC	aiis					
	ATM Traffic Profiles	Proce	ss ID:	100	Router ID:		172.255.1.4	D	
	Bidirectional Forwarding Detection	OSPE	Version:	¥2					
► .	Bridges								
	Cisco Discovery Protocol								
	Clock								
	Ethernet Link Aggregation	-SPF Tir	hers						
	Ethernet LMI								
<b></b>	Frame Relay Traffic Profiles GRE Tunnels	Sche	dule Delay:	5000	0.0 msec	Min Hold Tim	he:	10000.0 msec	
• 📑	IS-IS	Max	Nait Time:	1000	00.0 msec				
	Local Switching								
	LSEs								
	MPBGPs	OSPF	Neighbors	OSPF	- Interfaces				
> E	MPLS-TP					-			
	OAM	Find			_ 2 ÷	$\nabla = 1$			
	Operating System	Neig	<del>€</del> ∧	Area	Interfa	e Address	State	OSPF Interface	
	OSPF Processes		5.59.42	0	10.201	1.142	FULL	OSPF If: GigabitEthernet3/0/3	
99 19	OSPF Process (v2) 100		255.0.2	0	10.201		FULL		
	OSPF Process (v2) 200			-				OSPF If: GigabitEthernet3/0/19	
. 🔜 🖂	Pseudowires	172.	255.1.41	0	10.201	1.129	FULL	OSPF If: GigabitEthernet3/0/1	
> 🔜 😈	Routing Entities Spanning Tree Protocol	172.	255.1.103	0	10.210	1.2	FULL	OSPF If: Tunnel1000	
	Traffic Engineering Tunnels								
	Tunnel Traffic Descriptors								
•	VC Switching Entities								
Q Device Zoom	Best Fit								
									Line 0 (Size 4)
•	•								
Find :	日 会 マ ヤ 湯	5 IS							
		s- 1		1.5				Le restricte de la companya de la co	e 11 m
Tickets Net	work Events Provisioning Events								
INCO.	Travisioning Evenes								

Figure 18-75 OSPF Processes in Logical Inventory

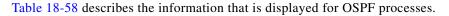


Table 18-58	OSPF P	rocesses in	Logical	Inventory
-------------	--------	-------------	---------	-----------

Field	Description
<b>OSPF</b> Process Detail	s
Process ID	Unique process identifier.
Router ID	Router IP address.
OSPF Version	OSPF version: v1, v2, or v3.
SPF Timers	
Schedule Delay	Number of milliseconds to wait after a change before calculating the shortest path first (SPF).
Min Hold Time	Minimum number of milliseconds to wait between two consecutive SPF calculations.
Max Wait Time	Maximum number of milliseconds to wait between two consecutive SPF calculations.
<b>OSPF</b> Neighbors Tab	le
Neighbor ID	OSPF neighbor IP address.
Area	OSPF area identifier.
Interface Address	IP Address of the interface on the neighbor configured for OSPF.
State	State of the communication with the neighbor: Down, Attempt, Init, 2-Way, Exstart, Exchange, Loading, and Full.
OSPF Interface	Hyperlinked entry to the OSPF Interface Properties window.
	The OSPF Interfaces window displays the same information as the OSPF Interfaces Table below.

-	Access Lists *	Poli Now										
	ATM Traffic Profiles											
	Bidirectional Forwarding Detection	OSPF Process Details										
•	Bridges	Process ID: 1000 Route	er ID: 192.1	68.1.1								
•	CFM	OSPF Version: v2										
	Cisco Discovery Protocol	OSPF Version: VZ										
> 🗰 💎	Clock [2M]											
	Ethernet LMI											
	Frame Relay Traffic Profiles											
Þ	IS-IS System	SPF Timers										
> <b></b>	Local Switching	and the second second	10.0003400	000000000								
Þ	LSEs	Schedule Delay: 5000 msec	Min Hold Time:	10000 ms	ec							
Þ	MPBGPs	Max Wait Time: 10000 msee										
▶	MPLS-TP											
	OAM											
	Operating System											
* <b>B</b>	OSPF Processes											
**	OSPF Process (v2) 1	OSPF Neighbors OSPF Interface										
	OSPF Process (v2) 5	Cont Heighbers										
22	OSPF Process (v2) 20	Find :	封立主要									
2 2 2 2	OSPF Process (v2) 100		Z V V All inte									
10	OSPF Process (v2) 101	IP Interface 🛛 🕀 🗡	Internet Address	Area ID	Priority	Cost	Status	State	Network Type	DR Address	BDR Address	
5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	OSPF Process (v2) 200 OSPF Process (v2) 500	ASR903: IP GigabitEthernet0/2/6	10.31.16.1	0	1	1	UP	DR	BROADCAST	192.168.1.1		
	OSPF Process (v2) 500 OSPF Process (v2) 1000	ASR903: IP GigabitEthernet0/2/7	10.31.19.1	0	1	1	UP	DR	BROADCAST	192.168.1.1	11.22.33.36	
	OSPF Process (v2) 1000 OSPF Process (v3) 33									192.100.1.1	11/22/33/30	
	OSPF Process (v3) 220	ASR903: IP Loopback501	8.8.8.8	0	N/A	1	UP	LOOPBAC	K LOOPBACK			
	OSPF Process (v3) 599											
	OSPF Process (v3) 8888											
• <b>G</b>	Probes											
	Pseudowires											
	QoS											
▶ III.	Routing Entities	<b>v</b>										
N2		-										
Device Zoom	Best Fit											

Figure 18-76 Viewing OSPF Interface

<b>OSPF Interfaces Tal</b>	ble
IP Interface	OSPF interface, hyperlinked to the relevant entry in the routing entity IP Interfaces table in logical inventory.
	For more information about the IP Interfaces table, see Table 17-8.
Internet Address	OSPF interface IP address.
Area ID	OSPF area identifier.
Priority	Eight-bit unsigned integer that specifies the priority of the interface. Values range from 0 to 255. Of two routers, the one with the higher priority takes precedence.
Cost	Specified cost of sending a packet on the interface, expressed as a metric. Values range from 1 to 65535.
Status	State of the interface: Up or Down.
State	The displayed OSPF state will be either BDR, DR, DR-Other, or LOOPBACK.
Network Type	Type of OSPF network: Broadcast, Nonbroadcast Multiple Access (NBMA), Point-to-Multipoint, Point-to-Point, or Loopback.
DR Address	Designated router IP address.
BDR Address	Backup designated router IP address.

 Table 18-59
 OSPF Processes in Logical Inventory (continued)

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# **OSPF** Topology

In OSPF topology, the links will be formed among the OSPF Process Device Components even though the link signifies the neighborship among them. The OSPF is a multilink topology, thus enabling the creation of multiple links from the same OSPF process. From Prime Network 5.0, the OSPF topology will be added along with the existing support.

The various types of topologies that can be formed under OSPF are

- Single layer topology
- Dynamic topology

The OSPF topological links are shown for the neighbors which has the Neighbor State as either FULL or TWOWAY. For neighbors with TWOWAY state, the OSPF interface's network type should be either BROADCAST or NBMA.

	( Vision - root@10.56.56				-		
	ools Networ <u>k</u> Inventory <u>V</u>	<u>M</u> indow <u>H</u> elp					
<b>.</b> - E	1 🛯 🖬 🐂 🖻 - 1		5 🗄 🔍 🔺 🏟 🕨	- (*) 🔊 🔬 🖾 🔹			
its	<b>5</b> ♥ bugs <b>5</b> ♥ ospf	× 👌 👳 10	00 📮 tp_3000				
).56.59.	L10 [5M+]			10.56.59.153 [1m]	<b>P</b>	Detais	10.56.59.153 [1m]
		•				OSPF OSPF	OSPF
		Severities	▼ Adknowledged S				
ID	N Last Modification Time	€V Ro	ot Root Event Time		Location Eleme		
5	07-May-14 15:56:34	4	07-May-14 15:52:30	MPLS Black hole f	10.56.59.147 Cisco	Properties	
5	07-May-14 15:56:33	•	07-May-14 15:52:30	MPLS Black hole f	10.56.59.11 Cisco	· · · · · · · · · · · · · · · · · · ·	

## **Viewing OSPF Link Properties**

To view the OSPF link properties:

- **Step 1** In the Vision client, right-click on the link between the devices and select **Properties** to view the link properties.
- Step 2 In the link properties window, the left pane displays the selected link and the right pane displays the link properties.

Figure 18-77 Viewing OSPF Link Properties

86 [11M+] <-> 7600_183 [1M]		
7600_186: GigabtEthernet2[1/1 <> 7600_183: GigabtEthernet5(0)0 Ethernet 7600_186: GigabtEthernet2[1/1 <> 7600_183: GigabtEthernet5(0)0 + Physical Layer 7600_186: OSPF Process (v2) 5000#172:20.0.410:GigabtEthernet6(0)0 <> 7600_183: OSPF 7600_186: OSPF Process (v2) 5000#172:2.00.410:FOSP(2)1 <> 7600_183: OSPF Process (v2 7600_186: POS2[3/0 <> 7600_183: POS6[2]1 Physical Layer 7600_186: POS2[3/0 <> 7600_183: POS6[2]1 Php_HDLC	- General Properties Link Type: <b>OSPF</b> Type: <b>Dynamic</b> Bi Directional: <b>true</b>	
	- OSPF Information	
	OSPF Process ID : 500	500
		172.20.0.4
		v2
	-	FULL
		7600_183: OSPF Process (v2) 500: Neighbor 3.3.3.186
	OSPF Interface : 0SPF If: GigabitEthernet2/1/1	0SPF If: GigabitEthernet6/0/0

Table 18-60 describes the information that is displayed in link properties window.

Field	Description
Link Type	The link protocol, which is OSPF in this instance.
Туре	The type of link, which is <b>Dynamic</b> .
Bi Directional	Indicates whether the link is bidirectional.
<b>OSPF Information tab</b>	
OSPF Process ID	The unique code to identify the OSPF process.
OSPF Router ID	The IP address of the OSPF router.
OSPF Version	The OSPF version, which can be v1, v2, or v3.
Neighbor State	The status of the OSPF neighbor, which can be Full and Two-Way.
Neighbor	Provides IP address of the OSPF Neighbor
OSPF Interface	The link to the OSPF interface.

Table 18-60OSPF Link Properties window

## **Service Alarms**

As part of the topological link support, two new service alarms **OSPF link down** and **OSPF link up** are introduced. These alarms are generated on the OSPF links in cases such as misconfigurations, shutting down of physical interfaces or any other scenario that might break the OSPF neighborship.

## Correlation

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The **OSPF link down** alarm is a ticketable event. It also can be correlated under the physical link alarms. If OSPF configured interface goes down, the OSPF link also goes down. For e.g, In case of interface shut down, the **OSPF link down** alarm is generated and correlated to the **Link down due to admin** service alarm.

# **Monitoring the CPT 50 Ring Support**

The Cisco Carrier Packet Transport (CPT) Product Family with CPT600, CPT200 and CPT50 Series sets the industry benchmark as a compact carrier-class converged access and aggregation platform for Unified Packet Transport architectures.

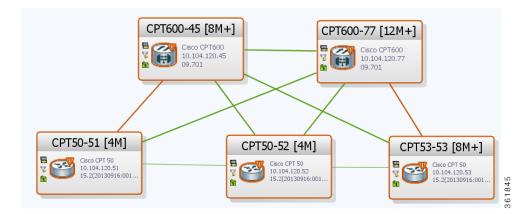
The CPT 50 is a compact and operationally simple, yet highly scalable and flexible platform optimized for delivering TDM like Ethernet Private 5.0 as well as multipoint capabilities for Business, Residential, Mobile Backhaul, Data Center, and Video Services. Its unique satellite architecture is designed to scale, simplify and enhance the operational and deployment aspects of service-delivery networks.

The CPT system also provides the ability to operate CPT 50 in a physical ring homed back to a single CPT 600 or CPT 200 chassis. This feature provides the flexibility of connecting CPT 50 in a closed-ended ring or an open-ended ring. As a result, the failure of a line or uplink card does not impact the traffic in a ring. CPT 50 in a ring works like a route processor and each CPT 50 interacts with Transport Node Controller (TNC) directly.

CPT 50 supports the following types of rings:

- Single Homed—A ring that is subtending from a single CPT-600 or CPT 200. There are two types of single home rings:
  - Open Ended Ring—Connects to the CPT-600 or CPT-200 through one interface only. Hence, there is only one unprotected path available to the traffic on the ring.
  - Closed—Connects to the CPT-600/200 through two interfaces. Hence there is a protected path available for the traffic either through the east or west interface on the ring.
- Dual Homed —A ring whose east port exists on one CPT 200 or CPT 600 (Working Ring Controller) and west port exists on another CPT 200 or CPT 600 (Protected Ring Controller). If WRC fails, this type of ring provides access to all the CPT 50s in the ring by switching the traffic to the other controller.

The following figure depicts the CPT 50 dual homed in Prime Network:



In the above figure, the dual ring home starts in one CPT 600 device and ends in another CPT 600 device. The CPT 600 device from which the dual ring starts is the Working Ring Controller (WRC) and the other CPT 600 device is the Protected Ring Controller (PRC).



To view more details about the device, right-click the device and choose **Inventory** to view the inventory details. The Node Role field in the content pane denotes whether the CPT device is WRC or PRC.

# **Configuring CPT**

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The following commands can be launched from the inventory by right-clicking the appropriate node and choosing **Commands > Configuration**. Your permissions determine whether you can run these commands. To find out if a device supports these commands, see the *Cisco Prime Network 5.0 Supported Cisco VNEs*.

Command	Navigation	Description	
Configure L2 Control Protocol	<b>Physical</b> <b>Inventory &gt; Chassis &gt; Ba</b> <b>ckplane &gt;</b> <i>slot &gt;</i> <i>right-click on the Ethernet</i> <i>card &gt;</i> <b>Commands &gt;</b> <b>Configuration</b>	Use this command to configure the L2 Control Protocol.	
Show L2 Control Protocol	Physical       Use this command to view details of the L2 C         Inventory > Chassis > Ba       protocol parameters configured for the select         ckplane > slot >       right-click on the Ethernet         card > Commands >       Show		
Add Loopback	Physical	Use these commands to add and remove a loop-back	
Remove Loopback	Inventory > Chassis > Ba ckplane > slot > right-click on the Ethernet card > Commands > Configuration	respectively.          Note       Loop-back refers to the process of routing electronic signals or digital data streams, back to their source with processing or modifying it.	
Configure CDP	Physical Inventory > Chassis > Backplane > slot >	Use this command to configure CDP.	
	right-click on the Ethernet card > Commands > Configuration	Note Cisco Discovery Protocol (CDP) is used to obtain protocol addresses of neighboring devices and discover the platform of those devices. It can also be used to show information about the interfaces your router uses.	
Configure Ethernet		Use this command to configure Ethernet parameters.	

Command	Navigation	Description
Show Ethernet Parameters	Physical Inventory > Chassis > Ba ckplane > slot > right-clic k on the Ethernet card > Commands > Show	Use this command to view details of the Ethernet parameters configured for the selected Ethernet port.
Configure Port Parameters	Physical Inventory > Chassis > Backplane > slot > right-click on the Ethernet card > Commands > Configuration	Use this command to configure port parameters.
Show Port Parameters	Physical Inventory > Chassis > Backplane > slot > right-click on the Ethernet card > Commands > Show	Use this command to view the port parameters configured for the selected port.

# Viewing the G8032 ERPS Configuration

Ethernet Ring Protection Switching is an effort at ITU-T under G.8032 Recommendation to provide sub-50ms protection and recovery switching for Ethernet traffic in a ring topology and at the same time ensuring that there are no loops formed at the Ethernet layer.

An Ethernet ring consists of multiple Ethernet ring nodes. Each Ethernet ring node is connected to adjacent Ethernet ring nodes using two independent ring links. A ring link prohibits formation of loops that affect the network. The Ethernet ring uses a specific link to protect the entire Ethernet ring. This specific link is called the Ring Protection Link (RPL). A ring link is bound by two adjacent Ethernet ring nodes and a port for a ring link (also known as a ring port). There must be at least two Ethernet ring nodes in an Ethernet ring.

Ring Protection Switching Architecture works based on the following fundamentals:

- Principle of Loop Avoidance—Loop avoidance is achieved by guaranteeing that traffic flows on all but one of the ring links at any point of time. The one ring link from which traffic does not flow is called the Ring Protection Link (RPL), which is generally blocked. A designated Ethernet ring node—the RPL owner node—is responsible for blocking traffic at one end of the RPL. In the event of an Ethernet ring failure, the RPL owner node must unblock its end of the RPL and allow the RPL to be used for traffic.
- Utilization of learning, forwarding, and filtering database mechanisms defined in the Ethernet Flow Forwarding Function—Failure of Ethernet ring results in protection switching of traffic, which is controlled by the Ethernet Flow Forwarding Function. An APS protocol is used to coordinate the protection action over the ring, which transmits Ring Automatic Protection Switching (R-APS) messages.

Ethernet rings also supports multi ring/ladder network that consists of conjoined Ethernet rings by one or more interconnection points. The protection switching mechanisms and protocol are also applicable for multi ring/ladder network on adherence of certain principles.

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The G8032 technology also supports multiple ERP instances over a ring. An ERP instance is an entity that is responsible for the protection of subset of VLANs carried over the physical ring and it should configure its own R-APS channel, RPL, RPL Owner and RPL Neighbor nodes.

Ring protection switching process also occurs based on the detection of defects on the transport entity on the ring link, and the transport entity can have a failed or non-failed condition. To monitor these defects, Ethernet ring protection may use any one of the following methods:

- Inherent—The fault condition status of each link connection is derived from the status of the underlying server layer trail.
- Sub-layer—Each ring link is monitored using Tandem Connection Monitoring (TCM).
- Test trail—An extra test trail is used to detect defects, which is setup along each ring link.

In Prime Network, the G8032 Ethernet Ring Protection Switching configuration can be viewed in the following nodes:

- Profile—This node displays the G8032 profile details. Each G8032 ring is associated to a profile, which consists of several timers. The timer displays details of the time frame the ring needs to wait before, during and after performing an action to avoid race conditions and unnecessary switching operations. If a ring is not associated to a profile, the default profile is automatically associated to it.
- Ring—This node displays the properties of the ring as well as the properties that are shared across all ERP instances

To view the G8032 Ethernet Ring Protection Switching Profile configuration:

- Step 1 Right-click on the required device and choose the Inventory option.
- **Step 2** In the **Inventory** window, choose **Logical Inventory** > **G8032** > **Profiles**. A list of all the G8032 profiles are displayed in the content pane.
- Step 3 In the content pane, right-click on the profile name to view the G8032 Profile Properties window.Table 18-61 describes the information displayed in the G8032 Profile Properties window.

Field	Description
Profile Name	The unique name of the profile associated to the G8032 ring.
WTR Interval	The Wait-to-Restore interval (in minutes) applicable to the G8032 ring. This interval refers to the duration before traffic is restored to the state, when it is found that a failure is no longer occurring. This interval also avoids toggling protection states in case of intermittent defects. This field defaults to 5 minutes.
Guard Interval	The Guard Interval (in milliseconds) that denotes the duration the node waits before performing a node state transition. This is done to block outdated R-APS messages from causing unnecessary node state changes. This field defaults to 500.

Table 18-61G8032 Profile Properties

Field	Description
Holdoff Timer	The duration (in seconds) applicable for the G8032 ring. The node waits for the specified duration to expire before reporting faults to the ring protection mechanism.
Mode Type	The operating mode applicable for the G8032 ring, which can be any one of the following:
	• Revertive—In case the condition causing the switch is cleared, the traffic channel is restored to the working transport entity.
	• Non revertive—In case the condition causing the switch is cleared, the traffic channel continues to use the RPL.
	This field defaults to <b>Revertive</b> .

Table 18-61	G8032 Profile Properties
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To view the G8032 Ethernet Ring Protection Switching Ring configuration:

- Step 1 Right-click on the required device and choose the Inventory option.
- **Step 2** In the **Inventory** window, choose **Logical Inventory** > **G8032** > **Ring** > *ring name*. The details of the ring are displayed in the content pane.

Table 18-62 describes the Ring properties.

Table 18-62G8032 Ring Properties

Field	Description
Ring Name	The name of the ring.
Ring Type	The ring type, which can be any one of the following:
	• Open—When the ring is terminated by an Ethernet access such as VPLS.
	• Closed—When the arcs or links in the ring are simple Ethernet links.
Excluded VLAN ID	The range of VLAN ID that are excluded by the ring. In other words, the VLAN ID included in this range are not serviced by the ring and not blocked by the ring switching mechanism.
Untagged in Excluded VLANs	Indicates whether untagged Ethernet traffic is also blocked by the VLAN exclusion list.
Ring Ports Entries tab	
Port Number	The port number associated to the ring.
Local Port	The link to the local physical port that is used for this ring port.
Monitor Interface	The link to the interface that is used as the monitor interface. A monitor interface is used to monitor the ring port and detect ring failures.
Blocked VLAN IDs	The range of VLAN IDs that are blocked by the ring port.
Untagged in Blocked VLANs	Indicates whether untagged traffic is blocked by the ring port.

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Field	Description
Unblocked VLAN IDs	The list of VLAN IDs that are not blocked by the ring port.
Untagged in Unblocked VLANs	Indicates whether untagged traffic is unblocked by the ring port.
<b>Ring Instance Entries tab</b>	
Instance	The unique code assigned to the instance.
Node Type	The node type that determines the node's responsibility towards the instance. This can be Normal, Owner, Neighbor, or Next Neighbor.
Node State	The state of the node for a specific instance, which can be any one of the following: Idle, Pending, Protection, Forced Switch, and Manual Switch. This state is configured by the administrator or determined by the APS as part of the G8032 protection protocol.
Port 0 State	The status of the port that is configured as Port 0, which can be N/A, RPL-Link, Faulty, Blocked, Local Forced Switch, or Local Manual Switch.
Port 1 State	The status of the port that is configured as Port 1, which can be N/A, RPL-Link, Faulty, Blocked, Local Forced Switch, or Local Manual Switch.
Instances tab	
ID	The unique code assigned to the instance.
Instance Description	The description of the instance.
Profile	The link to the ring profile associated to the instance.
Included VLAN IDs	The list of VLAN IDs included or served by this instance, which includes all VLANs associated with the ring instance.
RPL Port Role	The Ring Protection Link (RPL) port in charge of the RPL, which enables it to turn the RPL on or off according to the ring instance functionality. This port can be Port 0 or Port 1.
APS Channel Level	The APS Channel Level for the ring instance, which can be any value between 0 and 7. This value is defined by the Maintenance Entity group Level (MEL) and is used to differentiate various Ethernet problems and to signal them.
Configuration State	The configuration status of the ring instance, which can be Resolved or Unresolved.
Unresolved Reason	The feedback to the configurator that explains the reason for the unresolved configuration state.

### Table 18-62G8032 Ring Properties

# **Configuring REP and mLACP**

The following commands can be launched from the inventory by right-clicking the appropriate node and choosing **Commands > Configuration**. Your permissions determine whether you can run these commands (see Permissions for Managing Carrier Ethernet, page B-12). To find out if a device supports these commands, see the *Cisco Prime Network 5.0 Supported Cisco VNEs*.

Command	Navigation	Description
<b>REP Command</b>		
Show REP Segment Information	Commands > Show	This action performed at the command launch point.
mLACP Commands		
Show Group Show MPLS LDP Show Channel Show LACP Internal	Commands > Show	These actions are performed at the command launch point.

# Viewing the Remote Loop Free Alternate Configurations

When a link or router in the network fails, there is loss of data during the time it takes for the routers to converge after a topology change. Since it takes hundreds of milliseconds for the router to converge, the application traffic is sensitive to losses especially in the case of interactive multimedia services such as VoIP and pseudowires.

The Loop Free Alternate Fast ReRoute (LFA-FRR) technology helps reduce the packet loss that happens in the event of link or router failure. It reduces the failure reaction time to tens of milliseconds. This is achieved by using a pre-computed alternate next-hop. If the currently selected primary next-hop fails, then the alternate next-hop is used in the event of failure. A network that is configured with the LFA-FRR experiences less traffic loss and micro-looping of packets when compared to a network without LFA-FRR.

The Remote LFA-FRR technology is an extension of LFA that covers all topologies. It can dynamically compute its LFA node and forward traffic around a failed node to a remote LFA that is more than one hop away. After a node dynamically determines an alternate node (which is not directly connected to it), it establishes a directed Label Distribution Protocol (LDP) session to the alternate node. The directed LDP session exchanges labels for the particular forward error correction (FEC). When the network experiences link failure, the node manages to forward the data to the destination by using label stacking.

By configuring Remote LFA-FRR on your network, you can eliminate additional traffic engineering protocols, simplify operations with minimum configuration, prevent hair-pinning that occurs in TE-FRR, and compute node dynamically without manual provision.

In Prime Network, Remote LFA-FRR is configured using IS-IS and OSPF configurations.

To view the OSPF Remote LFA configuration:

- Step 1 Right-click on the required device and choose the **Inventory** option.
- Step 2 In the Inventory window, choose Logical Inventory > OSPF Processes > OSPF Process (version) ID. The OSPF process details are displayed in the content pane. For more information, see Viewing IS-IS Properties, page 18-130.

Step 3 In the content pane, click the **RLFA Tunnels** tab as shown in Figure 18-78.

▼ → ▲ 10.10	04.120.195 [1m]		Poll Now						
- 📳 Lo	ogical Inventory		POILINOW						
▶ ■	AAA		Process ID:	129	Router ID:	192.0.0.4			
	Access Gateway		OSPF Version:						
	Access Lists		OBPE Version:	٧Z					
	ATM Traffic Profiles								
· .	Bidirectional Forwarding Detection BNG								
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	Cisco Discovery Protocol		OSPF Neighbors		SPF Interfaces RLFA	Tunnels			
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	Ethernet LMI			-					
•	ICCP Redundancy					Next Hop	End Point	Protected Interface	Protected Interface IP Address
	IP Pools		Tunnel_192.0.0		10.104.120.195#0.3	192.168.129	192.0.0.1	10.104.120.195#0.3.0	192.168.129.9
- <b>-</b>	IS-IS		Tunnel_192.0.0		10.104.120.195#0.3	192.168.129	192.0.0.2	10.104.120.195#0.3.0	192.168.129.9
	Process mypn		Tunnel 192.0.0		10.104.120.195#0.3	192,168,129.	192.0.0.3	10.104.120.195#0.3.0.3	192,168,129,9
**	Process Remote_LFA		-		10.104.120.195#0.3			10.104.120.195#0.3.0.	
	Link Layer Discovery Protocol		-						
Þ • • • •	Local Switching				10.104.120.195#0.3			10.104.120.195#0.3.07	192.168.129.9
	LSEs		Tunnel_192.0.0		10.104.120.195#0.3	192.168.129	192.0.0.8	10.104.120.195#0.3.07	192.168.129.9
> <b></b>	Modular OS MPBGPs		Tunnel_192.0.0		10.104.120.195#0.3	192.168.129	192.0.0.9	10.104.120.195#0.3.0	192.168.129.9
	MPDGPS MPLS-TP		Tunnel 192.0.0		10.104.120.195#0.3	192.168.129.	192.0.0.10	10.104.120.195#0.3.0.	192.168.129.9
	OAM								
-	OSPF Processes								
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Figure 18-78 RLFA Tunnels tab

Table 18-63 describes the information that is displayed in the RLFA Tunnels tab.

Table 18-63OSPF Processes - RLFA Tunnels tab

Field	Description	
Tunnel Name	The name of the RLFA tunnel.	
Out-Interface	The outgoing interface of the tunnel, which is used to reach the end point. Clicking this link will take you to the relevant entry in the physical inventory node.	
Next Hop	The IP address of the next hop in the path.	
End Point	The end point of the RLFA tunnel.	
Protected Interface	The interface protected by the Remote RLFA tunnel.	
Protected Interface IP Address	The IP Address of the interface protected by the Remote RLFA tunnel.	

To view the IS-IS Remote LFA configuration:

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- Step 1 Right-click on the required device and choose the Inventory option.
- **Step 2** In the **Inventory** window, choose **Logical Inventory** > **IS-IS** > *Process*. The IS-IS process details are displayed in the content pane. For more information, see Viewing IS-IS Properties, page 18-130.

**Step 3** In the content pane, click the **RLFA Tunnels** tab. For more information, see Table 18-63.

## **Tie-Breaking Rules for Remote LFA**

A primary path can have multiple LFAs. A routing protocol is used to implement tie-breaking rules. When the primary path fails, then these rules help to eliminate multiple candidate LFAs, select one LFA per primary path, and distribute the traffic over multiple LFAs.

Note

The tie-breaking rule has certain conditions and attributes based on which multiple candidate LFAs are eliminated. If a rule eliminates all candidate LFAs, then the rule is omitted.

### **Configuring OSPF and ISIS with Remote LFA**

The following can be launched from the inventory by right-clicking on the appropriate node and choosing **Commands > Configuration**. Your permissions determine whether you can run these commands (see Permissions for Managing Carrier Ethernet, page B-12). To find out if a device supports these commands, see the *Cisco Prime Network 5.0 Supported Cisco VNEs*.

Command	Navigation	Description		
Create OSPF Process	In the Inventory window, right-click on the device > <b>Commands &gt; Configurat</b> ion > <b>OSPF</b> . <b>DSPF Processes</b> > <i>OSPF</i> <i>Process</i> . Right-click on the process and choose <b>Commands &gt; Configurat</b> ion.	Create a new OSPF process. The new OSPF process created here will be available under the <b>OSPF Processes</b> node in the Logical Inventory.		
Show OSPF Database		View the OSPF database details.		
Create OSPF Network		Create one or more of the following OSPF Networks—Broadcast, Non-broadcast, Point-to-multipoint, and Point-to-point.		
Delete OSPF Network		Delete an OSPF Network created using the <b>Create</b> <b>OSPF Network</b> command.		
Delete OSPF Process		Delete an OSPF process created using the <b>Create</b> <b>OSPF Process</b> command.		
Modify OSPF Process		Modify details of the OSPF process created using the <b>Create OSPF Process</b> command.		
Create OSPF Passive Interface		Create a passive interface for an OSPF process.		
Delete OSPF Passive Interface		Delete a passive interface for an OSPF process.		

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Command	Navigation	Description
Show OSPF Neighbor	Logical Inventory > OSPF Processes > OSPF process. Right-click and choose Commands > Show.	View the OSPF neighbor details.           Note         This command is available only for           ASR 9000 devices.
Show OSPF Process	Logical Inventory > OSPF Processes > OSPF process. Right-click and choose Commands > Show	View the OSPF process details.
Create OSPF on Interface	Logical Inventory > Routing Entities > Routing Entity. In the content pane, right-click the name in the IP Interfaces tab and choose Commands > Configurat ion.	Create a new IP interface on an existing OSPF process. The new interface details can be viewed under the <b>OSPF Interfaces</b> section in the content pane on selection of an OSPF process.
Modify OSPF on Interface	Logical Inventory > OSPF Processes > OSPF process. In the OSPF Interfaces section in the content pane, right-click the IP	Modify the OSPF interface details for a selected         OSPF process.         Note         This command is available only for         ASR 9000 devices.
Delete OSPF from Interface	-Interface > <b>Commands</b> > <b>Configuration</b> .	Delete the OSPF interface details for a selected OSPF process.
		Note         This command is available only for ASR 9000 devices.
Show OSPF On Interface	Logical Inventory > Routing Entities > Routing Entity. In the content pane, Right-click the name in the IP Interfaces tab and choose Commands > Configurat ion.	View the OSPF interface details.
Create ISIS Router	Logical Inventory > IS-IS > System. Right-click and choose Commands > Configuration.	Create a new ISIS process.

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Command	Navigation	Description		
Create ISIS Address Family	<b>Logical Inventory</b> > <b>IS-IS.</b> In the content pane,	Create an Address Family (IPV4 or IPV6)for a selected ISIS process.		
Create ISIS Interface	Right-click the process and choose <b>Commands</b> > <b>Configuration</b> .	Create an ISIS interface for the selected process.		
Delete ISIS Address Family		Delete the Address Family (IPV4 or IPV6) created for the selected ISIS process.		
Delete ISIS Router		Delete the ISIS process.		
Modify ISIS Address Family		Modify the Address Family (IPV4 or IPV6) details created for the ISIS process.		
Modify ISIS Router		Modify the ISIS process details.		
Create ISIS Interface Address Family		Create an Address Family for an ISIS interface.		
·		Note This command is applicable only for ASR 9000.		
Modify ISIS Interface Address Family		Modify the Address Family details created for an ISIS interface.		
		Note         This command is applicable only for ASR 9000 devices.		
Delete ISIS Interface Address Family		Delete the Address Family details created for an ISIS interface.		
		Note         This command is applicable only for ASR 9000 devices.		

18-149

# **Using Pseudowire Ping and Show Commands**

The following commands can be launched from the inventory by right-clicking the appropriate node and choosing **Commands > Configuration**. Your permissions determine whether you can run these commands (see Permissions for Managing Carrier Ethernet, page B-12). To find out if a device supports these commands, see the *Cisco Prime Network 5.0 Supported Cisco VNEs*.

Command	Navigation	Description
Ping Pseudowire		<ul> <li>Pings the peer router with a tunnel ID from a single or multisegment pseudowire. This command can be used to verify connectivity between any set of PE routers in the pseudowire path. For a multisegment pseudowire this command can be used to verify that all the segments of the multisegment pseudowire are operating. You can use this command to verify connectivity at the following pseudowire points:</li> <li>From one end of the pseudowire to the other</li> <li>From one of the pseudowires to a specific segment</li> <li>The segment between two adjacent PE routers</li> </ul>
		You can choose to ping the peer router by default or provide the IP of the required destination router to ping.
Display Pseudowire	Logical Inventory > Pseudowire > right-click the required interface > Commands > Show > Display Pseudowire	Shows the MPLS Layer 2 (L2) transport binding using tunnel identifier. MPLS L2 transport binding allows you to identify the VC label binding information. This command can be used to display information about the pseudowire switching point.

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# **Configuring IS-IS**

In order to enable IS-IS for IP on a Cisco router and have it exchange routing information with other IS-IS enabled routers, you must perform these two tasks:

- Enable the IS-IS process and assign area
- Enable IS-IS for IP routing on an interface

You can configure the router to act as a Level 1 (intra-area) router, as Level 1-2 (both a Level 1 router and a Level 2 router), or as Level 2 (an inter-area router only).

The following IS-IS commands can be launched from the inventory by right-clicking on the appropriate node and choosing **Commands > Configuration**. Your permissions determine whether you can run these commands (see Permissions for Managing Carrier Ethernet, page B-12). To find out if a device supports these commands, see the *Cisco Prime Network 5.0 Supported Cisco VNEs*.

Command	Navigation	Description	
Create ISIS Router	ISIS > right-click System > Commands > Configuration	Creates an IS-IS routing process and specify the area for each instance of the IS-IS routing process. An appropriate Network Entity Title (NET) must be configured to specify the area address for the IS-IS area and system ID of the router. Up to eight processes are configurable. A maximum of five IS-IS instances on a system are supported.	
Modify ISIS Router Delete ISIS Router	ISIS > System > right-click Process ID in content pane > Commands > Configuration	Modifies or deletes an existing IS-IS routing configuration for the specified routing process.	
Create ISIS Interface	ISIS > System > right-click Process ID in content pane > Commands > Configuration	Creates or modifies an IS-IS routing process and assign it to a specific interface, rather than to a	
Modify ISIS Interface Delete ISIS Interface	ISIS > expand System > select a Process > select Interfaces tab > right-click the Interface Name > Commands > Configuration	network.	
Create ISIS Address Family Modify ISIS Address Family Delete ISIS Address Family	ISIS > System > right-click Process ID in content pane > Commands > Configuration	Configure or modify IS-IS routing to use standard IP Version 4 (IPv4) and IP Version 6 (IPv6) address prefixes.	