



Junos Space

Ethernet Activator User Guide

Release 1.1

Juniper Networks, Inc.

1194 North Mathilda Avenue
Sunnyvale, California 94089
USA

408-745-2000

www.juniper.net

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Part 1

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Chapter 1

Overview of Junos Space Layer 2 Service Provisioning

- Junos Space Layer 2 Services Overview on page 3
- Provisioning Process Overview on page 10
- Service Attributes Overview on page 12
- Service Order States and Service States Overview on page 19

Junos Space Layer 2 Services Overview

Junos Space Ethernet Activator software enables you to provision the following types of services:

- Point-to-point services across networks that use LDP for signaling in the network core. These services use directed pseudowire virtual circuits across the network to establish point-to-point virtual private networks (VPNs). The provisioner must specify the addresses of the ingress and egress routers of the virtual circuits.
- Multipoint services across networks that use BGP signaling in the network core. These services use route targets and route distinguishers to establish service connectivity.

For details about Juniper Networks Layer 2 technologies, see the *JUNOS Software VPNs Configuration Guide*.

Point-to-point services and multipoint services support the following interface types:

- port-port—All traffic is transported across the network.
- 802.1Q (dot1.q)—Supports 802.1Q VLAN-tagged network traffic in a point-to-point or multipoint Ethernet service. Network traffic is constrained using VLAN IDs.
- Q-in-Q—Supports double tagged traffic in a point-to-point or multipoint Ethernet service.

Table 1 on page 4 provides a guide to selecting the appropriate service type for a specific customer need.

Table 1: Selecting a Layer 2 Service

Customer Requirement	Provision This Service
Send all VLAN traffic from one site to another.	Layer 2 VPN port-port service OR Layer 2 VPN Q-in-Q to Q-in-Q service for all traffic
Send traffic associated with one specific VLAN from one site to another.	Layer 2 VPN 802.1Q-to-802.1Q service
Send traffic associated with a range of VLANs from one site to another.	Layer 2 VPN Q-in-Q to Q-in-Q service for a range of VLANs

Supported Layer 2 Services

The Ethernet Activator software enables you to provision a range of services from the following service families for your enterprise customers:

- Layer 2 Point-to-Point Ethernet Services with LDP Signaling on page 4
- VPLS Services on page 8

Layer 2 Point-to-Point Ethernet Services with LDP Signaling

Point-to-point services provide transport and encapsulation of Layer 2 Ethernet circuits between two endpoints. To provision a point-to-point LDP service, the provisioner must select the network provider-edge (N-PE) routers that will be the service endpoints and configure the user-network interfaces (UNIs) at those endpoints. The Junos Space software automates the end-to-end provisioning of the pseudowire by establishing a virtual circuit between the N-PE routers using a unique virtual circuit ID (VC ID).

Juniper Networks refers to this kind of connection as a *Layer 2 circuit*. For details about Layer 2 circuits, see the *Junos Software VPNs Configuration guide*.

The IETF refers to these connections in *RFC 4905, Encapsulation Methods for Transport of Layer 2 Frames over MPLS Networks* as *emulated virtual circuits*, and in *RFC 4447, Pseudowire Setup and Maintenance Using the Label Distribution Protocol (LDP)* as *pseudowire emulation* (see *IETF RFC 4447*).

The Metro Ethernet Forum (MEF) refers to these connections as *E-Line services*. See *Metro Ethernet Services – A Technical Overview* by Ralph Santitoro.

The Junos Space software enables you to provision the following point-to-point service options for your enterprise customers:

- Port-Port Service on page 5
- 802.1Q-to-802.1Q Service—Single VLAN on page 5

- Q-in-Q to Q-in-Q Service—All Traffic on page 6
- Q-in-Q to Q-in-Q Service—Range of VLANs on page 6

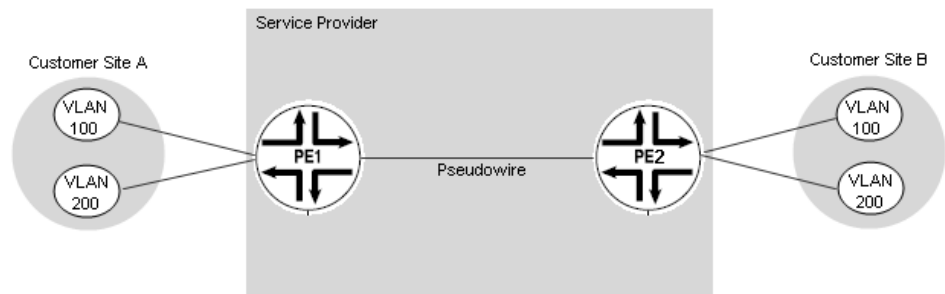
Port-Port Service

A port-port service transports all traffic on a port on a provider edge (N-PE) router across the network to a port of another N-PE router. The enterprise customer needs to purchase only a single physical port for all their traffic. However, a single port might cost more than the bandwidth for a single VLAN or selected range of VLANs.

The service provider needs no knowledge of the enterprise customer's VLAN structure, because all the customer's traffic is transported.

Figure 1 on page 5 shows an example in which a port-port connection transports all VLAN traffic for an enterprise customer from customer site A to customer site B across the network.

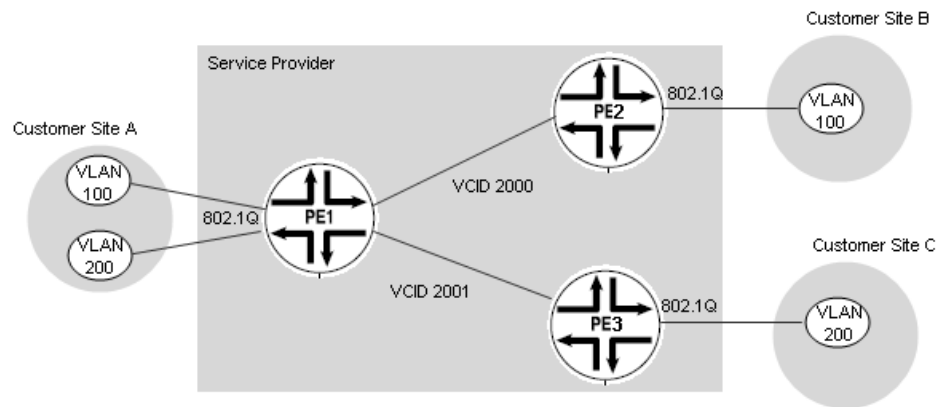
Figure 1: Point-to-Point LDP Port-Port Connection Transports all Traffic



802.1Q-to-802.1Q Service—Single VLAN

802.1Q services transport VLAN traffic from one site to another across the network. The selected payload is a single VLAN, so the enterprise customer needs to purchase only the bandwidth necessary to transport that VLAN. To implement this type of service, the service provider must exchange VLAN information with the enterprise customer.

Consider the example shown in Figure 2 on page 6. VLAN 100 might be used for payroll and spans sites A and B. VLAN 200 is used by engineering and spans sites A and C. Payroll and engineering are securely separated by provisioning separate point-to-point connections for each VLAN, each on a separate VCID. Service multiplexing at customer site A allows multiple virtual circuits to share the same port yet provide secure connections to separate sites.

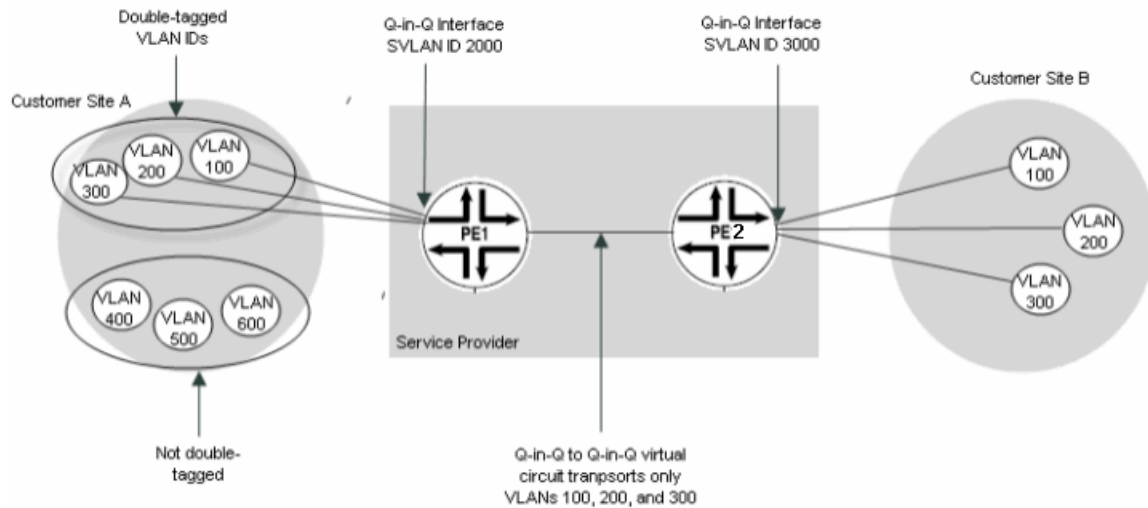
Figure 2: Point-to-Point Ethernet 802.1Q-to-802.1Q Service**Q-in-Q to Q-in-Q Service—All Traffic**

A point-to-point Ethernet (LDP) Q-in-Q to Q-in-Q service transports all customer traffic from one site to another across the network. The Q-in-Q interface adds a service provider tag to the frame, which isolates the enterprise customer's VLAN tags. The service provider does not need knowledge of the customer's VLAN structure because all traffic is transported to the destination site.

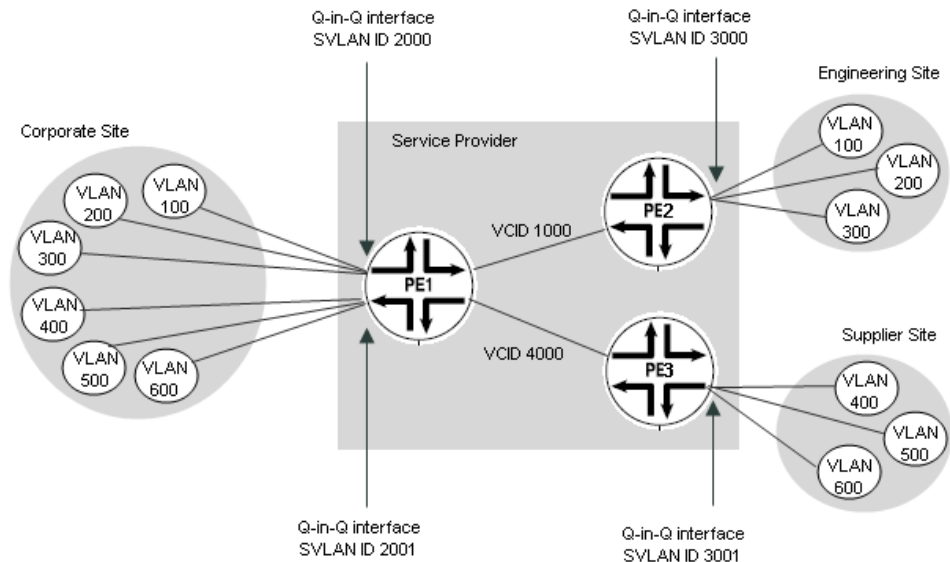
Q-in-Q to Q-in-Q Service—Range of VLANs

A point-to-point LDP QinQ-to-QinQ service carries a range of VLANs across the network. The service provider must establish with the enterprise customer which VLANs are to be transported. The service provider allocates a service provider VLAN ID as a second tag to the selected VLAN ID range, which isolates the traffic on selected VLANs from other traffic.

Figure 3 on page 7 shows an example in which an enterprise customer has 6 VLANs with VLAN IDs 100, 200, 300, 400, 500, and 600. The service is provisioned to carry only VLANs 100, 200, and 300 by tagging them with the service provider VLAN ID of 2000. VLANs 400, 500, and 600 do not cross the network.

Figure 3: Point-to-Point Ethernet Q-in-Q to Q-in-Q Service for Range of VLANs.

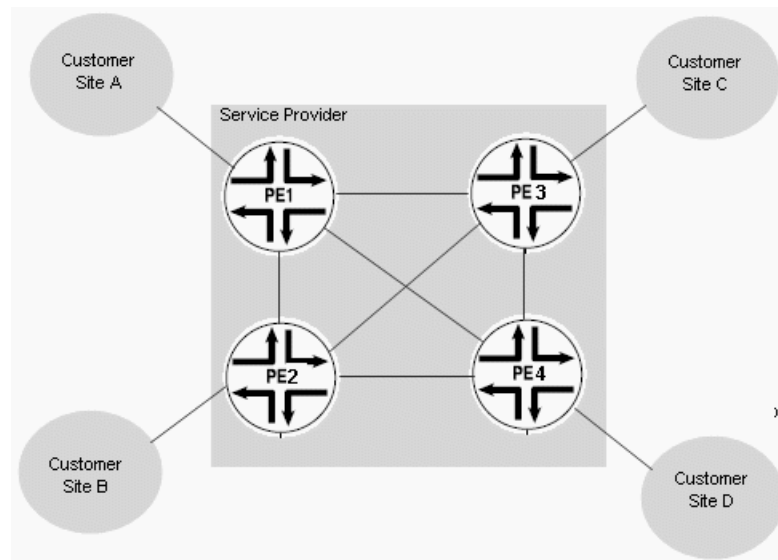
You can use separate service VLAN IDs to segregate traffic into secure groups of VLAN IDs. For example, VLANs 100, 200, and 300 might all be part of an enterprise's engineering organization, while VLANs 400, 500, and 600 might exchange information with suppliers. In this example, VLANs 100, 200, and 300 can be double-tagged with service VLAN ID 2000 and get transported only to the remote engineering site, while VLANs 400, 500, and 600 might be tagged with the service VLAN ID of 2001 and get transported only to the supplier's site along a separate pseudowire, as shown in Figure 4 on page 7.

Figure 4: Point-to-Point LDP Q-in-Q to Q-in-Q Service for Range of VLANs on Separate Service Provider VLANs

VPLS Services

The Ethernet Activator software supports Virtual Private LAN Services (VPLS) which in turn provide multipoint-to-multipoint services. Figure 5 on page 8 shows an example of a multipoint service connecting four customer sites.

Figure 5: VPLS Service

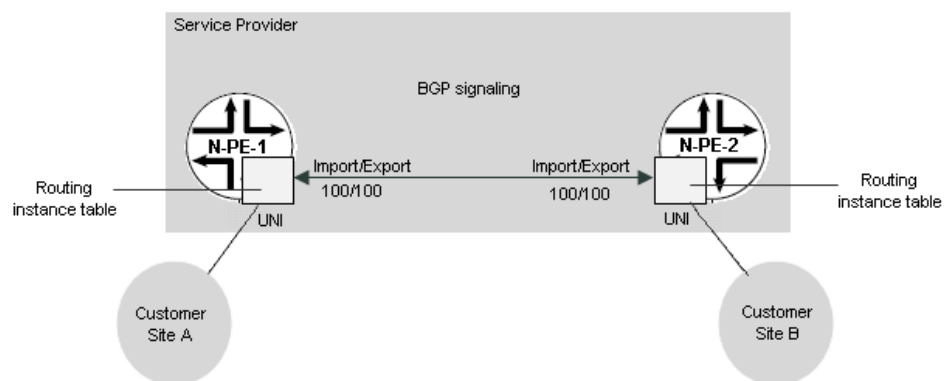


Route targets and route distinguishers designate the multipoint connectivity among the participating endpoints.

Service Autodiscovery

The Junos software in the devices uses autodiscovery to establish connectivity among the N-PE routers quickly and efficiently. Figure 6 on page 8 shows an example.

Figure 6: Autodiscovery of Service Connectivity



In this example, device N-PE-1 is the first to be added to the service. It exports route target 100 and imports route target 100. When N-PE-2 is added to the service, it also exports and imports route target 100. The Junos software on the device automatically makes the association and creates the connectivity path between the two devices. Similarly, when you add a third device to the service, so long as it exports/imports the same route targets as the N-PE devices in the existing service, the new device is added to the service and connectivity with both existing N-PE devices is established automatically.

VPLS and Normalization

Similar to point-to-point Ethernet services, the UNIs of VPLS services can be port-port, 802.1Q, or Q-in-Q. The type of VLAN mapping—or normalization—is specified in the service definition. VLAN normalization applies only to MX Series devices.

Normalization supports automatic mapping of VLANs. Normalization performs operations on VLAN tags to achieve the desired translation. The Ethernet Activator software supports two forms of VLAN normalization:

- **Normalize all**—The customer VLAN ID is preserved across the network. That is, the broadcast domain includes the interfaces that have the same VLAN ID across the VPLS service. For double-tagged packets (Q-in-Q interfaces), a “pop” operation at ingress strips the service VLAN ID from the packet. A corresponding “push” operation at egress inserts the service VLAN ID known at the local site. Hence, the service VLAN ID at egress does not have to match the service VLAN ID at ingress.

For single-tagged packets (802.1Q interfaces), “Normalize All” has no effect, because the packet has no service VLAN ID to pop or push.

- **Normalize none**—The customer VLAN ID is not preserved across the network. The broadcast domain includes all VLANs at any site provisioned in the service. For single-tagged packets (802.1Q interfaces), a “pop” operation at ingress removes the customer VLAN ID from the packet. A corresponding “push” operation at egress adds a local customer VLAN ID.

For double-tagged packets (Q-in-Q interfaces), both customer VLAN ID and service VLAN ID are popped from the packet at ingress and pushed at egress.

If normalization is not used, then all customer VLAN IDs and all service VLAN IDs must match to be part of the same broadcast domain.

Normalization works well with automatically assigned VLAN IDs, because the service provider does not need to specify the VLAN IDs that are popped and pushed. Without normalization, the service provider must specify explicitly the customer VLAN ID and the service VLAN ID.

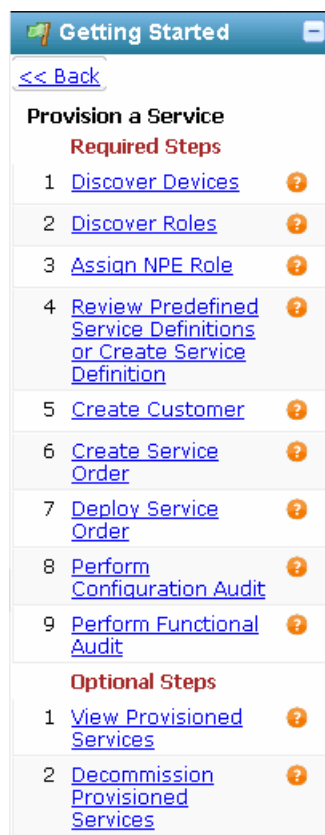
Related Topics

- Service Attributes Overview on page 12
- Provisioning Process Overview on page 10

Provisioning Process Overview

Provisioning is a process that makes services available to customers. It is a multistep process.

The Getting Started panel in the Junos Space user interface provides the steps involved in provisioning a service, including not only the provisioning work itself (steps 4 through 9), but also the steps that are necessary before you can begin the provisioning process (steps 1 through 3). The following example shows the Service Provisioning assistant in the Getting Started panel:



Creating a service definition is a task that is usually performed by a highly privileged user, typically a service designer. Adding a customer, creating a service order, scheduling a service for deployment, and validating services are tasks generally performed by a less privileged user, typically a service provisioner.

Network Operator Tasks—Provisioning Prerequisites

Network operators are usually responsible for performing the prerequisite tasks before the service designer or service provisioner can perform their tasks. Specifically, these tasks include:

1. Discovering devices

2. Launching role discovery
3. Assigning N-PE roles

Discovering devices is the process for bringing your network devices under Junos Space management. See *Device Discovery Overview* for more information.

Launching role discovery and assigning N-PE roles are collectively known as prestaging tasks. Prestaging finds the N-PE devices among those already under Junos Space management and assigns appropriate MPLS N-PE roles to these devices and user-to-network interface (UNI) roles to their interfaces. Once these roles are established, the devices are ready for provisioning. See “Prestaging Devices Overview” on page 23 for more information.

Service Designer Tasks

The service designer is responsible for the service definitions that the service provisioner will use as the basis for creating a service order.

A service definition specifies the attributes that are common among a group of service orders that have similar service requirements. For example, a service definition might specify a port-port service, whether the associated VCID should be assigned automatically from a predefined pool or specified by the user, and what range of bandwidths can be assigned to the service order. The service definition also defines which attributes of the service can be edited in the service order.

The Junos Space product provides several standard service definitions which support most needs. If the standard service definitions do not support your needs, then the service designer needs to create new, customized service definitions.

Service Provisioner Tasks

Service provisioner tasks include the following:

1. Creating the customer
2. Creating the service order
3. Deploying the service
4. Performing a configuration audit
5. Performing a functional audit

A service order is an instance of the service definition that completes the definition for a specific customer's use. The service order always specifies the customer and the endpoints that link the customer sites through the MPLS network. For each endpoint, the service provisioner specifies the N-PE device and the UNI on that device that connects the customer site to the N-PE device. The service order can also specify any additional attributes that are configured in the service definition as editable in the service order. These attributes might include the VCID, MTU for the UNI, MTU for the connection across the network, VLAN-ID, and rate limiting bandwidth.

Deployment of a service order pushes a service to the network devices. Before deployment completes, a series of prevalidation checks takes place. If the

prevalidation checks indicate that the service is valid, the deployment proceeds. If the prevalidation checks indicate an invalid service, the service provisioner must re-create the service order correctly before trying again to deploy it.

After the service is deployed, a functional audit establishes whether the service is up or down. If the functional audit reports that the service is up, the customer can begin using the service.

Once the service is active, the service provisioner can monitor the health of the service by running a configuration audit.

- Related Topics**
- Discovering Devices
 - Discovering and Assigning All N-PE Devices on page 44
 - Discovering and Assigning N-PE Devices with Exceptions on page 47
 - Predefined Service Definitions on page 61
 - Creating a Point-to-Point Ethernet Service Definition on page 114
 - Creating a VPLS Service Definition on page 121
 - Unpublishing a Service Definition on page 129
 - Adding a New Customer on page 139
 - Creating a Point-to-Point Ethernet Service Order on page 143
 - Creating a Multipoint Ethernet Service Order on page 149
 - Deploying a Service on page 157
 - Validating a Service on page 159

Service Attributes Overview

A service is defined by a set of attributes. Some attributes are common to all service instances created from one service definition, and are therefore set during service definition time. Other attributes are specific to a service instance and must be set in the service order. Some attributes can be set either in the service definition or in the service order; in such cases, it is up to the service designer to determine when the attribute will be set.

The Junos Space Ethernet Activator Space user interface groups service attributes as follows:

- General attributes—General information about the service, such as whether the service is point-to-point or multipoint, what signaling mechanism is used in the network core, and who the enterprise customer is who will use the service.
- UNI settings—Information about each customer site, including the N-PE device, interface, encapsulation (physical and logical), MTU, customer VLAN ID and range, service VLAN ID, bandwidth limiting, and so on.
- Connectivity settings—Information about connectivity among customer sites through the network. For point-to-point Ethernet services in a network with LDP

switching in the network core, these settings will include the VC ID. For multipoint Ethernet (or VPLS) services these settings will include the route target and route distinguisher.

General Attributes

The following general attributes are defined for each service:

- Service Type on page 13
- Customer on page 13

Service Type

The service type attribute combines the topology and core signaling technology in the same attribute.

A service can have one of the following topologies:

- Point-to-point—The service uses a pseudowire to connect two customer sites across the network core.
- Multipoint—The service connects multiple customer sites in a virtual LAN across the network core.

The core signaling technology specifies the type of signaling used in the service provider's network core. It can have one of the following values:

- LDP
- BGP

The service type is the first attribute to be determined during service definition. It can have one of the following values:

- Point-to-point Ethernet (LDP)—A virtual circuit between two customer sites using LDP signaling in the network core.
- Multipoint Ethernet—A Virtual private LAN service (VPLS) among multiple customer sites using BGP signaling in the network core.

Customer

This attribute specifies the enterprise customer who will use the service instance. This attribute is always specified in the service order.

UNI Settings

The following attributes are defined for the service endpoints or customer sites that are connected by the service:

- Ethernet Options on page 14
- N-PE Device on page 14
- Interface on page 14

- Protect Interface (Point-to-Point Services Only) on page 14
- MTU on page 14
- Traffic Type on page 15
- Customer VLAN ID on page 15
- Service VLAN ID and VLAN ID Range on page 15
- Physical Encapsulation on page 16
- Logical Encapsulation on page 16
- Rate Limiting and Bandwidth on page 17

Ethernet Options

This attribute identifies the interface type at the endpoint by defining the level packet tagging for the UNI. It can have the following values:

- port-port
Transfers all data from the UNI to the other end of the LSP trunk.
- dot1q
Tags each packet with a VLAN ID, thus allowing a specific VLAN to traverse the network.
- qinq
Double tags each frame. The inner tag is added by the service provider. The service provider can use this inner tag to differentiate among services. For example, you can configure VLANs for a customer's intranet with a different inner tag from VLANs used for working with providers or partners.

N-PE Device

Specifies the provider-edge device that connects the customer site to the network.

Interface

Specifies the physical interface on the N-PE device that connects the customer site or CE device to the N-PE device.

Protect Interface (Point-to-Point Services Only)

You can configure a protect interface for the logical interface linking a virtual circuit to its destination. The protect interface is a backup interface in case the primary interface fails. If the primary interface fails, traffic is switched to the protect interface. The protect interface is optional.

MTU

The MTU represents the largest frame size in bytes that passes through the UNI. MTU is configurable.



NOTE: This value is distinct from the MTU assigned to the connectivity in the network core.

Traffic Type

This attribute places restrictions on the traffic that can be transported across the network by the associated service. It can have the following values:

- **Transport single VLAN**
Restricts the associated service to transporting just one VLAN across the network. This option can be used only with 802.1Q interface types.
- **Transport VLAN range**
Allows the associated service to transport a range of VLANs across the network. This option can be used only with Q-in-Q interface types.
- **Transport all traffic**
Allows the associated service to transport all traffic across the network. This option can be used with Q-in-Q interface types only.

The traffic type attribute is not applicable to port-port services. Port-port services always transport all traffic.

Customer VLAN ID

Specifies a VLAN ID that is attached to each packet to permit VLANs to be shared across the network.

This attribute can be used only with 802.1Q and Q-in-Q interface types.

Service VLAN ID and VLAN ID Range

The service VLAN ID (SVLAN ID) specifies a second level of tagging to segregate groups of VLANs.

The VLAN range specifies a range of VLANs to be transported across the network by associating them with an SVLAN ID.

These options are configurable only for Q-in-Q interfaces.

Physical Encapsulation

Specifies the physical link-layer encapsulation type.

- **flexible-ethernet-services**—Offers the most flexibility, depending on the characteristics of the N-PE device and its line modules.

For Gigabit Ethernet IQ interfaces and Gigabit Ethernet PICs with small form-factor pluggable transceivers (SFPs) only, use flexible Ethernet services encapsulation when you want to configure multiple per-unit Ethernet encapsulations. This encapsulation type allows you to configure any combination of route, TCC, CCC, and VPLS encapsulations on a single physical port. Aggregated Ethernet bundles cannot use this encapsulation type. If you configure flexible Ethernet services encapsulation on the physical interface, VLAN IDs from 1 through 511 are no longer reserved for normal VLANs.

In the Junos Space Ethernet Activator product, you can use this encapsulation type with 802.1Q interfaces and Q-in-Q interfaces in point-to-point Ethernet services and in multipoint Ethernet services.

- **vlan-ccc**—You can use Ethernet VLAN encapsulation on CCC interfaces. This option restricts the range of available VLAN IDs to 512 through 4094. 1 through 511 are reserved for internal use.

In the Junos Space Ethernet Activator product, you can use this encapsulation type with 802.1Q interfaces and Q-in-Q interfaces in point-to-point services.

- **extended-vlan-ccc**—Use extended VLAN encapsulation on CCC interfaces with Gigabit Ethernet interfaces that must accept packets carrying 802.1Q values.

In the Junos Space Ethernet Activator product, you can use this encapsulation type with 802.1Q interfaces and Q-in-Q interfaces in point-to-point services.

- **ethernet-vpls**—Use Ethernet VPLS encapsulation on Ethernet interfaces that have VPLS enabled and that must accept packets carrying standard TPID values.

In the Junos Space Ethernet Activator product, this encapsulation is used only for port-port interface types in multipoint Ethernet services.

Logical Encapsulation

Specifies the logical link-layer encapsulation type. Logical encapsulation allows 802.1Q and Q-in-Q services to route multiple services through the same physical interface.

- **vlan-ccc**—Use Ethernet virtual LAN (VLAN) encapsulation on CCC interfaces. When you use this encapsulation type, you can configure the family ccc only.
- **extended-vlan-ccc**—Use extended VLAN encapsulation on CCC interfaces with Gigabit Ethernet interfaces that must accept packets carrying 802.1Q values.
- **vlan-vpls**—Use VLAN VPLS encapsulation on Ethernet interfaces with VLAN tagging and VPLS enabled. Interfaces with VLAN VPLS encapsulation accept packets carrying standard Tag Protocol (TPID) values only.

Table 2 on page 17 defines the logical encapsulation types that are valid for each physical encapsulation type in a point-to-point Ethernet service.

Table 2: Physical and Logical Encapsulation Compatibilities in Point-to-Point Ethernet Services

Physical Encapsulation	Logical Encapsulation	Valid Interface Types
flexible-ethernet-services	vlan-ccc	802.1Q and Q-in-Q
vlan-ccc	vlan-ccc	802.1Q and Q-in-Q
extended-vlan-ccc	extended-vlan-ccc	802.1Q and Q-in-Q
ethernet-ccc	not applicable	port-port

Table 3 on page 17 defines the logical encapsulation types that are valid for each physical encapsulation type in multipoint Ethernet services:

Table 3: Physical and Logical Encapsulation Compatibilities in Multipoint Ethernet (VPLS) Services

Physical Encapsulation	Logical Encapsulation	Valid Interface Types
flexible-ethernet-services	vlan-vpls	802.1Q and Q-in-Q
ethernet-vpls	not applicable	port-port

Rate Limiting and Bandwidth

Rate limiting allows you to specify the maximum bandwidth permitted for a service.

The burst rate is automatically calculated as 2 times the MTU of the UNI.

Connectivity Settings

The following attributes are defined for the connectivity among UNI endpoints across the network:

- Virtual Circuit Identifier (VCID) (Point-to-Point Services Only) on page 17
- Route Targets and Route Distinguishers (Multipoint Services Only) on page 18
- Normalized VLAN (Multipoint Services Only) on page 18
- MTU on page 18

Virtual Circuit Identifier (VCID) (Point-to-Point Services Only)

This unique identifier can be assigned automatically from a pool of VCIDs or can be manually specified. It uniquely identifies a point-to-point virtual circuit through the network and is provided for all switched point-to-point services.

Route Targets and Route Distinguishers (Multipoint Services Only)

Route targets and route distinguishers are always automatically generated by the Junos Space software for multipoint Ethernet (VPLS) services. Route targets and route distinguishers designate the multipoint connectivity among the participating endpoints of a multipoint service. They identify the members of the virtual LAN.

Normalized VLAN (Multipoint Services Only)

Similar to point-to-point Ethernet services, the UNIs of VPLS services can be port-port, 802.1Q, or Q-in-Q. The type of VLAN mapping—or normalization—is specified in the service definition. VLAN normalization applies only to MX Series devices.

Normalization supports automatic mapping of VLANs. Normalization performs operations on VLAN tags to achieve the desired translation. The Ethernet Activator software supports two forms of VLAN normalization:

- **Normalize all**—The customer VLAN ID is preserved across the network. That is, the broadcast domain includes the interfaces that have the same VLAN ID across the VPLS service. For double-tagged packets (Q-in-Q interfaces), a “pop” operation at ingress strips the service VLAN ID from the packet. A corresponding “push” operation at egress inserts the service VLAN ID known at the local site. Hence, the service VLAN ID at egress does not have to match the service VLAN ID at ingress.

For single-tagged packets (802.1Q interfaces), “Normalize All” has no effect, because the packet has no service VLAN ID to pop or push.

- **Normalize none**—The customer VLAN ID is not preserved across the network. The broadcast domain includes all VLANs at any site provisioned in the service. For single-tagged packets (802.1Q interfaces), a “pop” operation at ingress removes the customer VLAN ID from the packet. A corresponding “push” operation at egress adds a local customer VLAN ID.

For double-tagged packets (Q-in-Q interfaces), both customer VLAN ID and service VLAN ID are popped from the packet at ingress and pushed at egress.

If normalization is not used, then all customer VLAN IDs and all service VLAN IDs must match to be part of the same broadcast domain.

Normalization works well with automatically assigned VLAN IDs, because the service provider does not need to specify the VLAN IDs that are popped and pushed. Without normalization, the service provider must specify explicitly the customer VLAN ID and the service VLAN ID.

MTU

MTU is the largest packet size that can traverse the LSP without fragmentation.



NOTE: This value is distinct from the MTU assigned on each UNI.

Related Topics Junos Space Layer 2 Services Overview on page 3

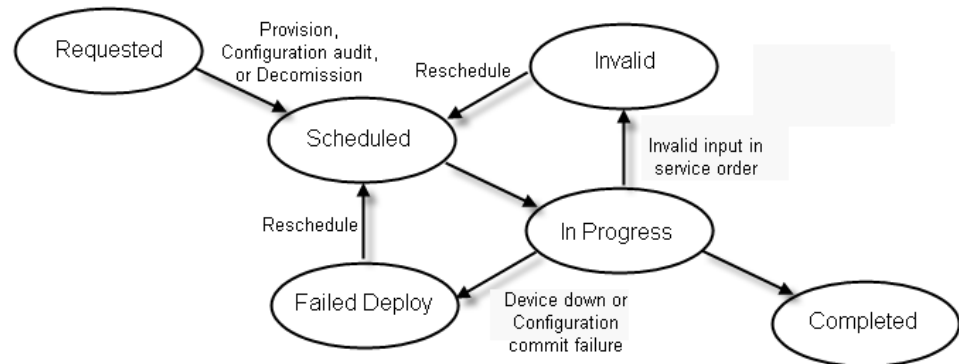
Service Order States and Service States Overview

Service provisioners create service orders which are requests to provision a service, validate a service, or decommission a service. The service order for provisioning a service defines all the service attributes.

Service Order States

Before a service order can affect a service, it must transition through several states as shown in Figure 7 on page 19.

Figure 7: Service Order States and State Transitions



When the service provisioner has created the service order, but has not yet attempted to deploy it or schedule it for deployment, the service order is in the Requested state.

After the service provisioner has scheduled the service order for deployment, the service order transitions to the Scheduled state. If the service provisioner schedules the service order for immediate deployment, then the service order will be in the Scheduled state only briefly. However, if the service provisioner has scheduled a later deployment, the service order could be in this state for several hours or days.

When a scheduled service order reaches its time for deployment, it transitions to the transitory In Progress state. From this state, the Junos Space software attempts to deploy the service. Successful deployment transitions the service order to the Completed state.

If the Junos Space software cannot deploy the service because of invalid information in the service order itself, the service order enters the Invalid state. The service provisioner must resolve the issues that cause the failure before re-creating the service order and rescheduling it for deployment.

If the device is down or the Junos Space software is unable to push the service configuration to the device, the service order transitions to the Failed Deploy state.

A network operator might need to resolve the problem before the service provisioner reschedules the service order.

Service States

A service is created when a service order to provision a service reaches the Completed state.

If a service exists, it is in the Deployed state. If a new service fails to deploy, the service does not exist.

If an attempt to modify a service fails, the service enters the Fail Deploy state. When a service is in the Fail Deploy state, you can attempt to redeploy it, or you can delete it.

The service also has an audit state of Up or Down, depending on whether the service passed or failed functional audit.

- Related Topics**
- Viewing Service Orders on page 174
 - Viewing Services on page 185
 - Deploying a Service on page 157
 - Validating a Service on page 159

Part 2

Prestaging Devices

- Prestaging Devices Overview on page 23
- Device Configuration Prerequisites to Prestaging on page 31
- Prestaging Actions on page 37
- Monitoring Prestaging Activities on page 55

Chapter 2

Prestaging Devices Overview

- Prestaging Devices Overview on page 23

Prestaging Devices Overview

In the Junos Space product, prestaging takes the devices already under Junos Space management and prepares them for service activation. The prestaging process discovers network provider edge (N-PE) devices in the Junos Space database and assigns roles to those devices and their interfaces. N-PE routers and user-to-network interfaces (UNIs) are basic building blocks required by provisioning.

The Junos Space software makes it easy to complete all the prestaging activities you need for up to several hundred devices.

Prestaging using the Ethernet Activator software automatically determines the role of a router based on rules that exist in the system. If a router is an N-PE router, the Junos Space software assigns it the N-PE role. The Junos Space software qualifies each interface on the N-PE router to be a serviceable UNI.

N-PE and UNI recommendations made automatically by the Ethernet Activator software are appropriate for most situations. In some networks, however, you might need to make some exceptions. You might have recommended N-PE devices that you don't want to assign the N-PE role for provisioning. In addition, you might want to exclude some interfaces from qualification as UNIs.

To prestage devices while accepting all recommendations made by the Ethernet Activator software, see “Discovering and Assigning All N-PE Devices” on page 44. To make exceptions to the Ethernet Activator recommendations, see “Discovering and Assigning N-PE Devices with Exceptions” on page 47.

The following topics provide additional overview information about the prestaging process:

- Prestaging Prerequisites on page 24
- Prestaging Process Overview on page 24
- Prestaging Rules on page 28
- VLAN Pool Profiles on page 29

Prestaging Prerequisites

Before you can perform prestaging on your network devices, each device must meet specific configuration requirements, and must be brought under Junos Space management through device discovery.

The following configuration requirements must be met before beginning the provisioning process. Otherwise, service deployment will fail:

- MPLS must run on each N-PE device and on each P device.
- LDP signaling must be established between N-PE devices that will participate in the same point-to-point Ethernet (LDP) service.
- MPBGP must run on each N-PE device that will participate in a multipoint service.

Before you can prestage devices, you must perform device discovery to import all Juniper Networks devices on your network that the Junos Space software can manage. The Ethernet Activator prestaging software works on devices that have already been discovered and imported into the Junos Space database, but have not yet been prestaged.

For details about bringing devices under Junos Space management, see *Discovering Devices*.

Related Topics ■ [Discovering Devices](#)

Prestaging Process Overview

After the Junos Space software has discovered the devices, you must perform a two or three stage process to prestage devices:

1. Discover roles. In this stage, the Junos Space software searches the database for N-PE devices that have not yet been assigned.
2. Examine the results of the role discovery and make any exceptions to the system recommendations (rare). Specifically, you might:
 - Exclude specified devices from N-PE role assignment.
You might need to do this for a device that you know is not a PE device. For example, Provider (P) devices that have loopback addresses will pass the rules for N-PE role assignment. For devices that you know are not PE devices, you can edit the configuration out-of-band, and then run role discovery again.
 - Select a different loopback address for a device.
 - Exclude interfaces from UNI assignment.
3. Confirm the assignments.

You make assignments and exceptions using two inventory pages:

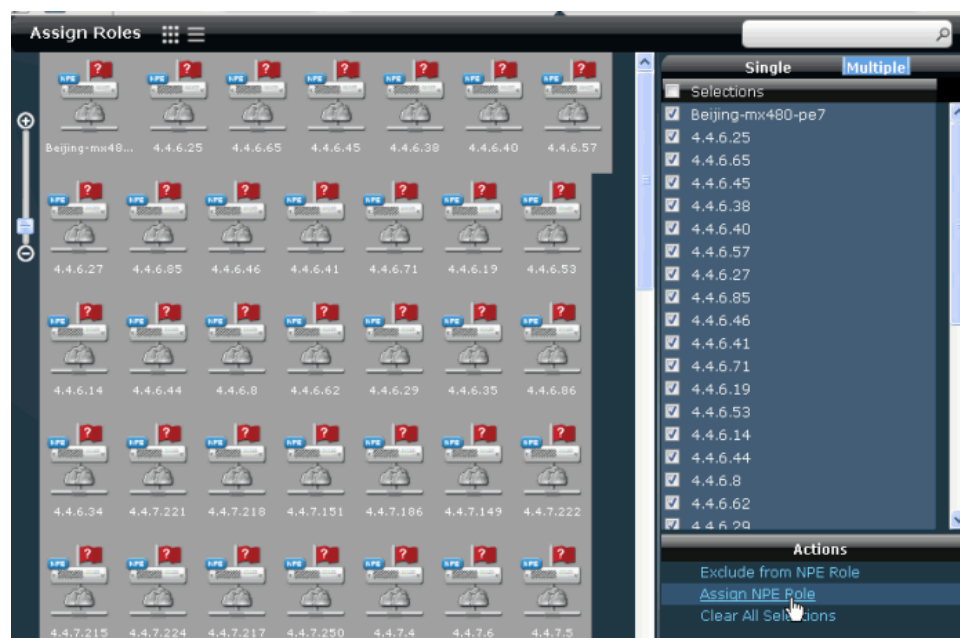
- The Assign Roles screen is a device inventory of N-PE routers that the Ethernet Activator software has discovered in its database that have not yet been assigned.
- The Manage Device UNIs screen is an inventory of UNI-qualified interfaces for a specific discovered device. You can view a separate Manage Device UNIs screen for each discovered N-PE device.

You can select and work on individual objects or multiple objects at the same time. The following topics summarize the operations you can perform from these inventory screens:

- Assign Roles Screen with Multiple Selections on page 25
- Assign Roles Screen with One Device Selected on page 26
- Manage Device UNIs Screen with Multiple Selections on page 26
- Manage Device UNIs Screen with Single UNI Selected on page 27

Assign Roles Screen with Multiple Selections

The following example shows the Assign Roles screen with multiple devices selected:

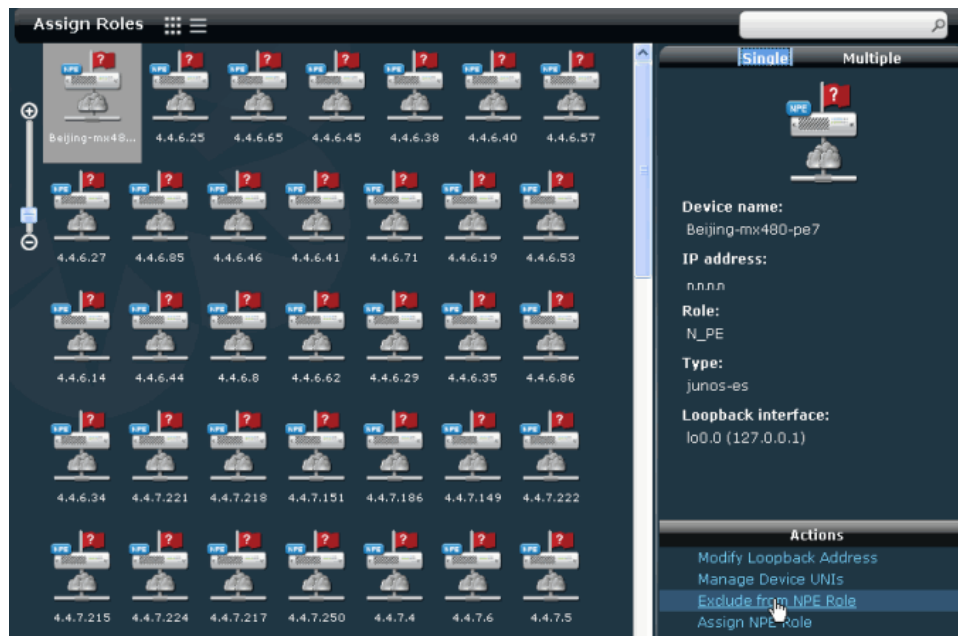


This example shows all the devices the Ethernet Activator software has discovered and recommended for assignment as N-PE devices. The most common and recommended prestaging workflow is to select all devices in the Assign Roles screen and assign them all. See “Discovering and Assigning All N-PE Devices” on page 44 for step-by-step instructions for assigning all Junos Space recommendations.

You can also use this screen to exclude specified devices from the N-PE role. See “Discovering and Assigning N-PE Devices with Exceptions” on page 47 for step-by-step instructions.

Assign Roles Screen with One Device Selected

This example shows the Role Discovery Results screen with just one device selected:

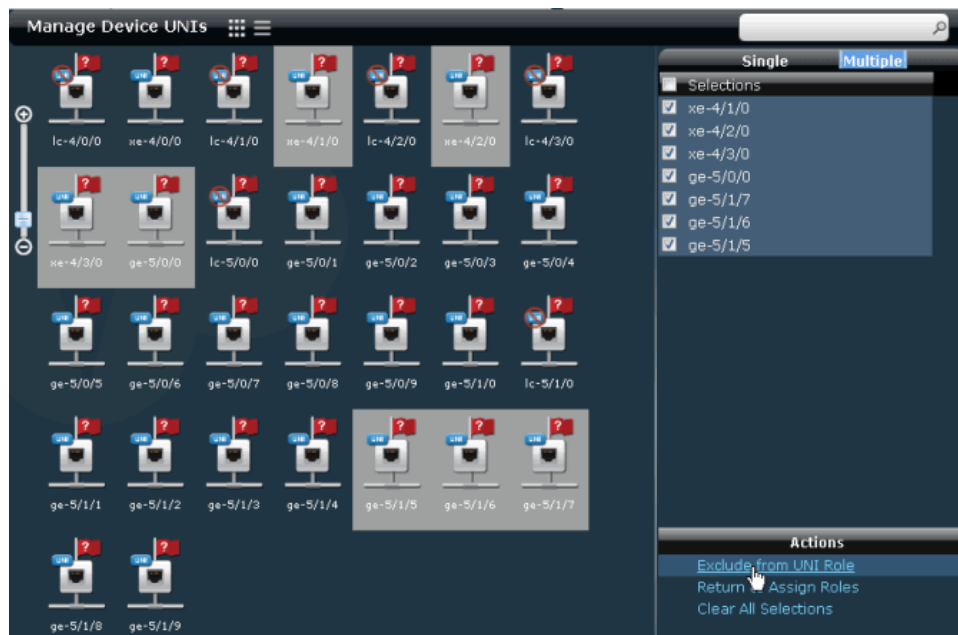


You must select a single device to change the loopback address or the UNI assignments on that device. You can also exclude a single device using this screen.

For step-by-step instructions on selecting a different loopback address, see “Changing the Loopback Address of an N-PE Device” on page 50.

Manage Device UNIs Screen with Multiple Selections

This example shows the Manage Device UNIs screen with multiple UNIs selected:



You can use this screen to exclude multiple interfaces from qualification as UNIs.

For step-by-step instructions on excluding interfaces from the list of qualified UNIs, see “Excluding Interfaces from UNI Role Assignments” on page 50.

Manage Device UNIs Screen with Single UNI Selected

This example shows the Manage Device UNIs screen with just one UNI selected:



You can use this screen to exclude a single interface from the list qualified for UNI assignment.

- Related Topics**
- Viewing N-PE Devices on page 37
 - Discovering and Assigning All N-PE Devices on page 44
 - Discovering and Assigning N-PE Devices with Exceptions on page 47

Prestaging Rules

Prestaging rules are predefined. These rules contain criteria for classifying the MPLS role of each device, in addition to recommending which physical interfaces should be UNI interfaces. For each recommended UNI interface, the system recommends its primary loopback address and its VLAN pool profile.

Correctly assigning MPLS roles to devices is critical for provisioning the correct MPLS behavior. Each MPLS role has a different behavior. For example, N-PE is the only role allowed to terminate MPLS sessions. Currently, the Ethernet Activator software classifies only N-PE devices.

The rules used by the Junos Space software to determine the recommended role assignment are described for devices, UNIs, and VLAN pool profiles in the following sections:

- N-PE Device Classification Rules on page 28
- UNI Classification Rules on page 28
- VLAN Pool Profile Classification Rules on page 29

N-PE Device Classification Rules

The system recommends the N-PE role for devices that satisfy the following criteria:

- The comment field in the device configuration identifies the device as an N-PE device.
- The device role is set to N-PE unless EBGp is enabled for the device. Specifically, the device role is set to N-PE unless the device configuration has `configuration/protocols/bgp/group/type` set to external. If EBGp is enabled, the device role is set to P.
- The device is assigned a loopback address. A device that has no loopback address cannot function as an N-PE device.

UNI Classification Rules

Before an interface on an N-PE device can be provisioned as a UNI, it must satisfy the following criteria:

- The interface must be Gigabit Ethernet (ge) or 10 Gigabit Ethernet (xe) type.
- The interface must have no IP address defined.

VLAN Pool Profile Classification Rules

The Junos Space software assigns VLAN pool ranges to the UNIs, depending on the configured encapsulation.

Related Topics Viewing Prestaging Rules on page 40

VLAN Pool Profiles

A VLAN pool profile specifies the ranges of valid VLAN IDs that are available for use on MX Series devices, on each physical interface. The maximum theoretical pool of VLAN IDs contains 4096 VLAN IDs—IDs 0 through 4095.

VLAN ID 0 and VLAN ID 4095 are never valid VLAN IDs.

The Ethernet Activator system provides the following predefined VLAN pool profiles:

- **maximum-range**—Any VLAN ID pool created using the maximum-range profile allows any VLAN ID from 1 through 4094. This is the default VLAN profile.
- **vlan-ccc**—Any VLAN ID pool created using the vlan-ccc profile allows any VLAN IDs from 512 through 4094 available for use. VLAN IDs 1 through 511 are reserved for use by Juniper Networks.

For each physical interface that the Ethernet Activator software recommends as a UNI, the system attempts to determine the best VLAN pool profile. For example, if a UNI has the vlan-ccc encapsulation setting, the rules recommend the vlan-ccc pool profile for that interface. When the correct VLAN pool profiles have been assigned to each UNI, The Ethernet Activator software creates a VLAN ID pool for each UNI containing only the allowed VLAN IDs specified in the VLAN pool profile for that UNI.

If the device interface is already running encapsulation before being brought under Junos Space management, the Ethernet Activator software will assign the appropriate VLAN range.

For details about encapsulation, see the *Junos Software VPNs Configuration Guide*.

Related Topics

- Viewing Prestaging Rules on page 40
- Discovering and Assigning All N-PE Devices on page 44
- Discovering and Assigning N-PE Devices with Exceptions on page 47

Chapter 3

Device Configuration Prerequisites to Prestaging

- Base Configuration for N-PE Device to be Used in Multipoint Service on page 31
- Base Configuration for N-PE Device to be Used in a Point-to-Point Ethernet (LDP) Service on page 32
- Base Configuration for a P Router on page 34

Base Configuration for N-PE Device to be Used in Multipoint Service

An N-PE device to be used in a multipoint service must have the following entities configured before you assign the N-PE role to the device:

- Gigabit Ethernet interfaces to the network core
- Loopback interface
- Routing options
- MPLS protocol
- BGP protocol
- ospf protocol
- ldp protocol

A sample configuration follows. The N-PE device in this example has just one interface to the network core. In a more complex network in which the N-PE device connects to more than one P device, you would need to configure multiple interfaces.

```
interfaces {
  ge-0/0/0 {
    unit 0 {
      family inet {
        address 10.1.22.2/30;
      }
      family mpls;
    }
  }
  lo0 {
    unit 0 {
      family inet {
```

```

        address 192.168.1.30/32;
    }
}
}
routing-options {
    autonomous-system 65410;
}
protocols {
    mpls {
        interface ge-0/0/0.0;
        interface lo0.0;
    }
    bgp {
        group CA-Peer {
            type internal;
            local-address 192.168.1.30;
            family l2vpn {
                signaling;
            }
            neighbor 192.168.1.40;
            neighbor 192.168.1.10;
            neighbor 192.168.1.20;
            neighbor 192.168.1.50;
            neighbor 192.168.1.60;
        }
    }
    ospf {
        traffic-engineering;
        area 0.0.0.0 {
            interface lo0.0 {
                passive;
            }
            interface ge-0/0/0.0;
        }
    }
    ldp {
        interface ge-0/0/0.0;
        interface lo0.0;
    }
}

```

- Related Topics**
- Base Configuration for N-PE Device to be Used in a Point-to-Point Ethernet (LDP) Service on page 32
 - Base Configuration for a P Router on page 34

Base Configuration for N-PE Device to be Used in a Point-to-Point Ethernet (LDP) Service

An N-PE device to be used in a point-to-point service must have the following entities configured before you assign the N-PE role to the device:

- Gigabit Ethernet interfaces to the network core
- Loopback interface
- MPLS protocol

- ospf protocol
- ldp protocol

A sample configuration follows. The N-PE device in this example has just one interface to the network core. In a more complex network in which the N-PE device connects to more than one P device, you would need to configure multiple interfaces.

```

interfaces {
  ge-0/0/0 {
    unit 0 {
      family inet {
        address 10.1.18.2/30;
      }
      family mpls;
    }
  }
  lo0 {
    unit 0 {
      family inet {
        address 192.168.1.20/32;
      }
    }
  }
}
protocols {
  mpls {
    interface ge-0/0/0.0;
    interface lo0.0;
  }
  ospf {
    traffic-engineering;
    area 0.0.0.0 {
      interface lo0.0 {
        passive;
      }
      interface ge-0/0/0.0;
    }
  }
  ldp {
    interface ge-0/0/0.0;
    interface lo0.0;
  }
}

```



NOTE: If the N-PE router will also be used in multipoint services, do not use this base configuration. Instead, use the base configuration for multipoint services.

- Related Topics**
- Base Configuration for N-PE Device to be Used in Multipoint Service on page 31
 - Base Configuration for a P Router on page 34

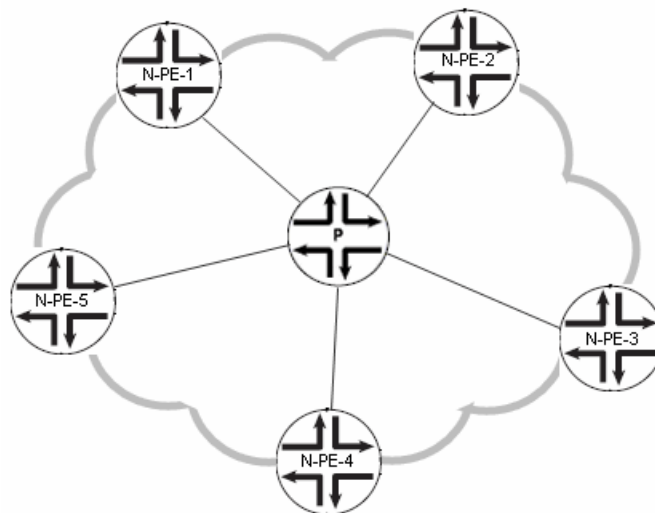
Base Configuration for a P Router

P routers in your MPLS network must have the following entities configured before these devices are prestaged:

- A Gigabit Ethernet interface to each router in the network
- Loopback interface
- MPLS protocol
- ospf protocol
- ldp protocol

Figure 8 on page 34 shows a simple network with one P router connecting five N-PE routers.

Figure 8: Connectivity in a Simple Network



The following example shows a P-router configuration for the simple network shown in Figure 8 on page 34.

```

interfaces {
    ge-0/0/2 {
        unit 0 {
            family inet {
                address 10.1.14.1/30;
            }
            family mpls;
        }
    }
    ge-0/0/3 {
        unit 0 {
            family inet {
                address 10.1.15.2/30;
            }
        }
    }
}
  
```

```

        family mpls;
    }
}
ge-5/0/0 {
    unit 0 {
        family inet {
            address 10.1.17.1/30;
        }
        family mpls;
    }
}
ge-5/0/1 {
    unit 0 {
        family inet {
            address 10.1.18.1/30;
        }
        family mpls;
    }
}
lo0 {
    unit 0 {
        family inet {
            address 192.168.1.1/32;
        }
    }
}
}

}
protocols {
    mpls {
        interface ge-0/0/2.0;
        interface ge-0/0/3.0;
        interface ge-5/0/0.0;
        interface ge-5/0/1.0;
        interface lo0.0;
    }
    ospf {
        traffic-engineering;
        area 0.0.0.0 {
            interface ge-0/0/2.0;
            interface ge-0/0/3.0;
            interface ge-5/0/0.0;
            interface ge-5/0/1.0;
            interface lo0.0 {
                passive;
            }
        }
    }
    ldp {
        interface ge-0/0/2.0;
        interface ge-0/0/3.0;
        interface ge-5/0/0.0;
        interface ge-5/0/1.0;
    }
}
}

```

Related Topics ■ Base Configuration for N-PE Device to be Used in Multipoint Service on page 31

- Base Configuration for N-PE Device to be Used in a Point-to-Point Ethernet (LDP) Service on page 32

Chapter 4

Prestaging Actions

- Viewing N-PE Devices on page 37
- Viewing Prestaging Rules on page 40
- Discovering and Assigning All N-PE Devices on page 44
- Discovering and Assigning N-PE Devices with Exceptions on page 47
- Adding a UNI on page 52
- Unassigning N-PE Devices on page 53
- Deleting UNIs on page 54

Viewing N-PE Devices

You can view network devices that have been assigned the N-PE role using either a thumbnail display or a table.

The following topics provide procedures for viewing N-PE devices:

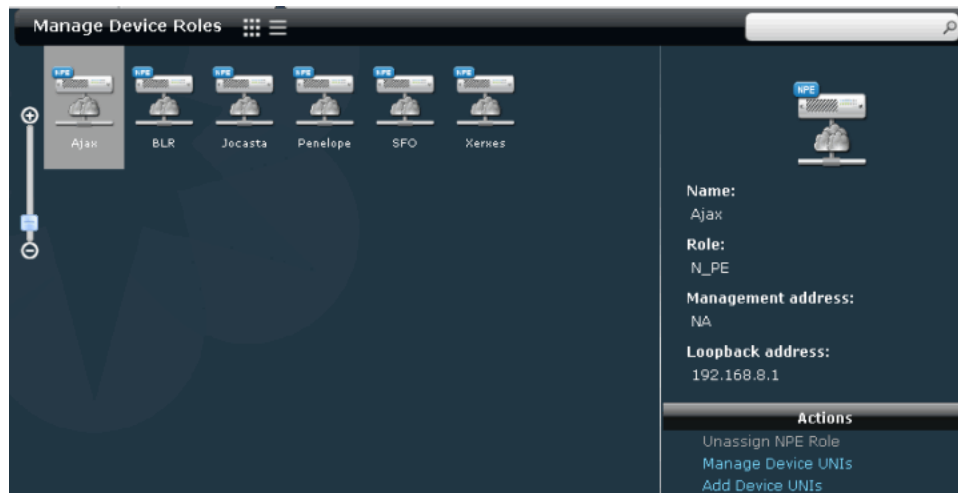
- Viewing N-PE Devices as Graphics on page 37
- Viewing N-PE Devices in a Table on page 39

Viewing N-PE Devices as Graphics

To view N-PE devices in a graphical form, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Prestage Devices** workspace icon.
2. In the task ribbon, select the **Manage Device Roles** task icon.
3. In the Manage Device Roles screen header, select the graphical view icon.

Thumbnails of every device on the network assigned the N-PE role appear in the main display area, as shown in the following example:



4. To view summary information about a specific N-PE device, select the thumbnail of that device. The Junos Space software provides the following information in the quick view panel:
 - Name—The name assigned to the device
 - Role—The assigned MPLS role for the device (N-PE)
 - Management address—The address to which the Junos Space fabric connects to the device
 - Loopback address
5. To view additional device details, including UNI information, double-click the thumbnail. The NPE Details window appears.

The detailed view provides the following information:

- Name—The name assigned to the device
- MPLS Role—The assigned MPLS role for the device (N-PE)
- Serial number—The serial number of the device
- OS version—The version of the Junos software on the device
- Platform—The device type and model, for example MX240
- Loopback address
- Connection status—up or down
- UNI Interfaces—All assigned UNIs on the device with the applied VLAN pool profile

An example follows:



Viewing N-PE Devices in a Table

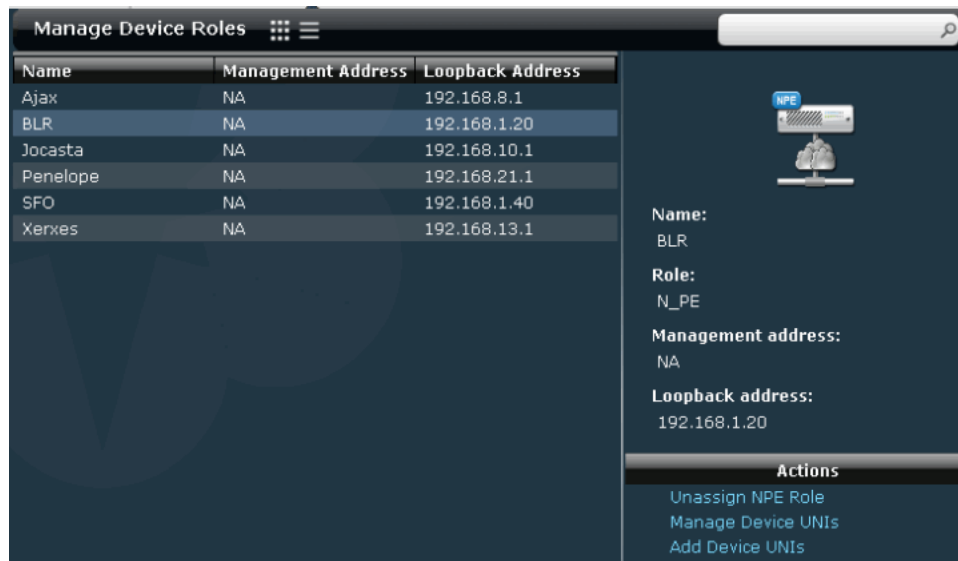
To view N-PE devices in a table, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Prestage Devices** workspace icon.
2. In the task ribbon, select the **Manage Device Roles** task icon.
3. In the Manage Device Roles screen header, select the table view icon.

A table of information about all N-PE devices on your network appears. For each device, the table presents the following information:

- **Name**—The name assigned to the device.
- **Management Address**—The address to which the Junos Space fabric connects to the device.
- **Loopback Address**

An example follows:



4. To view summary information about a specific N-PE device, select the table row for the device. The Ethernet Activator software provides the following information in the quick view panel:
 - Name—The name assigned to the device
 - Role—The assigned MPLS role for the device (N-PE)
 - Management address—The address to which the Junos Space fabric connects to the device
 - Loopback address
5. To view additional device details and UNI information, double-click the table row for the device. The device detail view appears in the main display area. The detailed view lists all UNIs discovered on the device with the applied VLAN pool profile. See “Viewing N-PE Devices as Graphics” on page 37 for an example.

- Related Topics**
- Prestaging Devices Overview on page 23
 - Viewing Prestaging Statistics on page 55
 - Viewing Prestaging Rules on page 40
 - Adding a UNI on page 52
 - Unassigning N-PE Devices on page 53
 - Deleting UNIs on page 54

Viewing Prestaging Rules

Prestaging rules contain criteria for classifying the MPLS role of each device and recommending which physical interfaces should be UNI interfaces. For each recommended UNI interface, the system recommends its primary loopback address.

These prestaging rules are predefined and cannot be configured. They are neither selectable nor configurable. However, you can modify the results of the rules before committing the recommended assignments to the database.

The following topics show how to view prestaging rules in either a graphical or a tabular view. You can view a summary of all prestaging rules, see a summary “quick view,” or view details of a specific prestaging rule.

- Viewing Prestaging Rules as Graphics on page 41
- Viewing Prestaging Rules in a Table on page 43

Viewing Prestaging Rules as Graphics

To view the prestaging rules as graphics, follow these steps:

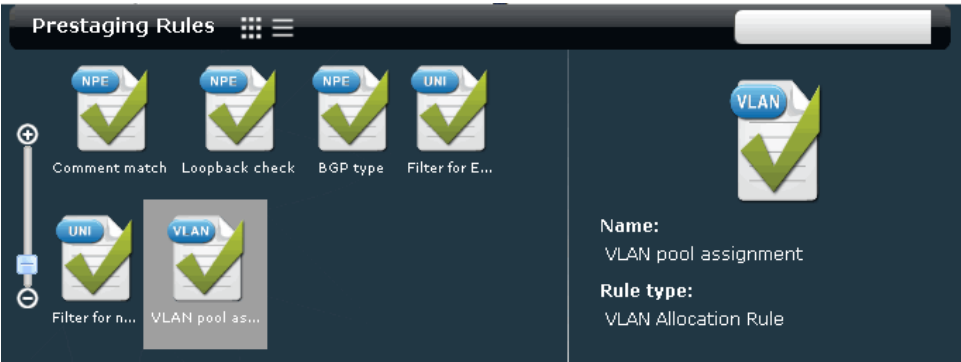
1. In the Ethernet Activator task ribbon, select the **Prestage Devices** workspace.
2. In the task ribbon, select the **Manage Device Roles** task.
3. In the task ribbon, select **Rules**.

The Prestaging Rules screen appears.

4. In the Prestaging Rules screen header, select the thumbnail view icon.







Thumbnails representing each of the prestaging rules appear. Figure 9 on page 41 shows an example.

Figure 9: Viewing Thumbnails of Prestaging Rules

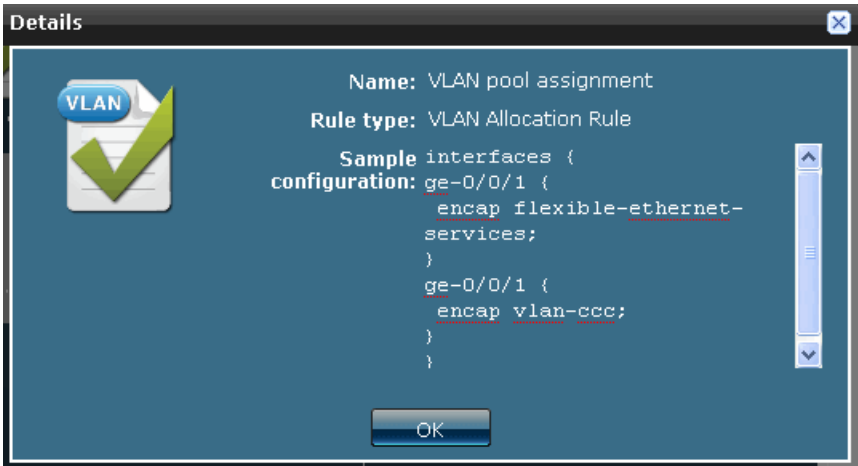


Each thumbnail contains a decoration in the top left corner that identifies the type of check the rule performs and a unique name that identifies the specific rule. Table 4 on page 42 explains each prestaging rule.

Table 4: Prestaging Rules

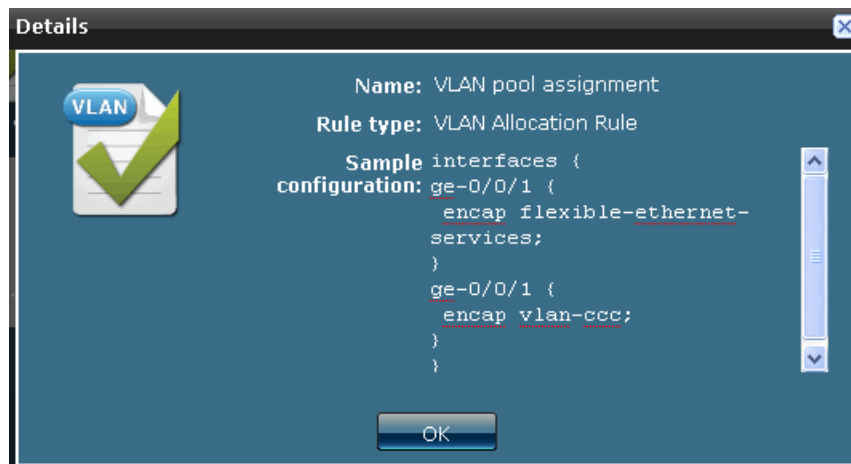
Name	Rule Type	Explanation
Comment match		<p>Checks whether the Comment field in the device configuration explicitly identifies the device as a PE device.</p> <p>The Comment field must contain “PE” if the device is to be assigned the PE MPLS role.</p>
Loopback check		<p>Checks whether the loopback IP address is set in the device configuration.</p> <p>A loopback address must be set if the device is to be assigned the PE MPLS role.</p>
BGP type		<p>Checks whether EBGp is enabled for the device. Specifically, the rule checks whether the device configuration has configuration/protocols/bgp/group/type set to “external.”</p> <p>EBGP must not be enabled if the device is to be assigned the PE MPLS role. Devices with EBGp set are instead assigned the P role.</p>
Filter for Ethernet ports		Checks for Gigabit Ethernet (ge) or 10 Gigabit Ethernet (xe) interfaces.
Filter for non IP ports		Excludes interfaces with IP addresses from UNI assignment.
Vlan pool assignment		<p>Depending on configured encapsulation, correct VLAN pool ranges are assigned to the UNIs:</p> <ul style="list-style-type: none"> ■ vlan-ccc—512 through 4094 ■ flexible-ethernet-services—1 through 4094 ■ flexible-vlan-services—1 through 4094 ■ extended-vlan-ccc—1 through 4094

5. To view summary information about a specific prestaging rule, click the rule icon. The following summary information appears in the quick look panel to the right:
 - The name of the rule
 - The rule type; that is, whether it is an NPE rule, a UNI rule, or a VLAN allocation rule
6. To view additional details about a rule, double-click the rule thumbnail. The additional information includes a sample configuration that satisfies the rule:



Viewing Prestaging Rules in a Table

- To view prestaging rules in a tabular format, follow these steps:
1. In the Ethernet Activator task ribbon, select the **Prestage Devices** workspace.
 2. In the task ribbon, select the **Manage Device Roles** task.
 3. In the task ribbon, select **Rules**.
The Prestaging Rules screen appears.
 4. In the Prestaging Rules screen header, select the table view icon.
A table appears listing all the prestaging rules along with a brief description of each rule. See Table 4 on page 42 for details.
 5. To view summary information about a specific rule, select the rule in the table. The following summary information appears in the quick-look pane to the right:
 - The name of the rule
 - The rule type; that is, whether it is an NPE rule, a UNI rule, or a VLAN rule
 6. To view details about the rule, including a sample configuration, double-click the table row. An example output follows:



- Related Topics**
- Prestaging Devices Overview on page 23
 - Viewing N-PE Devices on page 37
 - Discovering and Assigning All N-PE Devices on page 44
 - Discovering and Assigning N-PE Devices with Exceptions on page 47

Discovering and Assigning All N-PE Devices

Prestaging all Ethernet Activator assignment recommendations is a powerful yet simple way to prepare your devices for provisioning. This procedure provides the prestaging steps that accept all system recommendations. To prestage devices and make exceptions to the system recommendations, see “Discovering and Assigning N-PE Devices with Exceptions” on page 47.

Prestaging has two parts:

1. Discovering Device Roles on page 44
2. Assigning Device Roles on page 46

Discovering Device Roles

To discover the roles of devices found during element discovery, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Prestage Devices** workspace icon.
2. In the task ribbon, select the **Manage Device Roles** task icon.
3. In the task ribbon, select the **Discover Roles** task icon.

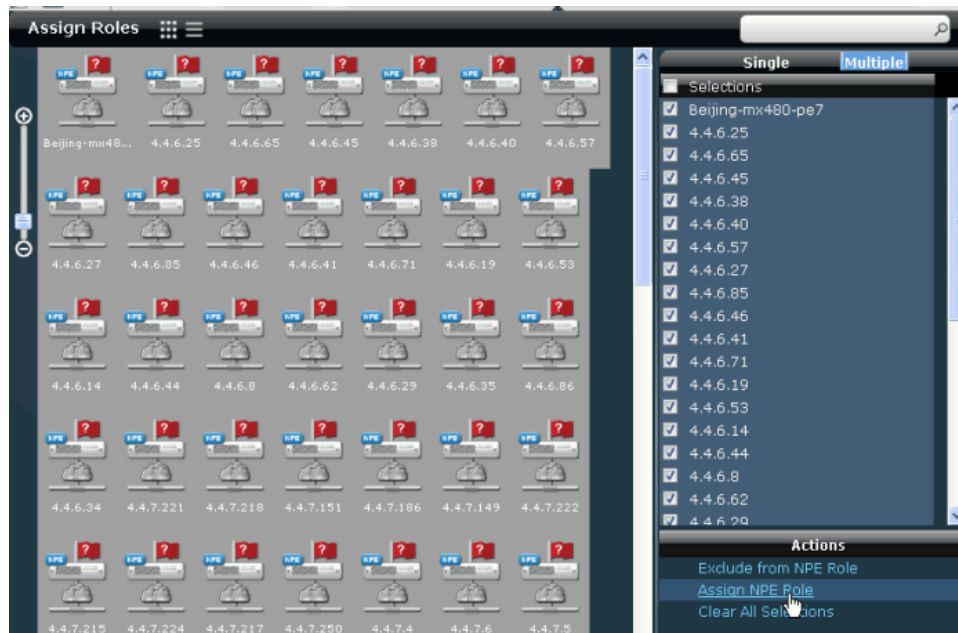
The Role Discovery Status window shows the discovery of unassigned devices found in the database, as shown in the following example:



In the graph portion of the Role Discovery Status window, the Total column shows the total number of devices under Junos Space management. At the start of the discovery process, the Discovered column shows the same number as the Total column. As discovery progresses, the Ethernet Activator software identifies devices as N-PE type, and moves them from the Discovered column to the PE column. On completion, the PE column shows the number of devices that the Ethernet Activator role discovery rules identify as N-PE devices, and the Discovered bar indicates devices for which the Ethernet Activator software was unable to determine the appropriate role.

4. To view the devices for which the Ethernet Activator software recommends the PE role, click on the PE bar.

The Assign Roles screen appears, as shown in the following example:



The question mark on each icon indicates that the device role has not yet been assigned.

Device role discovery is now complete. To assign device and interface roles, follow the steps in the next section, “Assigning Device Roles” on page 46.

Assigning Device Roles

If you need to exclude devices from role assignment, or you need to exclude interfaces from the list of interfaces that can be used as UNIs, use the procedures documented in “Discovering and Assigning N-PE Devices with Exceptions” on page 47.

To assign all discovered roles and interfaces, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Prestage Devices** workspace icon.
2. In the task ribbon, select **Manage Device Roles**.
3. The Manage Device Roles screen appears and shows all devices with roles currently assigned.
4. In the task ribbon, select the **Assign Roles** task icon.
5. In the Assign Roles screen, click **Multiple** in the quick view pane and select all devices.
6. Click **Assign NPE Role**.
7. In the confirmation screen, click **Assign**.
8. To view the assignment status, in the Job Details screen, click the job ID of the assignment job.

The Manage Jobs screen shows the progress and status of the role assignment job. See Viewing Scheduled Jobs for details.

While the job is ongoing, you cannot make additional assignments from the Assign Roles screen. The Assign NPE Role action is dimmed to indicate you cannot select it.

- Related Topics**
- Prestaging Devices Overview on page 23
 - Discovering and Assigning N-PE Devices with Exceptions on page 47
 - Unassigning N-PE Devices on page 53
 - Deleting UNIs on page 54
 - Viewing Scheduled Jobs
 - Viewing Prestaging Rules on page 40

Discovering and Assigning N-PE Devices with Exceptions

Preparing network devices for service activation is usually a simple process which directs the Ethernet Activator software to prepare your devices automatically. When you prestage devices, the Ethernet Activator software scans the database for devices that have already been discovered but have no MPLS role assigned, and recommends a role for each device it finds, based on the device configuration data and a set of predefined rules. You can then display those devices and their recommended settings for:

- MPLS role for the device (PE only)
- Loopback interface
- UNI interfaces

The Ethernet Activator software allows you to exclude specific recommended devices from being assigned the N-PE role and to exclude interfaces from use as UNIs during service provisioning. You can also change the loopback address of a PE device.

For step-by-step instructions on how to prepare devices for network activation using all the recommendations for N-PE role assignment and UNI assignment that the Ethernet Activator software makes, see “Discovering and Assigning All N-PE Devices” on page 44. These topics describe how to prestage devices with exceptions:

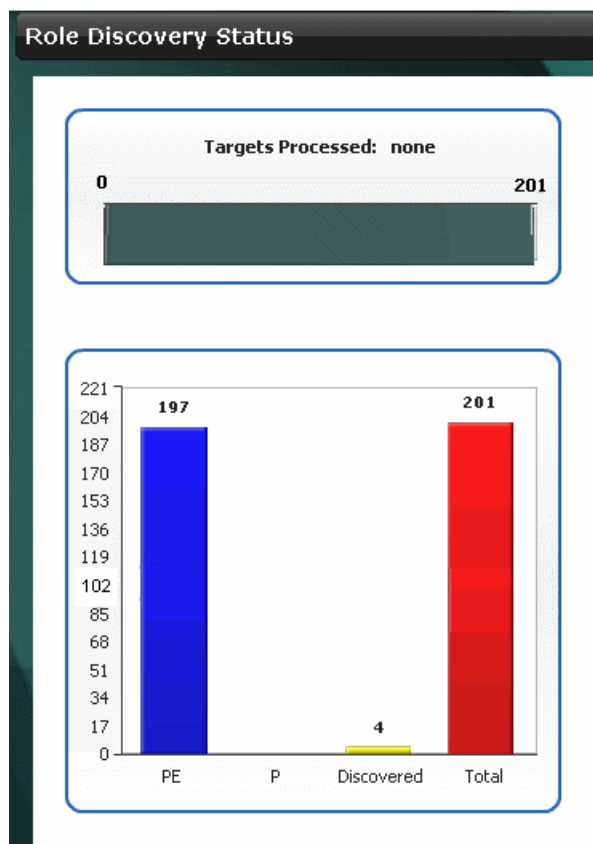
1. Discovering Device Roles on page 48
2. Excluding Devices from N-PE Role Assignment on page 49
3. Changing the Loopback Address of an N-PE Device on page 50
4. Excluding Interfaces from UNI Role Assignments on page 50
5. Committing Your Prestaging Choices on page 51

Discovering Device Roles

To discover unassigned PE devices, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Prestage Devices** workspace icon.
2. In the task ribbon, select the **Manage Device Roles** task icon.
3. In the task ribbon, select the **Discover Roles** task icon.

The Role Discovery Status window shows the discovery of unassigned devices found in the database, as shown in the following example:

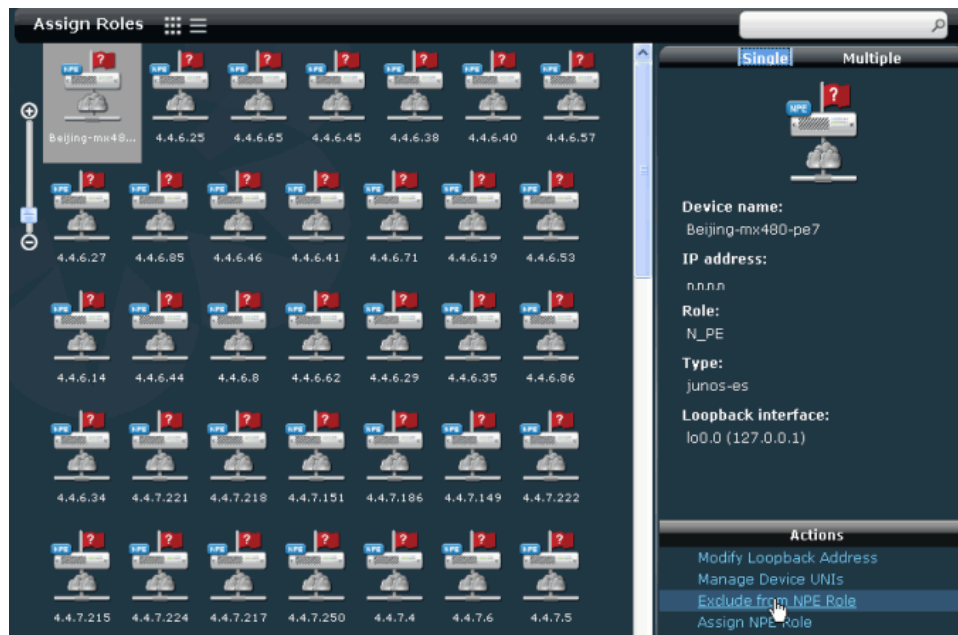


The Targets Processed box contains a progress bar, which when finished, shows how many unassigned devices the Ethernet Activator software found in its database.

The graph portion of this example shows how many of the unassigned devices the prestaging rules determined could be assigned the N-PE role and how many could be assigned the P role. The Discovered bar indicates devices that had no MPLS role assigned but for which the Ethernet Activator software was unable to recommend a role.

4. To view the devices for which the Ethernet Activator software recommends the PE role, click on the blue bar.

The Assign Roles screen appears, similar to the following example:



The question mark on each icon indicates that the device role has not yet been assigned.

5. Choose your next step:
 - To exclude a device, see “Excluding Devices from N-PE Role Assignment” on page 49.
 - To change the loopback address for specific devices, see “Changing the Loopback Address of an N-PE Device” on page 50.
 - To exclude some UNIs for specific devices, see “Excluding Interfaces from UNI Role Assignments” on page 50.

Excluding Devices from N-PE Role Assignment

The rules-driven process that the Ethernet Activator software uses to discover device roles recommends the correct roles in most cases. To exclude a device from N-PE role assignment, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Prestage Devices** workspace icon.
2. In the task ribbon, select the **Manage Device Roles** task icon.
3. In the task ribbon, select the **Assign Roles** task icon.
The results of the most recent role discovery operation appear.
4. In the Assign Roles screen, select the N-PE device that you want to exclude from role assignment. To exclude several N-PE devices, use the multiple selection capability.
5. In the Actions panel, select **Exclude from NPE Role**.

The Assign Roles screen refreshes. The excluded devices are no longer visible.

Changing the Loopback Address of an N-PE Device

The Ethernet Activator software allows you to change the loopback address of an N-PE device to that of a different loopback unit.



NOTE: Although Junos software allows you to assign multiple loopback addresses to the same loopback unit, the Junos Space software recognizes only the first address assigned to the loopback unit. Therefore, when you change the loopback address of an N-PE device, it must be to that of a different loopback unit.

To change the loopback address of an N-PE device, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Prestage Devices** workspace icon.
2. In the task ribbon, select the **Manage Device Roles** task icon.
3. In the task ribbon, select the **Assign Roles** task icon.

The results of the most recent role discovery operation appear, including any changes you have subsequently made to your prestaging data.

Repeat steps 4 through 7 for each device for which you want to change the loopback address:

4. In the Assign Roles screen, select the device for which you want to change the loopback address.
5. In the Actions panel, select **Modify Loopback Address**.
6. In the Modify Loopback Address window, select the loopback address you want to use.
7. Click **Modify**.

The quick look panel shows the new loopback address.

Excluding Interfaces from UNI Role Assignments

To exclude interfaces from the list of interfaces that the prestaging rules determined were suitable for use as UNIs, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Prestage Devices** workspace icon.
2. In the task ribbon, select the **Manage Device Roles** task icon.
3. In the task ribbon, select the **Assign Roles** task icon.

The results of the most recent role discovery operation appear, including any changes you have subsequently made to your prestaging data.

Repeat steps 4 through 9 for each device for which you want to exclude some recommended UNI selections:

4. In the Assign Roles screen, select the device for which you want to manage UNIs.
5. In the Actions panel, select **Manage Device UNIs**.

The Manage Device UNIs screen shows all the device interfaces for the selected device and indicates those that the Ethernet Activator software recommends for use as UNIs. The following graphic provides an example:



6. In the Manage Device UNIs screen, select the UNI you want to exclude.
To exclude more than one UNI, use the multiple selection capability.
7. In the Actions panel, select **Exclude from UNI Role**.
8. In the Actions panel, click **Return to Assign Roles** to return to the Assign Roles screen.

Committing Your Prestaging Choices

This procedure provides instructions for assigning the N-PE role to selected devices and committing all device prestaging information to the database.

Before performing these steps, you must complete the following tasks:

- Discover devices that have not yet been assigned an MPLS role.
- Exclude from the list of discovered devices those devices that you do not want to assign the N-PE role to.
- On each device, exclude the interfaces you do not want used as UNIs.

To commit your prestaging choices to the database, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Prestage Devices** workspace icon.
2. In the task ribbon, select the **Manage Device Roles** task icon.
3. In the task ribbon, select the **Assign Roles** task icon.

4. Examine the list of devices to be sure these are the devices you want to assign the N-PE role.
5. Use the multiple selection capability to select all devices. The quick look panel lists all selected devices.
6. Click **Assign NPE Role**.
7. In the confirmation screen, click **Assign**.
8. To view the assignment status, in the Job Details screen, click the job ID of the assignment job.

The Manage Jobs screen shows the progress and status of the role assignment job. See [Viewing Scheduled Jobs](#) for details.

While the job is ongoing, you cannot make additional assignments from the Assign Roles screen. The Assign NPE Role action is dimmed to indicate you cannot select it.

- Related Topics**
- [Prestaging Devices Overview on page 23](#)
 - [Discovering and Assigning All N-PE Devices on page 44](#)
 - [Unassigning N-PE Devices on page 53](#)
 - [Adding a UNI on page 52](#)
 - [Deleting UNIs on page 54](#)
 - [Viewing Scheduled Jobs](#)
 - [Viewing Prestaging Rules on page 40](#)
 - [Viewing N-PE Devices on page 37](#)

Adding a UNI

To add a UNI to the list of UNIs that can be assigned to a service on a specific device, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Prestage Devices** workspace icon.
2. In the task ribbon, select the **Manage Device Roles** task icon.
3. In the Manage Device Roles screen, select the device on which you want to add an interface to the list of potential UNIs.
4. In the Actions panel, select **Add Device UNIs**.
5. The Assign Device UNIs screen appears, similar to the following example.
This screen displays all interfaces on the device that have not been assigned.



Interfaces that the prestaging rules identified as having UNI capability have the UNI symbol in the upper left corner of the thumbnail.

6. Select the interface you want to make available for assignment as a UNI. To select multiple interfaces, use the multiple selection feature.
7. In the Actions panel, select **Assign UNI**.
8. In the Assign UNI role window, click **Confirm** to assign the UNI.

- Related Topics**
- Viewing N-PE Devices on page 37
 - Deleting UNIs on page 54

Unassigning N-PE Devices

To unassign an N-PE device so that it can no longer be assigned to a service, follow these steps:



NOTE: Before you unassign an N-PE device, it must not be assigned to any deployed service.

1. In the Ethernet Activator task ribbon, select the **Prestage Devices** workspace icon.
2. In the task ribbon, select the **Manage Device Roles** task icon.
3. In the Manage Device roles screen, select the N-PE device you want to unassign.

4. In the Actions panel, select **Unassign NPE Role**.



NOTE: If services are deployed on this device, the Unassign NPE Role action will be dimmed and not selectable.

5. The Manage Device Roles screen refreshes and shows the selected device removed.

- Related Topics**
- Viewing N-PE Devices on page 37
 - Discovering and Assigning All N-PE Devices on page 44
 - Discovering and Assigning N-PE Devices with Exceptions on page 47

Deleting UNIs

After performing the initial assignment of N-PE devices and UNIs, you can still exclude additional interfaces from the list of UNIs so long as those UNIs are not assigned to services.

To remove an interface from consideration as a UNI, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Prestage Devices** workspace icon.
2. In the task ribbon, select the **Manage Device Roles** task icon.
3. In the Manage Device Roles screen, select the device you want to work on.
4. In the Actions panel, select **Manage Device UNIs**.
The Manage Device UNIs screen appears. It shows all the interfaces that have been assigned the UNI role.
5. Select the interface you no longer want to have the UNI role. To unassign multiple interfaces, use the multiple selection feature.
6. In the Actions panel, select **Delete UNI**.
7. In the Exclude from UNI Role confirmation window, click **Exclude**.

- Related Topics**
- Viewing N-PE Devices on page 37
 - Adding a UNI on page 52

Chapter 5

Monitoring Prestaging Activities

- Monitoring Device Roles on page 55

Monitoring Device Roles

- Viewing Prestaging Statistics on page 55

Viewing Prestaging Statistics

The landing page for the Prestage Devices workspace contains charts and graphs that provide information about available capacity on discovered N-PE devices. You can determine which devices have UNIs available, or which devices have plenty of available capacity for routing services.

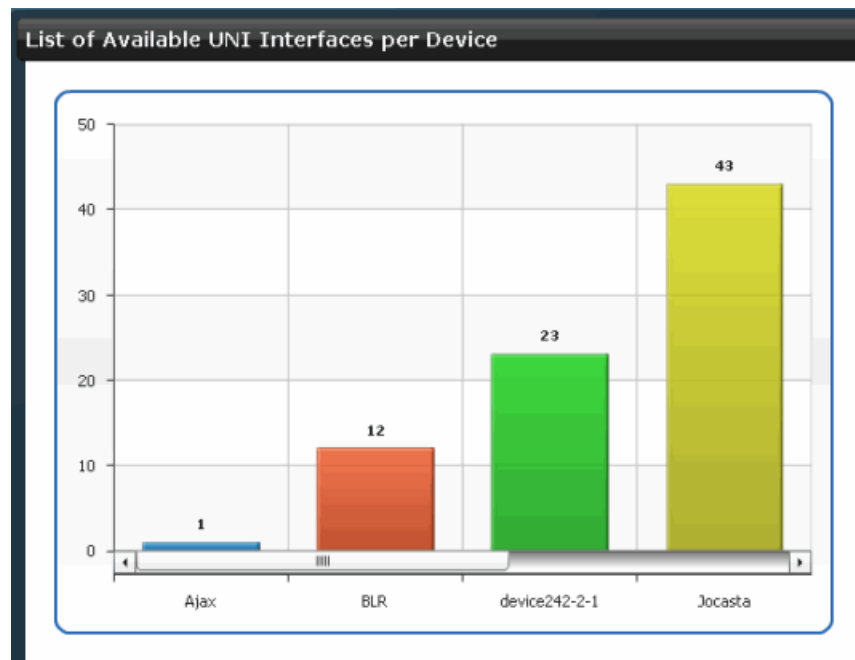
The following topics describe viewing statistics in the Prestage Devices workspace landing page:

- Viewing Available UNIs on N-PE Devices on page 55
- Viewing Services on N-PE Devices on page 56

Viewing Available UNIs on N-PE Devices

To view the number of available UNIs on each device allocated an N-PE role, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Prestage Devices** workspace icon.
The Junos Space software displays the chart named List of Available UNI Interfaces per Device. An example follows:



Each vertical bar represents an N-PE device. The number of UNIs is shown on the Y axis. If more than four devices on your network have been assigned the N-PE role, drag the slider across the bottom of the graph to view all devices.

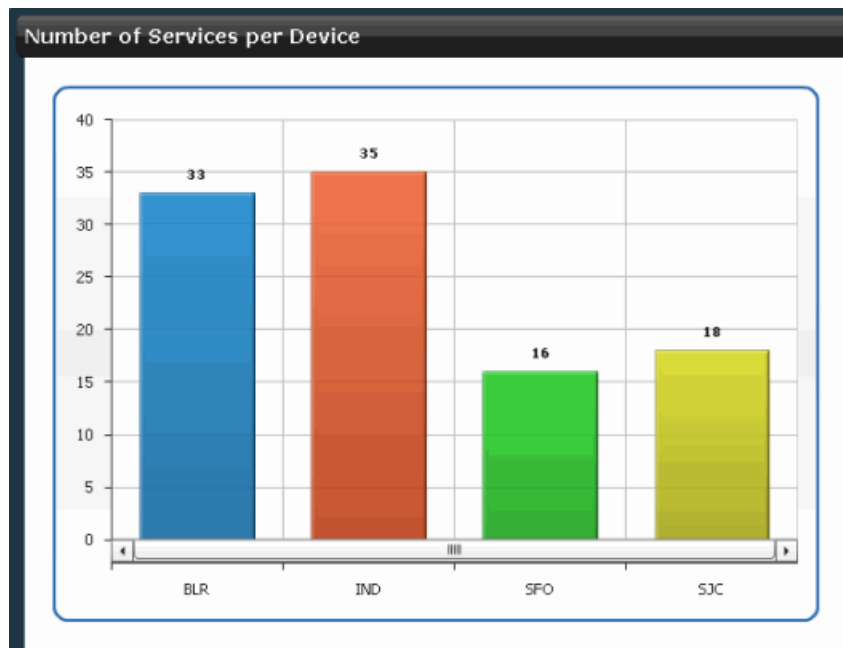
2. To list the UNIs configured on a specific N-PE device:
 - a. Click on the bar that represents the device.
 - b. In the Manage Device Roles screen, double-click the device.

The Manage Device Roles screen shows only the data for the selected device.

Viewing Services on N-PE Devices

To view the number of services provisioned on each N-PE device in your network, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Prestage Devices** workspace icon.
The Junos Space software displays the chart named Number of Services per Device. An example follows:



2. Each vertical bar represents an N-PE device. The number of services provisioned on each device is shown on the Y axis. If more than four devices on your network have been assigned the N-PE role, drag the slider across the bottom of the graph to view all devices.
3. To find out more information about the services provisioned on a specific device, click on the bar that represents the device.

The Manage Services page displays only those services provisioned on that device.

- Related Topics**
- Prestaging Devices Overview on page 23
 - Viewing Services on page 185
 - Viewing Managed Devices

Part 3

Creating and Managing Layer 2 Service Definitions

- Managing Service Definitions on page 61
- Monitoring Service Definitions on page 131

Chapter 6

Managing Service Definitions

- Predefined Service Definitions on page 61
- Viewing Service Definitions on page 109
- Creating a Point-to-Point Ethernet Service Definition on page 114
- Creating a VPLS Service Definition on page 121
- Publishing a Customized Service Definition on page 129
- Unpublishing a Service Definition on page 129
- Deleting a Customized Service Definition on page 130

Predefined Service Definitions

The Ethernet Activator provides predefined service definitions that a service provisioner can choose from when creating a service order.

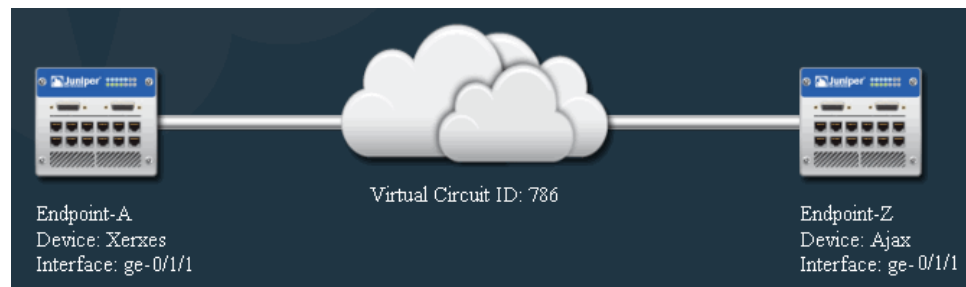
If none of the predefined service definitions is appropriate for your needs, you can create a service definition as described in “Creating a Point-to-Point Ethernet Service Definition” on page 114 or “Creating a VPLS Service Definition” on page 121.

The Junos Space product provides predefined service definitions for Ethernet point-to-point services and for VPLS services. The following sections describe these service definitions:

- Ethernet Point-to-Point Predefined Service Definitions on page 61
- VPLS Predefined Service Definitions on page 85

Ethernet Point-to-Point Predefined Service Definitions

The Ethernet Activator software provides predefined service definitions for Ethernet point-to-point services that use LDP switching in the network core. These services are sometimes known as E-Line Martini services. Figure 10 on page 62 shows an example of such a service.

Figure 10: Point-to-Point Service

Information specific to each service instance, such as the device name, endpoint name, and customer VLAN ID, is provided in the service order. Attributes that can apply across many service instances are typically defined in the service definition. These attributes include:

- Ethernet option (dot1.q, port-port, qinq)
- Traffic type (single VLAN, multiple VLAN, all traffic)
- Physical interface encapsulation
- Logical interface encapsulation
- Rate limit range

Table 5 on page 62 lists each of the standard Ethernet point-to-point service definitions. Each standard service definition is then described in detail in the sections that follow.

Table 5: Standard Service Definitions

Standard Service Definition Name	Service Attributes
“ELine-Dot1q-SingleVLAN” on page 64	<ul style="list-style-type: none"> ■ Point-to-point service for M Series and MX Series devices ■ Gigabit Ethernet interfaces ■ 802.1Q endpoint interface types ■ Customer traffic is single VLAN ■ Flexible-ethernet-services physical encapsulation type ■ Rate limiting from 10 Mbps to 100 Mbps with 10 Mbps increment
“ELine-Dot1q-SingleVLAN-CCC” on page 66	<ul style="list-style-type: none"> ■ Point-to-point service for J Series, M Series, and MX Series devices ■ Gigabit Ethernet interfaces ■ 802.1Q endpoint interface types ■ Customer traffic is single VLAN ■ Vlan-ccc physical encapsulation type ■ Rate limiting from 10 Mbps to 100 Mbps with 10 Mbps increment

Table 5: Standard Service Definitions *(continued)*

Standard Service Definition Name	Service Attributes
“ELine-Dot1q-SingleVLAN-Ext-CCC” on page 68	<ul style="list-style-type: none"> ■ Point-to-point service for J Series, M Series, and MX Series devices ■ Gigabit Ethernet interfaces ■ 802.1Q endpoint interface types ■ Customer traffic is single VLAN ■ Extended-vlan-ccc physical encapsulation type ■ Rate limiting from 10 Mbps to 100 Mbps with 10 Mbps increment
“ELine-PortBased” on page 70	<ul style="list-style-type: none"> ■ Point-to-point service for J Series, M Series, and MX Series devices ■ Gigabit Ethernet interfaces ■ Port-based UNI ■ Ethernet-ccc physical encapsulation type ■ Rate limiting from 10 Mbps to 100 Mbps with 10 Mbps increment
“ELine-QinQ-AllVLAN” on page 72	<ul style="list-style-type: none"> ■ Point-to-point service for M Series and MX Series devices ■ Gigabit Ethernet interfaces ■ Q-in-Q endpoint interface types ■ All customer traffic ■ Flexible-ethernet-services physical encapsulation type ■ Rate limiting from 10 Mbps to 100 Mbps with 10 Mbps increment
“ELine-QinQ-AllVLAN-CCC” on page 74	<ul style="list-style-type: none"> ■ Point-to-point service for J series, M Series, and MX Series devices ■ Gigabit Ethernet interfaces ■ Q-in-Q endpoint interface types ■ All customer traffic ■ Vlan-ccc physical encapsulation type ■ Rate limiting from 10 Mbps to 100 Mbps with 10 Mbps increment
“ELine-QinQ-AllVLAN-Ext-CCC” on page 76	<ul style="list-style-type: none"> ■ Point-to-point service for J Series, M Series, and MX Series devices ■ Gigabit Ethernet interfaces ■ Q-in-Q endpoint interface types ■ All customer traffic ■ Extended-vlan-ccc physical encapsulation type ■ Rate limiting from 10 Mbps to 100 Mbps with 10 Mbps increment

Table 5: Standard Service Definitions *(continued)*

Standard Service Definition Name	Service Attributes
“ELine-QinQ-VLANRange” on page 78	<ul style="list-style-type: none"> ■ Point-to-point service for MX Series devices only ■ Gigabit Ethernet interfaces ■ Q-in-Q endpoint interface types ■ Customer traffic is range of VLANs ■ Flexible-ethernet-services physical encapsulation type ■ Rate limiting from 10 Mbps to 100 Mbps with 10 Mbps increment
“ELine-QinQ-VLANRange-CCC” on page 81	<ul style="list-style-type: none"> ■ Point-to-point service for MX Series devices only ■ Gigabit Ethernet interfaces ■ Q-in-Q endpoint interface types ■ Customer traffic is range of VLANs ■ Vlan-ccc physical encapsulation type ■ Rate limiting from 10 Mbps to 100 Mbps with 10 Mbps increment
“ELine-QinQ-VLANRange-Ext-CCC” on page 83	<ul style="list-style-type: none"> ■ Point-to-point service for MX Series devices only ■ Gigabit Ethernet interfaces ■ Q-in-Q endpoint interface types ■ Customer traffic is range of VLANs ■ Extended-vlan-ccc physical encapsulation ■ Rate limiting from 10 Mbps to 100 Mbps with 10 Mbps increment

ELine-Dot1q-SingleVLAN

This service definition provides a base for creating point-to-point services that transport a single VLAN across an LDP network core using 802.1Q endpoint interface types and flexible-ethernet-services as the physical encapsulation type. Service provisioners can limit the bandwidth of services built from this service definition to specific values from 10 Mbps through 100 Mbps.

The following sections show the configuration data on each endpoint when you use this service definition to create the service shown in Figure 10 on page 62:

- Configuration on Endpoint A on page 64
- Configuration on Endpoint Z on page 65

Configuration on Endpoint A

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint A:

```
ge-0/1/1 {
    flexible-vlan-tagging;
    mtu 1522;
    encapsulation flexible-ethernet-services;
```



```

        unit 1 {
            description "Dot1q Eline Martini ";
            encapsulation vlan-ccc;
            vlan-id 1;
            family ccc {
                filter {
                    input filter_in_ge-0/1/1_1;
                }
            }
        }
    }

    firewall {
        policer policer_in_ge-0/1/1_1 {
            if-exceeding {
                bandwidth-limit 100m;
                burst-size-limit 62500000;
            }
            then discard;
        }
    }

    family ccc {
        filter filter_in_ge-0/1/1_1 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/1/1_1;
                    accept;
                }
            }
        }
    }

    protocols {
        l2circuit {
            neighbor 192.168.1.40
                interface ge-0/1/1.1 {
                    virtual-circuit-id 786;
                    no-control-word;
                    mtu 1522;
                }
        }
    }
}

```

Configuration on Endpoint Z

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint Z:

```

ge-0/1/1 {
    flexible-vlan-tagging;
    mtu 1522;
    encapsulation flexible-ethernet-services;
    unit 1 {
        description "Dot1q Eline Martini ";
        encapsulation vlan-ccc;
        vlan-id 1;
        family ccc {
            filter {
                input filter_in_ge-0/1/1_1;
            }
        }
    }
}

```

```

}

firewall {
  policer policer_in_ge-0/1/1_1 {
    if-exceeding {
      bandwidth-limit 100m;
      burst-size-limit 62500000;
    }
    then discard;
  }
}

family ccc {
  filter filter_in_ge-0/1/1_1 {
    interface-specific;
    term 1 {
      then {
        policer policer_in_ge-0/1/1_1;
        accept;
      }
    }
  }
}

protocols {
  l2circuit {
    neighbor 192.168.1.30 {
      interface ge-0/1/1.1 {
        virtual-circuit-id 786;
        no-control-word;
        mtu 1522;
      }
    }
  }
}

```

ELine-Dot1q-SingleVLAN-CCC

This service definition provides a base for creating point-to-point services that transport a single VLAN across an LDP network core using 802.1Q endpoint interface types and vlan-ccc as the physical encapsulation type. Service provisioners can limit the bandwidth of services built from this service definition to specific values from 10 Mbps through 100 Mbps.

The following sections show the configuration data on each endpoint when you use this service definition to create the service shown in Figure 10 on page 62:

- Configuration on Endpoint A on page 66
- Configuration on Endpoint Z on page 67

Configuration on Endpoint A

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint A:

```

ge-0/1/1 {
  flexible-vlan-tagging;
  mtu 1522;
  encapsulation vlan-ccc;
  unit 513 {
    description VLANCCC-SR;
    encapsulation vlan-ccc;
  }
}

```

```

        vlan-id 513;
        family ccc {
            filter {
                input filter_in_ge-0/1/1_513;
            }
        }
    }
}

firewall {
    policer policer_in_ge-0/1/1_513 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
        then discard;
    }
    family ccc {
        filter filter_in_ge-0/1/1_513 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/1/1_513;
                    accept;
                }
            }
        }
    }
}

protocols {
    l2circuit {
        neighbor 192.168.1.40 {
            interface ge-0/1/1.513 {
                virtual-circuit-id 786;
                no-control-word;
                mtu 1522;
            }
        }
    }
}

```

Configuration on Endpoint Z

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint Z:

```

ge-0/1/1 {
    flexible-vlan-tagging;
    mtu 1522;
    encapsulation vlan-ccc;
    unit 513 {
        description VLANCCC-SR;
        encapsulation vlan-ccc;
        vlan-id 513;
        family ccc {
            filter {
                input filter_in_ge-0/1/1_513;
            }
        }
    }
}

```

```

    }
  }
}

firewall {
  policer policer_in_ge-0/1/1_513 {
    if-exceeding {
      bandwidth-limit 100m;
      burst-size-limit 62500000;
    }
    then discard;
  }
  family ccc {
    filter filter_in_ge-0/1/1_513 {
      interface-specific;
      term 1 {
        then {
          policer policer_in_ge-0/1/1_513;
          accept;
        }
      }
    }
  }
}

protocols {
  l2circuit {
    neighbor 192.168.1.30 {
      interface ge-0/1/1.513 {
        virtual-circuit-id 786;
        no-control-word;
        mtu 1522;
      }
    }
  }
}

```

ELine-Dot1q-SingleVLAN-Ext-CCC

This service definition provides a base for creating point-to-point services that transport a single VLAN across an LDP network core using 802.1Q endpoint interface types and extended-vlan-ccc as the physical encapsulation type. Service provisioners can limit the bandwidth of services built from this service definition to specific values from 10 Mbps through 100 Mbps.

The following sections show the configuration data on each endpoint when you use this service definition to create the service shown in Figure 10 on page 62:

- Configuration on Endpoint A on page 68
- Configuration on Endpoint Z on page 69

Configuration on Endpoint A

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint A:

```

ge-0/1/1 {
  flexible-vlan-tagging;

```

```

mtu 1522;
encapsulation extended-vlan-ccc;
unit 1 {
    description Extended-SR;
    vlan-id 1;
    family ccc {
        filter {
            input filter_in_ge-0/1/1_1;
        }
    }
}

firewall {
    policer policer_in_ge-0/1/1_1 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
        then discard;
    }
    family ccc {
        filter filter_in_ge-0/1/1_1 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/1/1_1;
                    accept;
                }
            }
        }
    }
}

protocols {
    l2circuit {
        neighbor 192.168.1.40 {
            interface ge-0/1/1.1 {
                virtual-circuit-id 786;
                no-control-word;
                mtu 1522;
            }
        }
    }
}

```

Configuration on Endpoint Z

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint Z:

```

ge-0/1/1 {
    flexible-vlan-tagging;
    mtu 1522;
    encapsulation extended-vlan-ccc;
    unit 1 {
        description Extended-SR;
        vlan-id 1;
        family ccc {

```

```

        filter {
            input filter_in_ge-0/1/1_1;
        }
    }
}

firewall {
    policer policer_in_ge-0/1/1_1 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
        then discard;
    }
    family ccc {
        filter filter_in_ge-0/1/1_1 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/1/1_1;
                    accept;
                }
            }
        }
    }
}

protocols {
    l2circuit {
        neighbor 192.168.1.30 {
            interface ge-0/1/1.1 {
                virtual-circuit-id 786;
                no-control-word;
                mtu 1522;
            }
        }
    }
}

```

ELine-PortBased

This service definition provides a base for creating point-to-point services that transport all traffic across an LDP network core using an entire port at each endpoint using ethernet-ccc as the physical encapsulation type. Service provisioners can limit the bandwidth of services built from this service definition to specific values from 10 Mbps to 100 Mbps.

The following sections show the configuration data on each endpoint when you use this service definition to create the service shown in Figure 10 on page 62:

- Configuration on Endpoint A on page 70
- Configuration on Endpoint Z on page 71

Configuration on Endpoint A

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint A:

```

ge-0/1/1 {
  encapsulation ethernet-ccc;
  unit 0 {
    family ccc {
      filter {
        input filter_in_ge-0/1/1;
      }
    }
  }
}

firewall {
  policer policer_in_ge-0/1/1 {
    if-exceeding {
      bandwidth-limit 10m;
      burst-size-limit 6250000;
    }
    then discard;
  }
  family ccc {
    filter filter_in_ge-0/1/1 {
      interface-specific;
      term 1 {
        then {
          policer policer_in_ge-0/1/1;
          accept;
        }
      }
    }
  }
}

protocols {
  l2circuit {
    neighbor 192.168.1.40 {
      interface ge-0/1/1.0 {
        virtual-circuit-id 786;
        no-control-word;
        mtu 1522;
      }
    }
  }
}

```

Configuration on Endpoint Z

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint Z:

```

ge-0/1/1 {
  encapsulation ethernet-ccc;
  unit 0 {
    family ccc {
      filter {
        input filter_in_ge-0/1/1;
      }
    }
  }
}

```

```

firewall {
  policer policer_in_ge-0/1/1 {
    if-exceeding {
      bandwidth-limit 10m;
      burst-size-limit 6250000;
    }
    then discard;
  }
  family ccc {
    filter filter_in_ge-0/1/1 {
      interface-specific;
      term 1 {
        then {
          policer policer_in_ge-0/1/1;
          accept;
        }
      }
    }
  }
}

protocols {
  l2circuit {
    neighbor 192.168.1.30 {
      interface ge-0/1/1.0 {
        virtual-circuit-id 786;
        no-control-word;
        mtu 1522;
      }
    }
  }
}

```

ELine-QinQ-AllVLAN

This service definition provides a base for creating point-to-point services that transport all customer traffic across an LDP network core using Q-in-Q endpoint interface types and flexible-ethernet-services as the physical encapsulation type. Service provisioners can limit the bandwidth of services built from this service definition to specific values from 10 Mbps through 100 Mbps.

The following sections show the configuration data on each endpoint when you use this service definition to create the service shown in Figure 10 on page 62:

- Configuration on Endpoint A on page 72
- Configuration on Endpoint Z on page 73

Configuration on Endpoint A

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint A:

```

ge-0/1/1 {
  flexible-vlan-tagging;
  mtu 1522;
  encapsulation flexible-ethernet-services;
  unit 1 {

```



```

        description "AllVlanTransport";
        encapsulation vlan-ccc;
        vlan-tags outer 1;
        family ccc {
            filter {
                input filter_in_ge-0/1/1_1;
            }
        }
    }

protocols {
    l2circuit {
        neighbor 192.168.1.40 {
            interface ge-0/1/1.1 {
                virtual-circuit-id 786;
                no-control-word;
                mtu 1522;
            }
        }
    }
}

firewall {
    policer policer_in_ge-0/1/1_1 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
        then discard;
    }
    family ccc {
        filter filter_in_ge-0/1/1_1 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/1/1_1;
                    accept;
                }
            }
        }
    }
}

```

Configuration on Endpoint Z

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint Z:

```

ge-0/1/1 {
    flexible-vlan-tagging;
    mtu 1522;
    encapsulation flexible-ethernet-services;
    unit 1 {
        description "AllVlanTransport";
        encapsulation vlan-ccc;
        vlan-tags outer 1;
        family ccc {
            filter {
                input filter_in_ge-0/1/1_1;
            }
        }
    }
}

```

```

    }
  }

  firewall {
    policer policer_in_ge-0/1/1_1 {
      if-exceeding {
        bandwidth-limit 100m;
        burst-size-limit 62500000;
      }
      then discard;
    }
    family ccc {
      filter filter_in_ge-0/1/1_1 {
        interface-specific;
        term 1 {
          then {
            policer policer_in_ge-0/1/1_1;
            accept;
          }
        }
      }
    }
  }
}

protocols {
  l2circuit {
    neighbor 192.168.1.30 {
      interface ge-0/1/1.1 {
        virtual-circuit-id 786;
        no-control-word;
        mtu 1522;
      }
    }
  }
}

```

ELine-QinQ-AllVLAN-CCC

This service definition provides a base for creating point-to-point services that transport all customer traffic across an LDP network core using Q-in-Q endpoint interface types and vlan-ccc as the physical encapsulation type. Service provisioners can limit the bandwidth of services built from this service definition to specific values from 10 Mbps through 100 Mbps.

The following sections show the configuration data on each endpoint when you use this service definition to create the service shown in Figure 10 on page 62:

- Configuration on Endpoint A on page 74
- Configuration on Endpoint Z on page 75

Configuration on Endpoint A

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint A:

```

ge-0/1/1 {
    flexible-vlan-tagging;
    mtu 1522;
    encapsulation vlan-ccc;
    unit 515 {
        description QinQ-ALLVLAN;
        encapsulation vlan-ccc;
        vlan-tags outer 515;
        family ccc {
            filter {
                input filter_in_ge-0/1/1_515;
            }
        }
    }
}

firewall {
    policer policer_in_ge-0/1/1_515 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
        then discard;
    }

    family ccc {
        filter filter_in_ge-0/1/1_515 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/1/1_515;
                    accept;
                }
            }
        }
    }
}

protocols {
    l2circuit {
        neighbor 192.168.1.40 {
            interface ge-0/1/1.515 {
                virtual-circuit-id 786;
                no-control-word;
                mtu 1522;
            }
        }
    }
}

```

Configuration on Endpoint Z

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint Z:

```

ge-0/1/1 {
    flexible-vlan-tagging;
    mtu 1522;
    encapsulation vlan-ccc;
    unit 515 {

```

```

        description QinQ-ALLVLAN;
        encapsulation vlan-ccc;
        vlan-tags outer 515;
        family ccc {
            filter {
                input filter_in_ge-0/1/1_515;
            }
        }
    }
}

firewall {
    policer policer_in_ge-0/1/1_515 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
        then discard;
    }
    family ccc {
        filter filter_in_ge-0/1/1_515 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/1/1_515;
                    accept;
                }
            }
        }
    }
}

protocols {
    l2circuit {
        neighbor 192.168.1.30 {
            interface ge-0/1/1.515 {
                virtual-circuit-id 786;
                no-control-word;
                mtu 1522;
            }
        }
    }
}

```

ELine-QinQ-AllVLAN-Ext-CCC

This service definition provides a base for creating point-to-point services that transport all customer traffic across an LDP network core using Q-in-Q endpoint interface types and extended-vlan-ccc as the physical encapsulation type. Service provisioners can limit the bandwidth of services built from this service definition to specific values from 10 Mbps through 100 Mbps.

The following sections show the configuration data on each endpoint when you use this service definition to create the service shown in Figure 10 on page 62:

- Configuration on Endpoint A on page 77
- Configuration on Endpoint Z on page 78

Configuration on Endpoint A

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint A:

```

ge-0/1/1 {
    flexible-vlan-tagging;
    mtu 1522;
    encapsulation extended-vlan-ccc;
    unit 1 {
        description Ext-AllVLAN;
        vlan-tags outer 1;
        family ccc {
            filter {
                input filter_in_ge-0/1/1_1;
            }
        }
    }
}

firewall {
    policer policer_in_ge-0/1/1_1 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
        then discard;
    }
    family ccc {
        filter filter_in_ge-0/1/1_1 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/1/1_1;
                    accept;
                }
            }
        }
    }
}

protocols {
    l2circuit {
        neighbor 192.168.1.40 {
            interface ge-0/1/1.1 {
                virtual-circuit-id 786;
                no-control-word;
                mtu 1522;
            }
        }
    }
}

```

Configuration on Endpoint Z

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint Z:

```

ge-0/1/1 {
    flexible-vlan-tagging;
    mtu 1522;
    encapsulation extended-vlan-ccc;
    unit 1 {
        description Ext-AllVLAN;
        vlan-tags outer 1;
        family ccc {
            filter {
                input filter_in_ge-0/1/1_1;
            }
        }
    }
}

firewall {
    policer policer_in_ge-0/1/1_1 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
        then discard;
    }
    family ccc {
        filter filter_in_ge-0/1/1_1 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/1/1_1;
                    accept;
                }
            }
        }
    }
}

protocols {
    l2circuit {
        neighbor 192.168.1.30 {
            interface ge-0/1/1.1 {
                virtual-circuit-id 786;
                no-control-word;
                mtu 1522;
            }
        }
    }
}

```

ELine-QinQ-VLANRange

This service definition provides a base for creating point-to-point services that transport a range of VLANs across an LDP network core using Q-in-Q endpoint

interface types and flexible-ethernet-services as the physical encapsulation type. Service provisioners can limit the bandwidth of services built from this service definition to specific values from 10 Mbps through 100 Mbps.

The following sections show the configuration data on each endpoint when you use this service definition to create the service shown in Figure 10 on page 62:

- Configuration on Endpoint A on page 79
- Configuration on Endpoint Z on page 80

Configuration on Endpoint A

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint A:

```
ge-0/1/1 {
    flexible-vlan-tagging;
    mtu 1522;
    encapsulation flexible-ethernet-services;
    unit 2 {
        description "QinQ Eline Martini";
        encapsulation vlan-ccc;
        vlan-tags outer 2 inner-range 100-110;
        family ccc {
            filter {
                input filter_in_ge-0/1/1_2;
            }
        }
    }
}

firewall {
    policer policer_in_ge-0/1/1_2 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
    }

    family ccc {
        filter filter_in_ge-0/1/1_2 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/1/1_2;
                    accept;
                }
            }
        }
    }

    protocols {
        l2circuit {
            neighbor 192.168.1.40 {
                interface ge-0/1/1.2 {
                    virtual-circuit-id 786;
                    no-control-word;
                    mtu 1522;
                }
            }
        }
    }
}
```

```
    }
}
```

Configuration on Endpoint Z

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint Z:

```
ge-0/1/1 {
  flexible-vlan-tagging;
  mtu 1522;
  encapsulation flexible-ethernet-services;
  unit 2 {
    description "QinQ Eline Martini";
    encapsulation vlan-ccc;
    vlan-tags outer 2 inner-range 100-110;
    family ccc {
      filter {
        input filter_in_ge-0/1/1_2;
      }
    }
  }
}

firewall {
  policer policer_in_ge-0/1/1_2 {
    if-exceeding {
      bandwidth-limit 100m;
      burst-size-limit 62500000;
    }
    then discard;
  }

  family ccc {
    filter filter_in_ge-0/1/1_2 {
      interface-specific;
      term 1 {
        then {
          policer policer_in_ge-0/1/1_2;
          accept;
        }
      }
    }
  }
}

protocols {
  l2circuit {
    interface ge-0/1/1.2 {
      virtual-circuit-id 786;
      no-control-word;
      mtu 1522;
    }
  }
}
}
```


ELine-QinQ-VLANRange-CCC

This service definition provides a base for creating point-to-point services that transport a range of VLANs across an LDP network core using Q-in-Q endpoint interface types and vlan-ccc as the physical encapsulation type. Service provisioners can limit the bandwidth of services built from this service definition to specific values from 10 Mbps through 100 Mbps.

The following sections show the configuration data on each endpoint when you use this service definition to create the service shown in Figure 10 on page 62:

- Configuration on Endpoint A on page 81
- Configuration on Endpoint Z on page 82

Configuration on Endpoint A

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint A:

```

ge-0/1/1 {
  flexible-vlan-tagging;
  mtu 1522;
  encapsulation vlan-ccc;
  unit 514 {
    description VLANRANGE-SR;
    encapsulation vlan-ccc;
    vlan-tags outer 514 inner-range 600-610;
    family ccc {
      filter {
        input filter_in_ge-0/1/1_514;
      }
    }
  }
}

firewall {
  policer policer_in_ge-0/1/1_514 {
    if-exceeding {
      bandwidth-limit 100m;
      burst-size-limit 62500000;
    }
    then discard;
  }
  family ccc {
    filter filter_in_ge-0/1/1_514 {
      interface-specific;
      term 1 {
        then {
          policer policer_in_ge-0/1/1_514;
          accept;
        }
      }
    }
  }
}

protocols {

```

```

l2circuit {
  neighbor 192.168.1.40 {
    interface ge-0/1/1.514 {
      virtual-circuit-id 786;
      no-control-word;
      mtu 1522;
    }
  }
}

```

Configuration on Endpoint Z

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint Z:

```

ge-0/1/1 {
  flexible-vlan-tagging;
  mtu 1522;
  encapsulation vlan-ccc;
  unit 514 {
    description VLANRANGE-SR;
    encapsulation vlan-ccc;
    vlan-tags outer 514 inner-range 600-610;
    family ccc {
      filter {
        input filter_in_ge-0/1/1_514;
      }
    }
  }
}

firewall {
  policer policer_in_ge-0/1/1_514 {
    if-exceeding {
      bandwidth-limit 100m;
      burst-size-limit 62500000;
    }
    then discard;
  }
  family ccc {
    filter filter_in_ge-0/1/1_514 {
      interface-specific;
      term 1 {
        then {
          policer policer_in_ge-0/1/1_514;
          accept;
        }
      }
    }
  }
}

protocols {
  l2circuit {
    neighbor 192.168.1.30 {
      interface ge-0/1/1.514 {

```

```

        virtual-circuit-id 786;
        no-control-word;
        mtu 1522;
    }
}
}

```

ELine-QinQ-VLANRange-Ext-CCC

This service definition provides a base for creating point-to-point services that transport a range of VLANs across an LDP network core using Q-in-Q endpoint interface types and extended-vlan-ccc as the physical encapsulation type. Service provisioners can limit the bandwidth of services built from this service definition to specific values from 10 Mbps through 100 Mbps.

The following sections show the configuration data on each endpoint when you use this service definition to create the service shown in Figure 10 on page 62:

- Configuration on Endpoint A on page 83
- Configuration on Endpoint Z on page 84

Configuration on Endpoint A

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint A:

```

ge-0/1/1 {
    flexible-vlan-tagging;
    mtu 1522;
    encapsulation extended-vlan-ccc;
    unit 2 {
        description Ext-VLANRange;
        vlan-tags outer 2 inner-range 100-110;
        family ccc {
            filter {
                input filter_in_ge-0/1/1_2;
            }
        }
    }
}

firewall {
    policer policer_in_ge-0/1/1_2 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
        then discard;
    }
    family ccc {
        filter filter_in_ge-0/1/1_2 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/1/1_2;
                }
            }
        }
    }
}

```

```

        accept;
    }
}
}
}
}
protocols {
    l2circuit {
        neighbor 192.168.1.30 {
            interface ge-0/1/1.2 {
                virtual-circuit-id 786;
                no-control-word;
                mtu 1522;
            }
        }
    }
}
}

```

Configuration on Endpoint Z

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint Z:

```

ge-0/1/1 {
    flexible-vlan-tagging;
    mtu 1522;
    encapsulation extended-vlan-ccc;
    unit 2 {
        description Ext-VLANRange;
        vlan-tags outer 2 inner-range 100-110;
        family ccc {
            filter {
                input filter_in_ge-0/1/1_2;
            }
        }
    }
}

firewall {
    policer policer_in_ge-0/1/1_2 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
        then discard;
    }
    family ccc {
        filter filter_in_ge-0/1/1_2 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/1/1_2;
                    accept;
                }
            }
        }
    }
}
}

```

```

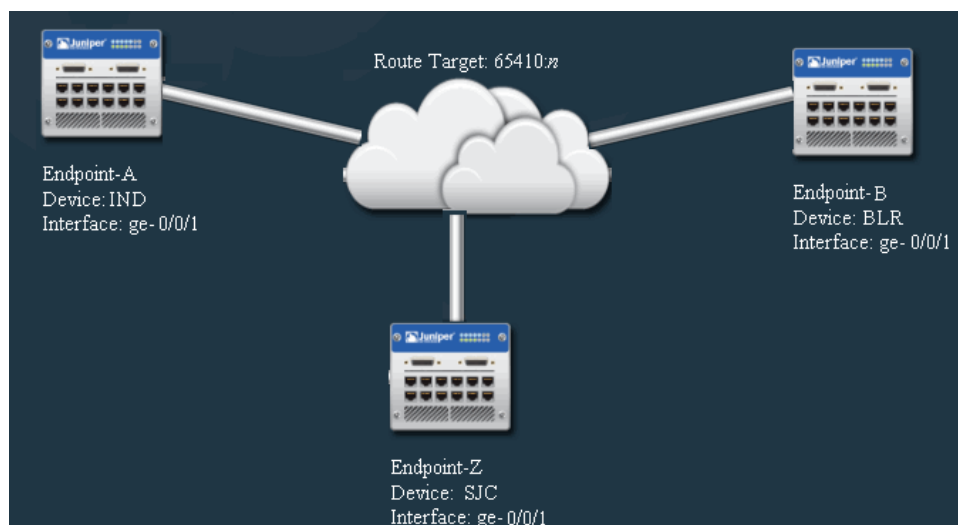
protocols {
  l2circuit {
    neighbor 192.168.1.30 {
      interface ge-0/1/1.2 {
        virtual-circuit-id 786;
        no-control-word;
        mtu 1522;
      }
    }
  }
}

```

VPLS Predefined Service Definitions

The Ethernet Activator software provides predefined service definitions for VPLS services that use BGP switching in the network core. These services are sometimes known as E-LAN services. They are multipoint services. Figure 11 on page 85 shows an example of such a service.

Figure 11: Multipoint Service



Information specific to each service instance, such as the device name, endpoint name, and customer VLAN ID, is provided in the service order. Attributes that can apply across many service instances are typically defined in the service definition. These attributes include:

- Ethernet option (dot1.q, port-port, qinq)
- Traffic type (single VLAN, VLAN range, all traffic)
- Physical interface encapsulation
- Logical interface encapsulation
- Rate limit range

Table 6 on page 86 lists each of the standard VPLS service definitions. Each standard service definition is then described in detail in the sections that follow.

Table 6: Standard Service Definitions

Standard Service Definition Name	Service Attributes
“ELAN-BGP-Dot1Q-Normalized-VLAN-None” on page 87	<ul style="list-style-type: none"> ■ Multipoint Ethernet service for M Series and MX Series devices ■ Gigabit Ethernet interfaces ■ Customer VLAN IDs are not preserved ■ 802.1Q endpoint interface types ■ Customer traffic is single VLAN ■ Flexible-ethernet-services physical encapsulation type ■ Rate limiting from 10 Mbps to 100 Mbps with 10 Mbps increment
“ELAN-BGP-Dot1Q-SingleVLAN” on page 91	<ul style="list-style-type: none"> ■ Multipoint Ethernet service for M Series or MX Series devices ■ Gigabit Ethernet interfaces ■ 802.1Q endpoint interface types ■ Customer traffic is single VLAN ■ Flexible-ethernet-services physical encapsulation type ■ Rate limiting from 10 Mbps to 100 Mbps with 10 Mbps increment
“ELAN-BGP-PortBased” on page 94	<ul style="list-style-type: none"> ■ Multipoint Ethernet service for M series and MX Series devices ■ Gigabit Ethernet interfaces ■ Port-based UNIs ■ Transports all customer traffic ■ Ethernet VPLS as physical encapsulation type ■ Rate limiting from 10 Mbps to 100 Mbps with 10 Mbps increment
“ELAN-BGP-QinQ-AllVLAN” on page 97	<ul style="list-style-type: none"> ■ Multipoint Ethernet service for M Series and MX Series devices ■ Gigabit Ethernet interfaces ■ Q-in-Q endpoint interface types ■ All customer traffic ■ Flexible-ethernet-services physical encapsulation type ■ Rate limiting from 10 Mbps to 100 Mbps with 10 Mbps increment

Table 6: Standard Service Definitions *(continued)*

Standard Service Definition Name	Service Attributes
“ELAN-BGP-QinQ-AllVLAN-Normalized-All” on page 100	<ul style="list-style-type: none"> ■ Multipoint Ethernet service for M Series and MX Series devices ■ Gigabit Ethernet interfaces ■ Customer VLAN IDs preserved ■ Q-in-Q endpoint interface types ■ All customer traffic ■ Flexible-ethernet-services physical encapsulation type ■ Rate limiting from 10 Mbps to 100 Mbps with 10 Mbps increment
“ELAN-BGP-QinQ-AllVLAN-Normalized-None” on page 103	<ul style="list-style-type: none"> ■ Multipoint Ethernet service for M Series and MX Series devices ■ Gigabit Ethernet interfaces ■ Q-in-Q endpoint interface types ■ VLAN IDs not preserved ■ All customer traffic ■ Flexible-ethernet-services physical encapsulation type ■ Rate limiting from 10 Mbps to 100 Mbps with 10 Mbps increment
“ELAN-BGP-QinQ-Range-Normalized-VLAN” on page 107	<ul style="list-style-type: none"> ■ Multipoint Ethernet service for MX Series devices only ■ Gigabit Ethernet interfaces ■ Customer VLAN IDs preserved ■ Q-in-Q endpoint interface types ■ Transports specified VLAN range ■ Flexible Ethernet services physical encapsulation type ■ Rate limiting from 10 Mbps to 100 Mbps with 10 Mbps increment

ELAN-BGP-Dot1q-Normalized-VLAN-None

This service definition provides a base for creating multipoint Ethernet services that transport traffic from a single VLAN on an endpoint across a BGP network core using 802.1Q endpoint interface types and flexible-ethernet-services as the physical encapsulation type. VLAN IDs are not preserved across the network—traffic passes from the single VLAN on an endpoint to any VLANs in the broadcast domain. Service provisioners can limit the bandwidth of services built from this service definition to specific values from 10 Mbps through 100 Mbps.

The following sections show the configuration data on each endpoint when you use this service definition to create the service shown in Figure 11 on page 85:

- Configuration on Endpoint A on page 88
- Configuration on Endpoint B on page 89
- Configuration on Endpoint Z on page 90

Configuration on Endpoint A

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint A (device IND):

```
ge-0/0/1 {
    flexible-vlan-tagging;
    encapsulation flexible-ethernet-services;
    unit 1 {
        encapsulation vlan-vpls;
        vlan-id 1;
        family vpls {
            filter {
                input filter_in_ge-0/0/1_1;
            }
        }
    }
}

firewall {
    policer policer_in_ge-0/0/1_1 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
        then discard;
    }
    family vpls {
        filter filter_in_ge-0/0/1_1 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/0/1_1;
                    accept;
                }
            }
        }
    }
}

routing-instances {
    BestCustomer_ELAN-BGP-Dot1q-Normalized-VLAN-SR {
        instance-type vpls;
        interface ge-0/0/1.1;
        route-distinguisher 65410:1;
        vrf-target target:65410:0;
        protocols {
            vpls {
                no-tunnel-services;
                site Site_2 {
                    site-identifier 2;
                    site-preference primary;
                    interface ge-0/0/1.1;
                }
            }
        }
    }
}
```



```

    }
  }
}

```

Configuration on Endpoint B

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint B (device BLR):

```

ge-0/0/1 {
  flexible-vlan-tagging;
  encapsulation flexible-ethernet-services;
  unit 1 {
    encapsulation vlan-vpls;
    vlan-id 1;
    family vpls {
      filter {
        input filter_in_ge-0/0/1_1;
      }
    }
  }
}

firewall {
  policer policer_in_ge-0/0/1_1 {
    if-exceeding {
      bandwidth-limit 100m;
      burst-size-limit 62500000;
    }
    then discard;
  }
  family vpls {
    filter filter_in_ge-0/0/1_1 {
      interface-specific;
      term 1 {
        then {
          policer policer_in_ge-0/0/1_1;
          accept;
        }
      }
    }
  }
}

routing-instances {
  BestCustomer_ELAN-BGP-Dot1q-Normalized-VLAN-SR {
    instance-type vpls;
    interface ge-0/0/1.1;
    route-distinguisher 65410:0;
    vrf-target target:65410:0;
    protocols {
      vpls {
        no-tunnel-services;
        site Site_1 {
          site-identifier 1;
          site-preference primary;
          interface ge-0/0/1.1;
        }
      }
    }
  }
}

```

```
    }
}
```

Configuration on Endpoint Z

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint Z (device SJC):

SJC:

```
ge-0/0/1 {
    flexible-vlan-tagging;
    encapsulation flexible-ethernet-services;
    unit 1 {
        encapsulation vlan-vpls;
        vlan-id 1;
        family vpls {
            filter {
                input filter_in_ge-0/0/1_1;
            }
        }
    }
}

firewall {
    policer policer_in_ge-0/0/1_1 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
        then discard;
    }
    family vpls {
        filter filter_in_ge-0/0/1_1 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/0/1_1;
                    accept;
                }
            }
        }
    }
}

routing-instances {
    BestCustomer_ELAN-BGP-Dot1q-Normalized-VLAN-SR {
        instance-type vpls;
        interface ge-0/0/1.1;
        vlan-id none;
        route-distinguisher 65410:2;
        vrf-target target:65410:0;
        protocols {
            vpls {
                no-tunnel-services;
                site Site_3 {
                    site-identifier 3;
                    site-preference primary;
                    interface ge-0/0/1.1;
                }
            }
        }
    }
}
```

```
    }
}
```

ELAN-BGP-Dot1Q-SingleVLAN

This service definition provides a base for creating multipoint Ethernet services that transport traffic on a single VLAN across a BGP network core using 802.1Q endpoint interface types and flexible-ethernet-services as the physical encapsulation type. No VLAN mapping is performed—the VLAN ID must be the same on all endpoints. Service provisioners can limit the bandwidth of services built from this service definition to specific values from 10 Mbps through 100 Mbps.

The following sections show the configuration data on each endpoint when you use this service definition to create the service shown in Figure 11 on page 85:

- Configuration on Endpoint A on page 91
- Configuration on Endpoint B on page 92
- Configuration on Endpoint Z on page 93

Configuration on Endpoint A

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint A (device IND):

```
ge-0/0/2 {
  flexible-vlan-tagging;
  encapsulation flexible-ethernet-services;
  unit 1 {
    encapsulation vlan-vpls;
    vlan-id 1;
    family vpls {
      filter {
        input filter_in_ge-0/0/2_1;
      }
    }
  }
}

firewall {
  policer policer_in_ge-0/0/2_1 {
    if-exceeding {
      bandwidth-limit 100m;
      burst-size-limit 62500000;
    }
    then discard;
  }

  filter filter_in_ge-0/0/2_1 {
    interface-specific;
    term 1 {
      then {
        policer policer_in_ge-0/0/2_1;
        accept;
      }
    }
  }
}
```

```

}
routing-instances {
  BestCustomer_ELAN-BGP-Dot1Q-SingleVLAN-SR {
    instance-type vpls;
    interface ge-0/0/2.1;
    route-distinguisher 65410:4;
    vrf-target target:65410:1;
    protocols {
      vpls {
        no-tunnel-services;
        site Site_2 {
          site-identifier 2;
          site-preference primary;
          interface ge-0/0/2.1;
        }
      }
    }
  }
}

```

Configuration on Endpoint B

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint B (device BLR):

```

ge-0/0/2 {
  flexible-vlan-tagging;
  encapsulation flexible-ethernet-services;
  unit 1 {
    encapsulation vlan-vpls;
    vlan-id 1;
    family vpls {
      filter {
        input filter_in_ge-0/0/2_1;
      }
    }
  }
}

firewall {
  policer policer_in_ge-0/0/2_1 {
    if-exceeding {
      bandwidth-limit 100m;
      burst-size-limit 62500000;
    }
    then discard;
  }
  filter filter_in_ge-0/0/2_1 {
    interface-specific;
    term 1 {
      then {
        policer policer_in_ge-0/0/2_1;
        accept;
      }
    }
  }
}

routing-instances {
  BestCustomer_ELAN-BGP-Dot1Q-SingleVLAN-SR {

```

```

instance-type vpls;
interface ge-0/0/2.1;
route-distinguisher 65410:3;
vrf-target target:65410:1;
protocols {
    vpls {
        no-tunnel-services;
        site Site_1 {
            site-identifier 1;
            site-preference primary;
            interface ge-0/0/2.1;
        }
    }
}

```

Configuration on Endpoint Z

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint Z (device SJC):

```

ge-0/0/2 {
    flexible-vlan-tagging;
    encapsulation flexible-ethernet-services;
    unit 1 {
        encapsulation vlan-vpls;
        vlan-id 1;
        family vpls {
            filter {
                input filter_in_ge-0/0/2_1;
            }
        }
    }
}

firewall {
    policer policer_in_ge-0/0/2_1 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
        then discard;
    }
    family vpls {
        filter filter_in_ge-0/0/2_1 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/0/2_1;
                    accept;
                }
            }
        }
    }
}

routing-instances {
    BestCustomer_ELAN-BGP-Dot1Q-SingleVLAN-SR {
        instance-type vpls;
        interface ge-0/0/2.1;
        route-distinguisher 65410:5;
    }
}

```

```

vrf-target target:65410:1;
protocols {
  vpls {
    no-tunnel-services;
    site Site_3 {
      site-identifier 3;
      site-preference primary;
      interface ge-0/0/2.1;
    }
  }
}

```

ELAN-BGP-PortBased

This service definition provides a base for creating multipoint Ethernet services that transport all traffic on an entire port across a BGP network core using ethernet-vpls as the physical encapsulation type. Service provisioners can limit the bandwidth of services built from this service definition to specific values from 10 Mbps through 100 Mbps.

The following sections show the configuration data on each endpoint when you use this service definition to create the service shown in Figure 11 on page 85:

- Configuration on Endpoint A on page 94
- Configuration on Endpoint B on page 95
- Configuration on Endpoint Z on page 96

Configuration on Endpoint A

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint A (device IND):

```

ge-0/1/3 {
  mtu 1522;
  encapsulation ethernet-vpls;
  unit 0 {
    family vpls {
      filter {
        input filter_in_ge-0/1/3;
      }
    }
  }
}

firewall {
  policer policer_in_ge-0/1/3 {
    if-exceeding {
      bandwidth-limit 100m;
      burst-size-limit 15220;
    }
    then discard;
  }
  family vpls {
    filter filter_in_ge-0/1/3 {
      interface-specific;
      term 1 {

```

```

        then {
            policer policer_in_ge-0/1/3;
            accept;
        }
    }
}

routing-instances {
    ELAN_BGP_PortBased_10_100M {
        instance-type vpls;
        interface ge-0/1/3.0;
        route-distinguisher 65410:3;
        vrf-target target:65410:1;
        protocols {
            vpls {
                no-tunnel-services;
                site Site_2 {
                    site-identifier 2;
                    site-preference primary;
                    interface ge-0/1/3.0;
                }
            }
        }
    }
}

```

Configuration on Endpoint B

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint B (device BLR):

```

ge-0/1/3 {
    mtu 1522;
    encapsulation ethernet-vpls;
    unit 0 {
        family vpls {
            filter {
                input filter_in_ge-0/1/3;
            }
        }
    }
}

firewall {
    policer policer_in_ge-0/1/3 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 15220;
        }
        then discard;
    }
    family vpls {
        filter filter_in_ge-0/1/3 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/1/3;
                    accept;
                }
            }
        }
    }
}

```

```

    }
  }
}
routing-instances {
  ELAN_BGP_PortBased_10_100M {
    instance-type vpls;
    interface ge-0/1/3.0;
    route-distinguisher 65410:2;
    vrf-target target:65410:1;
    protocols {
      vpls {
        no-tunnel-services;
        site Site_1 {
          site-identifier 1;
          site-preference primary;
          interface ge-0/1/3.0;
        }
      }
    }
  }
}

```

Configuration on Endpoint Z

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint Z (device SJC):

```

ge-0/2/2 {
  mtu 1522;
  encapsulation ethernet-vpls;
  unit 0 {
    family vpls {
      filter {
        input filter_in_ge-0/2/2;
      }
    }
  }
}

firewall {
  policer policer_in_ge-0/2/2 {
    if-exceeding {
      bandwidth-limit 100m;
      burst-size-limit 15220;
    }
    then discard;
  }
  family vpls {
    filter filter_in_ge-0/2/2 {
      interface-specific;
      term 1 {
        then {
          policer policer_in_ge-0/2/2;
          accept;
        }
      }
    }
  }
}

```



```

    }
}

routing-instances {
    ELAN_BGP_PortBased_10_100M {
        instance-type vpls;
        interface ge-0/2/2.0;
        route-distinguisher 65410:4;
        vrf-target target:65410:1;
        protocols {
            vpls {
                no-tunnel-services;
                site Site_3 {
                    site-identifier 3;
                    site-preference primary;
                    interface ge-0/2/2.0;
                }
            }
        }
    }
}

```

ELAN-BGP-QinQ-AllVLAN

This service definition provides a base for creating multipoint Ethernet services that transport all traffic across a BGP network core using Q-in-Q endpoint interface types and flexible-ethernet-services as the physical encapsulation type. No VLAN mapping is performed—customer VLAN IDs and service provider VLAN IDs must match on each endpoint that is to send or receive traffic. Service provisioners can limit the bandwidth of services built from this service definition to specific values from 10 Mbps through 100 Mbps.

The following sections show the configuration data on each endpoint when you use this service definition to create the service shown in Figure 11 on page 85:

- Configuration on Endpoint A on page 97
- Configuration on Endpoint B on page 98
- Configuration on Endpoint Z on page 99

Configuration on Endpoint A

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint A (device IND):

```

ge-0/1/1 {
    flexible-vlan-tagging;
    encapsulation flexible-ethernet-services;
    unit 1 {
        encapsulation vlan-vpls;
        vlan-tags outer 1;
        family vpls {
            filter {
                input filter_in_ge-0/1/1_1;
            }
        }
    }
}

```

```

firewall {
  policer policer_in_ge-0/1/1_1 {
    if-exceeding {
      bandwidth-limit 100m;
      burst-size-limit 62500000;
    }
    then discard;
  }
  family vpls {
    filter filter_in_ge-0/1/1_1 {
      interface-specific;
      term 1 {
        then {
          policer policer_in_ge-0/1/1_1;
          accept;
        }
      }
    }
  }
}
routing-instances {
  BestCustomer_ELAN-BGP-QinQ-AllVLAN-SR {
    instance-type vpls;
    interface ge-0/1/1.1;
    route-distinguisher 65410:13;
    vrf-target target:65410:4;
    protocols {
      vpls {
        no-tunnel-services;
        site Site_2 {
          site-identifier 2;
          site-preference primary;
          interface ge-0/1/1.1;
        }
      }
    }
  }
}

```

Configuration on Endpoint B

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint B (device BLR):

```

ge-0/1/1 {
  flexible-vlan-tagging;
  encapsulation flexible-ethernet-services;
  unit 1 {
    encapsulation vlan-vpls;
    vlan-tags outer 1;
    family vpls {
      filter {
        input filter_in_ge-0/1/1_1;
      }
    }
  }
}

firewall {
  policer policer_in_ge-0/1/1_1 {

```

```

        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
        then discard;
    }
}
family vpls {
    filter filter_in_ge-0/1/1_1 {
        interface-specific;
        term 1 {
            then {
                policer policer_in_ge-0/1/1_1;
                accept;
            }
        }
    }
}
}
routing-instances {
    BestCustomer_ELAN-BGP-QinQ-AllVLAN-SR {
        instance-type vpls;
        interface ge-0/1/1.1;
        route-distinguisher 65410:12;
        vrf-target target:65410:4;
        protocols {
            vpls {
                no-tunnel-services;
                site Site_1 {
                    site-identifier 1;
                    site-preference primary;
                    interface ge-0/1/1.1;
                }
            }
        }
    }
}
}

```

Configuration on Endpoint Z

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint Z (device SJC):

```

ge-0/0/5 {
    flexible-vlan-tagging;
    encapsulation flexible-ethernet-services;
    unit 1 {
        encapsulation vlan-vpls;
        vlan-tags outer 1;
        family vpls {
            filter {
                input filter_in_ge-0/0/5_1;
            }
        }
    }
}

firewall {
    policer policer_in_ge-0/0/5_1 {
        if-exceeding {
            bandwidth-limit 100m;

```

```

        burst-size-limit 62500000;
    }
    then discard;
}
family vpls {
    filter filter_in_ge-0/0/5_1 {
        interface-specific;
        term 1 {
            then {
                policer policer_in_ge-0/0/5_1;
                accept;
            }
        }
    }
}
}
routing-instances {
    BestCustomer_ELAN-BGP-QinQ-AllVLAN-SR {
        instance-type vpls;
        interface ge-0/0/5.1;
        route-distinguisher 65410:14;
        vrf-target target:65410:4;
        protocols {
            vpls {
                no-tunnel-services;
                site Site_3 {
                    site-identifier 3;
                    site-preference primary;
                    interface ge-0/0/5.1;
                }
            }
        }
    }
}
}

```

ELAN-BGP-QinQ-AllVLAN-Normalized-All

This service definition provides a base for creating multipoint Ethernet services that transport all traffic across a BGP network core using Q-in-Q endpoint interface types and flexible-ethernet-services as the physical encapsulation type. Customer VLAN IDs are preserved across the network—traffic passes only among matching customer VLAN IDs. However, traffic can pass among any service provider VLAN ID in the broadcast domain. Service provisioners can limit the bandwidth of services built from this service definition to specific values from 10 Mbps through 100 Mbps.

The following sections show the configuration data on each endpoint when you use this service definition to create the service shown in Figure 11 on page 85:

- Configuration on Endpoint A on page 100
- Configuration on Endpoint B on page 101
- Configuration on Endpoint Z on page 102

Configuration on Endpoint A

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint A (device IND):

```

ge-0/1/0 {
    flexible-vlan-tagging;
    encapsulation flexible-ethernet-services;
    unit 1 {
        encapsulation vlan-vpls;
        vlan-tags outer 1;
        family vpls {
            filter {
                input filter_in_ge-0/1/0_1;
            }
        }
    }
}

firewall {
    policer policer_in_ge-0/1/0_1 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
        then discard;
    }
    family vpls {
        filter filter_in_ge-0/1/0_1 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/1/0_1;
                    accept;
                }
            }
        }
    }
}

routing-instances {
    BestCustomer_ELAN-BGP-QinQ-AllVLAN-Normalized-All-SR {
        instance-type vpls;
        interface ge-0/1/0.1;
        route-distinguisher 65410:10;
        vrf-target target:65410:3;
        protocols {
            vpls {
                no-tunnel-services;
                site Site_2 {
                    site-identifier 2;
                    site-preference primary;
                    interface ge-0/1/0.1;
                }
            }
        }
    }
}

```

Configuration on Endpoint B

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint B (device BLR):

```

ge-0/1/0 {
    flexible-vlan-tagging;
    encapsulation flexible-ethernet-services;

```

```

        unit 1 {
            encapsulation vlan-vpls;
            vlan-tags outer 1;
            family vpls {
                filter {
                    input filter_in_ge-0/1/0_1;
                }
            }
        }
    }

    firewall {
        policer policer_in_ge-0/1/0_1 {
            if-exceeding {
                bandwidth-limit 100m;
                burst-size-limit 62500000;
            }
            then discard;
        }
        family vpls {
            filter filter_in_ge-0/1/0_1 {
                interface-specific;
                term 1 {
                    then {
                        policer policer_in_ge-0/1/0_1;
                        accept;
                    }
                }
            }
        }
    }
}

routing-instances {
    BestCustomer_ELAN-BGP-QinQ-AllVLAN-Normalized-All-SR {
        instance-type vpls;
        interface ge-0/1/0.1;
        route-distinguisher 65410:9;
        vrf-target target:65410:3;
        protocols {
            vpls {
                no-tunnel-services;
                site Site_1 {
                    site-identifier 1;
                    site-preference primary;
                    interface ge-0/1/0.1;
                }
            }
        }
    }
}

```

Configuration on Endpoint Z

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint Z (device SJC):

```

ge-0/0/4 {
    flexible-vlan-tagging;
    encapsulation flexible-ethernet-services;
    unit 1 {
        encapsulation vlan-vpls;
        vlan-tags outer 1;
    }
}

```

```

        family vpls {
            filter {
                input filter_in_ge-0/0/4_1;
            }
        }
    }
}
firewall {
    policer policer_in_ge-0/0/4_1 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
        then discard;
    }
    family vpls {
        filter filter_in_ge-0/0/4_1 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/0/4_1;
                    accept;
                }
            }
        }
    }
}
routing-instances {
    BestCustomer_ELAN-BGP-QinQ-AllVLAN-Normalized-All-SR {
        instance-type vpls;
        interface ge-0/0/4.1;
        vlan-id all;
        route-distinguisher 65410:11;
        vrf-target target:65410:3;
        protocols {
            vpls {
                no-tunnel-services;
                site Site_3 {
                    site-identifier 3;
                    site-preference primary;
                    interface ge-0/0/4.1;
                }
            }
        }
    }
}

```

ELAN-BGP-QinQ-AllVLAN-Normalized-None

This service definition provides a base for creating multipoint Ethernet services that transport all traffic across a BGP network core using Q-in-Q endpoint interface types and flexible-ethernet-services as the physical encapsulation type. VLAN IDs are not preserved across the network—traffic passes between any customer VLAN or service provider VLAN in the broadcast domain. Service provisioners can limit the bandwidth of services built from this service definition to specific values from 10 Mbps through 100 Mbps.

The following sections show the configuration data on each endpoint when you use this service definition to create the service shown in Figure 11 on page 85:

- Configuration on Endpoint A on page 104
- Configuration on Endpoint B on page 105
- Configuration on Endpoint Z on page 106

Configuration on Endpoint A

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint A (device IND):

```
ge-0/0/3 {
    flexible-vlan-tagging;
    encapsulation flexible-ethernet-services;
    unit 1 {
        encapsulation vlan-vpls;
        vlan-tags outer 1;
        family vpls {
            filter {
                input filter_in_ge-0/0/3_1;
            }
        }
    }
}

firewall {
    policer policer_in_ge-0/0/3_1 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
        then discard;
    }
    family vpls {
        filter filter_in_ge-0/0/3_1 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/0/3_1;
                    accept;
                }
            }
        }
    }
}

routing-instances {
    BestCustomer_ELAN-BGP-QinQ-AllVLAN-Normalized-SR {
        instance-type vpls;
        interface ge-0/0/3.1;
        route-distinguisher 65410:7;
        vrf-target target:65410:2;
        protocols {
            vpls {
                no-tunnel-services;
                site Site_2 {
                    site-identifier 2;
                    site-preference primary;
                    interface ge-0/0/3.1;
                }
            }
        }
    }
}
```



```

    }
  }
}

```

Configuration on Endpoint B

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint B (device BLR):

```

ge-0/0/3 {
    flexible-vlan-tagging;
    encapsulation flexible-ethernet-services;
    unit 1 {
        encapsulation vlan-vpls;
        vlan-tags outer 1;
        family vpls {
            filter {
                input filter_in_ge-0/0/3_1;
            }
        }
    }
}

firewall {
    policer policer_in_ge-0/0/3_1 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
        then discard;
    }
    family vpls {
        filter filter_in_ge-0/0/3_1 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/0/3_1;
                    accept;
                }
            }
        }
    }
}

routing-instances {
    BestCustomer_ELAN-BGP-QinQ-AllVLAN-Normalized-SR {
        instance-type vpls;
        interface ge-0/0/3.1;
        route-distinguisher 65410:6;
        vrf-target target:65410:2;
        protocols {
            vpls {
                no-tunnel-services;
                site Site_1 {
                    site-identifier 1;
                    site-preference primary;
                    interface ge-0/0/3.1;
                }
            }
        }
    }
}

```

```

    }
  }
}

```

Configuration on Endpoint Z

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint Z (device SJC):

```

ge-0/0/3 {
    flexible-vlan-tagging;
    encapsulation flexible-ethernet-services;
    unit 1 {
        encapsulation vlan-vpls;
        vlan-tags outer 1;
        family vpls {
            filter {
                input filter_in_ge-0/0/3_1;
            }
        }
    }
}

firewall {
    policer policer_in_ge-0/0/3_1 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
        then discard;
    }
    family vpls {
        filter filter_in_ge-0/0/3_1 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/0/3_1;
                    accept;
                }
            }
        }
    }
}

routing-instances {
    BestCustomer_ELAN-BGP-QinQ-AllVLAN-Normalized-SR {
        instance-type vpls;
        interface ge-0/0/3.1;
        vlan-id none;
        route-distinguisher 65410:8;
        vrf-target target:65410:2;
        protocols {
            vpls {
                no-tunnel-services;
                site Site_3 {
                    site-identifier 3;
                    site-preference primary;
                    interface ge-0/0/3.1;
                }
            }
        }
    }
}

```

```

    }
}

```

ELAN-BGP-QinQ-Range-Normalized-VLAN

This service definition provides a base for creating multipoint Ethernet services that transport traffic from a range of VLANs on an endpoint across a BGP network core using Q-in-Q endpoint interface types and flexible-ethernet-services as the physical encapsulation type. Services built from this service definition must use MX Series devices on the provider edge. Customer VLAN IDs are preserved across the network—traffic passes among like customer VLAN IDs on any service provider VLAN in the broadcast domain. Service provisioners can limit the bandwidth of services built from this service definition to specific values from 10 Mbps through 100 Mbps.

The following sections show the configuration data for a service with only two endpoints, SJC and SFO.

- Configuration on Endpoint A on page 107
- Configuration on Endpoint Z on page 108

Configuration on Endpoint A

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint A (device SJC):

```

ge-0/0/6 {
    flexible-vlan-tagging;
    mtu 1522;
    encapsulation flexible-ethernet-services;
    unit 2 {
        encapsulation vlan-vpls;
        vlan-tags outer 2 inner-range 1500-2000;
        family vpls {
            filter {
                input filter_in_ge-0/0/6_2;
            }
        }
    }
}

firewall {
    policer policer_in_ge-0/0/6_2 {
        if-exceeding {
            bandwidth-limit 100m;
            burst-size-limit 62500000;
        }
        then discard;
    }
    family vpls {
        filter filter_in_ge-0/0/6_2 {
            interface-specific;
            term 1 {
                then {
                    policer policer_in_ge-0/0/6_2;
                    accept;
                }
            }
        }
    }
}

```

```

    }
  }
}
routing-instances {
  BestCustomer_ELAN-BGP-QinQ-Range-Normalized-VLAN-SR1 {
    instance-type vpls;
    vlan-id all;
    interface ge-0/0/6.2;
    vlan-id all;
    route-distinguisher 65410:19;
    vrf-target target:65410:6;
    protocols {
      vpls {
        no-tunnel-services;
        site Site_2 {
          site-identifier 2;
          site-preference primary;
          interface ge-0/0/6.2;
        }
      }
    }
  }
}
}

```

Configuration on Endpoint Z

The following statements show the interface configuration, the filter configuration, and connectivity configuration on endpoint Z (device SFO):

```

ge-0/0/1 {
  flexible-vlan-tagging;
  mtu 1522;
  encapsulation flexible-ethernet-services;
  unit 1 {
    encapsulation vlan-vpls;
    vlan-tags outer 1 inner-range 1500-2000;
    family vpls {
      filter {
        input filter_in_ge-0/0/1_1;
      }
    }
  }
}

firewall {
  policer policer_in_ge-0/0/1_1 {
    if-exceeding {
      bandwidth-limit 100m;
      burst-size-limit 62500000;
    }
    then discard;
  }
  family vpls {
    filter filter_in_ge-0/0/1_1 {
      interface-specific;
      term 1 {
        then {
          policer policer_in_ge-0/0/1_1;
          accept;
        }
      }
    }
  }
}

```

```

    }
  }
}
routing-instances {
  BestCustomer_ELAN-BGP-QinQ-Range-Normalized-VLAN-SR1 {
    instance-type vpls;
    vlan-id all;
    interface ge-0/0/1.1;
    route-distinguisher 65410:18;
    vrf-target target:65410:6;
    protocols {
      vpls {
        no-tunnel-services;
        site Site_1 {
          site-identifier 1;
          site-preference primary;
          interface ge-0/0/1.1;
        }
      }
    }
  }
}

```

- Related Topics**
- Creating a Point-to-Point Ethernet Service Definition on page 114
 - Creating a VPLS Service Definition on page 121

Viewing Service Definitions

The following topics show how to view service definitions in either a graphical or a tabular view. You can view all service definitions, use filters to limit the view, see a “quick view,” or view full details of a specific service definition.

- Viewing Service Definitions as Graphics on page 109
- Viewing Service Definitions in Tables on page 112

Viewing Service Definitions as Graphics

To view the service definitions on your network in a graphical form, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Design** workspace icon.
2. In the task ribbon, select the **Manage Service Definitions** task icon.
3. To display the service definition inventory as graphics, in the filter bar, select the thumbnail view icon.

Thumbnails for the service definitions appear in the main display area, as shown in the following example:

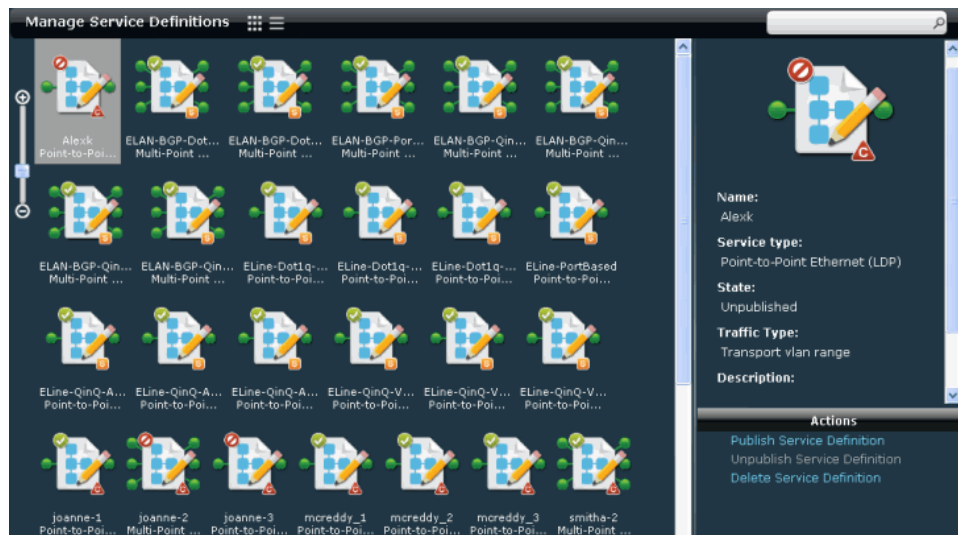


Figure 12 on page 110 and Table 7 on page 110 explain the service definition thumbnail decorations. In Figure 12 on page 110, the icon on the left is for a point-to-point Ethernet service definition. The icon on the right represents a VPLS service definition.

Figure 12: Service Definition Thumbnails

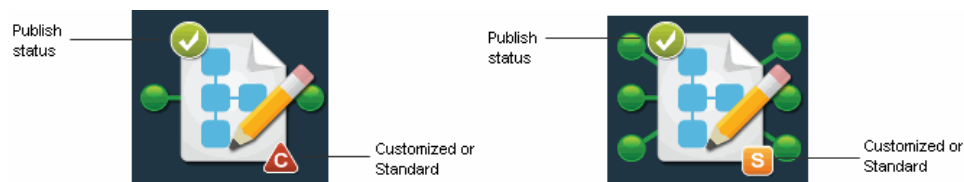






Table 7: Service Definition Decorations

Decoration	Name	Description
	Standard	The service definition is prepackaged and cannot be modified.
	Customized	The service definition is customized.
	Published	<p>The service definition is published and is available for creating service orders.</p> <p>Standard service definitions are always published. Customized service definitions can be published or not.</p>
	Unpublished	The customized service definition has not yet been published.

4. Use the search facility to restrict the display by partial name.

5. For a quick look view of a specific service definition, click once on the service icon. Summary information about the service appears in the right pane. Table 8 on page 111 explains the fields in this quick look view.

Table 8: Quick Look Service Definition Information

Field	Meaning
Name	The unique name assigned to the service definition.
Service type	One of the following: <ul style="list-style-type: none"> ■ Point-to-point Ethernet (LDP) ■ Multipoint Ethernet
State	One of the following values: <ul style="list-style-type: none"> ■ Published—The service definition is available for use by service provisioners. ■ Unpublished—The service definition is not yet available for use by service provisioners.
Traffic type	One of: <ul style="list-style-type: none"> ■ All traffic—All the customers traffic is transported across the network. ■ Single VLAN—Only one specified VLAN is transported across the network. ■ VLAN range—A specified range of VLANs is transported across the network.
Description	A brief description of the service definition.

6. To view details of a specific service definition, double-click the service definition icon.

The Ethernet Activator software displays a detailed view of the service definition. The following example shows a point-to-point Ethernet service definition:

Service Definition Details

General

Name: ELine-PortBased
 Type: Point-to-Point Ethernet (LDP)
 Comments: P2P-Martini for J/M/MX, Port based, rate limit 10M

Connectivity Settings

VC ID selection: Auto pick ☒ Editable in service order
 Default MTU (Bytes): 1522 ☒ Editable in service order
 MTU range: 1522-9192

UNI Settings

Ethernet option: port-port
 Traffic type: N/A
 VLAN ID selection: N/A ☐ Editable in service order
 Physical IF encapsulation: ethernet-ccc
 Logical IF encapsulation: N/A
☐ Protect UNI interface
 Default MTU (Bytes): 1522 ☐ Editable in service order
 MTU range: 1522-9192
 Rate limiting: Enabled
 Default Bandwidth (Mbps): 10 ☒ Editable in service order
 Bandwidth range: 10-100
 Increment (Mbps): 10

For information about the meaning of each attribute, see “Service Attributes Overview” on page 12.

Viewing Service Definitions in Tables

To view the service definitions on your network in a tabular form, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Design** workspace icon.
2. In the task ribbon, select the **Manage Service Definitions** task icon.
3. To display the service definition inventory in tabular form, in the filter bar, select the table view icon.

A table of service definitions appears in the main display area of the screen, as shown in the following example:

Name	State	Service Type	Created By
Alexk	Unpublished	Point-to-Point Ethernet (LDP)	super
ELAN-BGP-Dot1q-Normalized-VLAN-None	Published	Multi-Point Ethernet	super
ELAN-BGP-Dot1q-SingleVLAN	Published	Multi-Point Ethernet	super
ELAN-BGP-PortBased-10-100M	Published	Multi-Point Ethernet	super
ELAN-BGP-QinQ-AllVLAN	Published	Multi-Point Ethernet	super
ELAN-BGP-QinQ-AllVLAN-Normalized-All	Published	Multi-Point Ethernet	super
ELAN-BGP-QinQ-AllVLAN-Normalized-None	Published	Multi-Point Ethernet	super
ELAN-BGP-QinQ-Range-Normalized-VLAN	Published	Multi-Point Ethernet	super
ELine-Dot1q-SingleVLAN	Published	Point-to-Point Ethernet (LDP)	super
ELine-Dot1q-SingleVLAN-CCC	Published	Point-to-Point Ethernet (LDP)	super
ELine-Dot1q-SingleVLAN-Ext-CCC	Published	Point-to-Point Ethernet (LDP)	super
ELine-PortBased	Published	Point-to-Point Ethernet (LDP)	super
ELine-QinQ-AllVLAN	Published	Point-to-Point Ethernet (LDP)	super
ELine-QinQ-AllVLAN-CCC	Published	Point-to-Point Ethernet (LDP)	super
ELine-QinQ-AllVLAN-Ext-CCC	Published	Point-to-Point Ethernet (LDP)	super

Details for Alexk:

- Name:** Alexk
- Service type:** Point-to-Point Ethernet (LDP)
- State:** Unpublished
- Traffic Type:** Transport vlan range
- Description:**

Actions:

- Publish Service Definition
- Unpublish Service Definition
- Delete Service Definition

Table 9 on page 113 explains the information presented in the table.

Table 9: Service Definition Table Fields

Column	Meaning
Name	The unique name assigned to the service definition.
Service Type	One of the following: <ul style="list-style-type: none"> ■ Point-to-point Ethernet (LDP) ■ Multipoint Ethernet
State	One of the following values: <ul style="list-style-type: none"> ■ Published—The service definition is available for use by service provisioners. ■ Unpublished—The service definition is not yet available for use by service provisioners.
Service type	One of the following: <ul style="list-style-type: none"> ■ Point-to-point Ethernet (LDP) ■ Multipoint Ethernet
Created By	The screen name of the user who created the service definition.

- To restrict the display of service definitions, enter a search criterion of one or more characters in the Search bar and press Enter. All service definition names that match the search criterion appear in the main display area.

5. For a quick look view of a specific service definition, select the service definition in the table. Summary information about the service appears in the right panel.
6. To view details about a service definition, double-click the service definition icon in the table.

The Ethernet Activator software displays a detailed view of the service definition. The following example shows a point-to-point Ethernet service definition:

The screenshot shows the 'Service Definition Details' window for a service named 'ELine-PortBased'. The window is divided into three main sections: General, Connectivity Settings, and UNI Settings.

- General:**
 - Name: ELine-PortBased
 - Type: Point-to-Point Ethernet (LDP)
 - Comments: P2P-Martini for J/M/MX, Port based, rate limit 10M
- Connectivity Settings:**
 - VC ID selection: Auto pick (Editable in service order)
 - Default MTU (Bytes): 1522 (Editable in service order)
 - MTU range: 1522-9192
- UNI Settings:**
 - Ethernet option: port-port
 - Traffic type: N/A
 - VLAN ID selection: N/A (Editable in service order)
 - Physical IF encapsulation: ethernet-ccc
 - Logical IF encapsulation: N/A
 - ☐ Protect UNI interface
 - Default MTU (Bytes): 1522 (Editable in service order)
 - MTU range: 1522-9192
 - Rate limiting: Enabled
 - Default Bandwidth (Mbps): 10 (Editable in service order)
 - Bandwidth range: 10-100
 - Increment (Mbps): 10

For information about the meaning of each attribute, see “Service Attributes Overview” on page 12.

- Related Topics**
- Creating a Point-to-Point Ethernet Service Definition on page 114
 - Creating a VPLS Service Definition on page 121
 - Predefined Service Definitions on page 61

Creating a Point-to-Point Ethernet Service Definition

This procedure provides the steps to create a definition for a point-to-point VPN service. The standard service definitions that came with your initial software installation are designed to be appropriate for most requirements. You can also create a customized service definition—for example, to set different bandwidth limits on the service than those offered in the standard service definitions.

Once the new service definition is complete and published, network operators or service provisioners can use the completed service definition as a base for creating and then activating point-to-point VPN services on the network.

The screens appear in the order stated. You can, however, perform these steps in any order by accessing them through the task list in the right panel. If the panel is not visible, click the snap tool on the right side of the main display area.

To create a point-to-point service definition, follow these procedures:

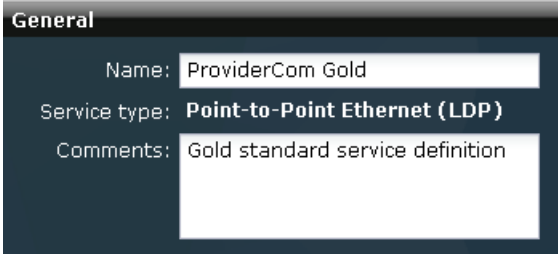
1. Specifying General Information on page 115
2. Specifying Connectivity Information on page 115
3. Specifying UNI Settings on page 116

Specifying General Information

To specify the general information for a point-to-point Ethernet (LDP) service definition, follow these steps:

1. In the task ribbon, select the **Service Design** workspace icon.
2. In the Ethernet Activator task ribbon, select the **Manage Service Definitions** task icon.
3. In the task ribbon, select the **Create P2P Service Definition** task icon.

The first Create Service Definition screen appears, as shown in the following example:



The screenshot shows a dark-themed window titled 'General'. It contains three input fields: 'Name' with the value 'ProviderCom Gold', 'Service type' with the value 'Point-to-Point Ethernet (LDP)', and 'Comments' with the value 'Gold standard service definition'.

4. In the Name field, enter a name for the service definition.
5. In the Comments field, enter a brief description or other comment that you want to appear in the Service Definition table. (Optional)
6. Click **Next** to save the General step information. The Connectivity step appears.

Specifying Connectivity Information

In the Connectivity step, specify the attributes that define the connectivity between remote sites across the service provider network. An example screen follows:

To specify connectivity between sites across the network, follow these steps:

1. In the VC ID selection field, specify how the VC ID will be chosen during service order creation:
 - To allow the service provisioner to enter the VC ID, choose **Select manually**.
 - To cause the Junos Space software to assign a VC ID automatically from the VC ID pool, select **Auto pick**.

To allow the service provisioner to override the setting in the VC ID field, select **Editable in service order**.

2. In the Default MTU field, specify the MTU across the service provider network.

To allow the service provisioner to override the MTU setting, select **Editable in service order**. In the MTU range field, enter the highest and lowest MTU that the service provisioner can enter.
3. Click **Next** to save the connectivity settings. The UNI Settings step appears.

Specifying UNI Settings

In the UNI Settings step, provide the UNI service attributes for this service definition. The attributes you set depend on whether you are setting attributes for a port, an 802.1Q interface, or a Q-in-Q interface.

- Specifying UNI Settings for Port-Port Services on page 116
- Specifying UNI Settings for Services with 802.1Q Interface Types on page 118
- Specifying UNI Settings for Services with Q-in-Q Interface Types on page 119

Specifying UNI Settings for Port-Port Services

To set UNI attributes for a port:

1. In the Ethernet Options field, select **port-port**. The screen shows options specific to port-to-port circuits, as shown in the following example:

UNI Settings

Traffic Treatment

Ethernet option: **port-port**

Customer traffic type: **N/A**

VLAN ID selection: **Auto pick** ☐ Editable in service order

Interface Settings

☐ Protect UNI interface

Physical IF encapsulation: **ethernet-ccc**

Logical IF encapsulation: **N/A**

MTU Settings

Default MTU (Bytes): **1522** ☐ Editable in service order

MTU range (Bytes): **1522** **9192**

Bandwidth Settings

☒ Enable rate limiting

Default bandwidth (Mbps): **10** ☐ Editable in service order

Bandwidth range (Mbps): **10** **50**

Increment (Mbps): **10**

2. In the Customer traffic type field, select **N/A**. For port-to-port services, all traffic is always transported.

The VLAN ID cannot be selected. In port-to-port services, all traffic and all VLANs on one port are transported to the other port.

3. In the Physical IF encapsulation field, select **ethernet-ccc**, which is the only valid physical interface encapsulation method for port-to-port services.

The Logical IF encapsulation field cannot be selected because it is not relevant to port-to-port services.

4. In the Default MTU field, specify the MTU for each UNI.

To allow the service provisioner to override the MTU setting, select **Editable in service order**. In the MTU range field, enter the highest and lowest value for MTU that the service provisioner can enter.

5. To enable a service provisioner to limit the available bandwidth, select **Enable rate limiting** and enter a default bandwidth limit.

To enable the service provisioner to override the default bandwidth value, check the **Editable in service order** field. The Bandwidth Range (Mbps) and Increment (Mbps) fields become active.

- In the Bandwidth range (Mbps) fields, enter the lowest and highest values that the service provisioner can enter.
- In the Increment (Mbps) field, enter a value that defines which values in the range will be made available to the service provisioner. For example, a range of 10 through 50 with an increment of 10 makes the following values available to the service provisioner: 10, 20, 30, 40, and 50 Mbps.

6. Click **Finish** to save the UNI settings.

The service definition is complete.

Specifying UNI Settings for Services with 802.1Q Interface Types

To set UNI attributes for 802.1Q interfaces:

1. In the Ethernet Options field, select **dot1q**. The screen shows options specific to 802.1Q interfaces, as shown in the following example:

The screenshot shows the 'UNI Settings' configuration page. It is divided into four main sections: Traffic Treatment, Interface Settings, MTU Settings, and Bandwidth Settings.

- Traffic Treatment:**
 - Ethernet option: **dot1q** (dropdown)
 - Customer traffic type: **Transport single vlan** (dropdown)
 - VLAN ID selection: **Auto pick** (dropdown)
 - ☐ Editable in service order
- Interface Settings:**
 - ☐ Protect UNI interface
 - Physical IF encapsulation: **flexible-ethernet-service** (dropdown)
 - Logical IF encapsulation: **vlan-ccc** (dropdown)
- MTU Settings:**
 - Default MTU (Bytes): **1522** (input field)
 - MTU range (Bytes): **1522** (input field) to **9192** (input field)
 - ☒ Editable in service order
- Bandwidth Settings:**
 - ☒ Enable rate limiting
 - Default bandwidth (Mbps): **10** (input field)
 - Bandwidth range (Mbps): **10** (input field) to **100** (input field)
 - Increment (Mbps): **10** (input field)
 - ☒ Editable in service order

2. In the Customer Traffic type field, select **Transport single vlan** to transport the traffic for specific VLANs across the network. Transport single VLAN is the only option for 802.1Q interfaces.

The service provisioner will be prompted for the VLAN-ID when creating a service order based on this service definition.

3. In the VLAN ID field, specify how the VLAN ID will be determined:
 - To allow the service provider to specify the VLAN ID, choose **Select manually**.
 - To cause the VLAN ID to be selected automatically from the VLAN ID pool, select **Auto pick**.

To enable the service provisioner to override this setting in a service order, select **Editable in service order**.

4. To specify a backup UNI interface for a service definition, select **Protect UNI interface**. The service provisioner must then specify a backup UNI for the service, when creating the service order.

5. In the Physical IF encapsulation field, select the default physical encapsulation scheme to be used by service orders based on this service definition. We recommend you select **flexible-ethernet-services**.
6. The Logical IF encapsulation field is constrained by your selection in the Physical IF encapsulation field. If you selected the recommended physical encapsulation mode of **flexible-ethernet-service**, then your only option is to select **vlan-ccc** for the logical encapsulation method.
7. In the Default MTU field, specify the MTU for each UNI.
To allow the service provisioner to override the MTU setting, select **Editable in service order** and, in the MTU range fields, enter the lowest and highest values for MTU that the service provisioner is allowed to enter.
8. To enable a service to limit the available bandwidth, select **Enable rate limiting** and enter a default bandwidth limit in the Default bandwidth (Mbps) field.
To enable the service provisioner to override the default bandwidth value, check the **Editable in service order** field. The Bandwidth Range (Mbps) and Increment (Mbps) fields become active.
 - In the Bandwidth range (Mbps) fields, enter lowest and highest values that the service provisioner can enter.
 - In the Increment (Mbps) field, enter a value that defines which values in the range will be made available to the service provisioner. For example, a range of 10 through 50 with an increment of 10 makes the following values available to the service provisioner: 10, 20, 30, 40, and 50 Mbps.
9. Click **Finish** to save the UNI settings.
The service definition is complete.

Specifying UNI Settings for Services with Q-in-Q Interface Types

To set UNI attributes for Q-in-Q interfaces:

1. In the Ethernet Options field, select **qinq**. The screen expands to include options specific to Q-in-Q interfaces, as shown in the following example:

UNI Settings

Traffic Treatment

Ethernet option: **qinq**

Customer traffic type: **Transport vlan range**

VLAN ID selection: **Select manually**

☒ Editable in service order

Interface Settings

☒ Protect UNI interface

Physical IF encapsulation: **flexible-ethernet-service**

Logical IF encapsulation: **vlan-ccc**

MTU Settings

Default MTU (Bytes): **1522**

MTU range (Bytes): **1522** **9192**

☒ Editable in service order

Bandwidth Settings

☒ Enable rate limiting

Default bandwidth (Mbps): **10**

Bandwidth range (Mbps): **10** **100**

Increment (Mbps): **10**

☒ Editable in service order

2. In the Customer traffic type field:
 - Select **Transport all traffic** if you want to transport the traffic from all VLANs across the network.
 - Select **Transport vlan range** if you want to limit the traffic across the network to a specific range of VLANs.

If you select this option, the service provisioner will be prompted for the VLAN-ID range when creating a service order based on this service definition.
3. In the VLAN ID selection field, specify how the service provider VLAN ID will be set during service order creation:
 - To cause the provisioning software to automatically select the service provider VLAN ID from the VLAN ID pool, select **Auto pick**.
 - To allow the service provisioner to specify the service provider VLAN ID, choose **Select manually**.

To enable the service provisioner to override this setting, select **Editable in service order**.

4. To specify a backup UNI for a service definition, select **Protect UNI Interface**. The service provisioner must then specify a backup UNI for the service, when creating the service order.
5. In the Physical IF encapsulation field, select the default physical encapsulation scheme to be used by service orders based on this service definition. We recommend you choose **flexible-ethernet-services**.
6. The Logical IF encapsulation field is constrained by your selection in the Physical IF encapsulation field. If you selected the recommended physical encapsulation

mode of flexible-ethernet-services, then your only option is to select **vlan-ccc** for the logical encapsulation method.

7. In the Default MTU field, specify the MTU for each UNI.

To allow the service provisioner to override the MTU setting, select **Editable in service order** and, in the MTU range fields, enter the lowest and highest values for MTU that the service provisioner can enter.

8. To enable a service to limit the available bandwidth, select **Enable rate limiting** and enter a default bandwidth limit in the Default bandwidth (Mbps) field.

To enable the service provisioner to override the default bandwidth value, check the **Editable in service order** field. The Bandwidth Range (Mbps) and Increment (Mbps) fields become active.

- In the Bandwidth range (Mbps) field, enter the lowest and highest values that the service provisioner can enter.
- In the Increment (Mbps) field, enter a value that defines which values in the range will be made available to the service provisioner. For example, a range of 10 through 50 with an increment of 10 makes the following values available to the service provisioner: 10, 20, 30, 40, and 50 Mbps.

9. Click **Finish** to complete the service definition.

- Related Topics**
- Publishing a Customized Service Definition on page 129
 - Predefined Service Definitions on page 61
 - Viewing Service Definitions on page 109
 - Creating a VPLS Service Definition on page 121

Creating a VPLS Service Definition

This procedure provides the steps to create a definition for a multipoint Ethernet service. Multipoint Ethernet services are also known as VPLS services.

The standard service definitions that came with your initial software installation are designed to be appropriate for most requirements. You can also create a customized service definition—for example, to set different bandwidth limits on the service than those offered in the standard service definitions.

When the new service definition is complete and published, network operators or service provisioners can use the completed service definition as a base for creating and then activating multipoint Ethernet services on the network.

The screens appear in the order stated. You can, however, perform these steps in any order by accessing them through the task list in the right panel. If the panel is not visible, click the snap tool on the right side of the main display area.

To create a multipoint Ethernet service definition, follow these procedures:

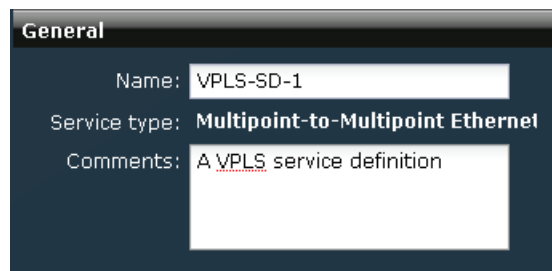
1. General Information on page 122
2. Specifying Connectivity and Security Information on page 122
3. Specifying UNI Settings on page 124

General Information

To specify the general information for a VPLS service definition, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Design** workspace icon.
2. In the task ribbon, select the **Manage Service Defintions** task icon.
3. In the task ribbon, select the **Create VPLS Service Definition** task icon.

The first Create Service Definition screen appears. A sample screen follows:



The screenshot shows a web interface with a dark blue header bar labeled 'General'. Below the header, there are three input fields. The first field is labeled 'Name:' and contains the text 'VPLS-SD-1'. The second field is labeled 'Service type:' and contains the text 'Multipoint-to-Multipoint Ethernet'. The third field is labeled 'Comments:' and contains the text 'A VPLS service definition'.

4. In the Name field, enter a name for the service definition.
5. In the Comments field, enter a brief description or other comment that you want to appear in the Service Definition table. (Optional)
6. Click Next to save the General step information. The Connectivity step appears.

Specifying Connectivity and Security Information

In the Connectivity step, specify the attributes that define the connectivity among remote sites across the service provider network and the service security. A sample Connectivity screen follows:

The screenshot shows a configuration window titled "Connectivity". It contains two main sections:

- Connectivity Settings:**
 - Route target: Auto pick
 - Route distinguisher: Auto pick
 - Normalized Vlan: Normalized VLAN all (dropdown menu)
- MAC Security Settings:**
 - MAC learning: Enable (dropdown menu)
 - Interface MAC limit: 1024 (text field)
 - MAC statistics: Enable (dropdown menu)
 - MAC table size: 5120 (text field)

To specify connectivity between sites across the network, follow these steps:

1. In the Connectivity Settings box, select a value in the Normalized Vlan field:
 - To preserve customer VLAN IDs across the network, select **Normalized VLAN all**.
 - To preserve no VLAN IDs across the network, select **Normalized VLAN none**.
 - If VLAN IDs are to be provided manually and are required to match, select **Not normalized**.



NOTE: For services that transport a range of VLANs, you must select either **Normalized VLAN all** or **Normalized VLAN none**. You cannot transport a range of VLANs without normalization.

For port-port services, you must select **Not normalized**.

For more information about VLAN normalization, see “Junos Space Layer 2 Services Overview” on page 3

The Route target field and the Route distinguisher field are not editable. These values are always selected automatically.

2. In the MAC Security Setting box, choose values for MAC learning, Interface MAC limit, MAC statistics, and MAC table size.
3. Click **Next** to save the connectivity settings. The UNI Settings step appears.

Specifying UNI Settings

In the UNI Settings step, provide the UNI service attributes for this service definition. The attributes you set depend on whether you are setting attributes for ports, 802.1Q interfaces, or Q-in-Q interfaces:

- Specifying UNI Settings for Port-Port Services on page 124
- Specifying UNI Settings for Services with 802.1Q interface Types on page 125
- Specifying UNI Settings for Services with Q-in-Q interface Types on page 127

Specifying UNI Settings for Port-Port Services

To set UNI attributes for port UNIs:

1. In the Ethernet option field, select **port-port**. The screen shows options specific to port-to-port interfaces:

The screenshot shows the 'UNI Settings' configuration window with the following sections and fields:

- Traffic Treatment:**
 - Ethernet option: **port-port** (dropdown)
 - Customer traffic type: **N/A** (dropdown)
 - VLAN ID selection: **Auto pick** (dropdown)
 - ☐ Editable in service order
- Interface Settings:**
 - Physical IF encapsulation: **ethernet-vpls** (dropdown)
 - Logical IF encapsulation: **N/A** (dropdown)
- MTU Settings:**
 - Default MTU (Bytes): **1522** (text field)
 - MTU range (Bytes): **1522** (text field) to **9192** (text field)
 - ☐ Editable in service order
- Bandwidth Settings:**
 - ☒ Enable rate limiting
 - Default bandwidth (Mbps): **1** (text field)
 - Bandwidth range (Mbps): **1** (text field) to **10** (text field)
 - Increment (Mbps): **1** (text field)
 - ☐ Editable in service order

2. In the Customer traffic type field, select **N/A**. For port-to-port services, all traffic is always transported.

The VLAN ID cannot be selected. In port-port services, all traffic and all VLANs on one port are transported to all other ports.

3. In the Physical IF encapsulation field, select **ethernet-vpls**, which is the only valid physical interface encapsulation method for port-port services.

The Logical IF encapsulation field cannot be selected because it is not relevant to port-port services.

4. In the Default MTU field, specify the MTU for each UNI.

To allow the service provisioner to override the MTU setting, select **Editable** in **service order**. In the MTU range fields, enter the lowest and highest values for MTU that the service provisioner can enter.

5. To enable a service provisioner to limit the available bandwidth, select **Enable rate limiting** and enter a default bandwidth limit.

To enable the service provisioner to override the default bandwidth value, check the **Editable** in **service order** field. The Bandwidth Range (Mbps) and Increment (Mbps) fields become active.

- In the Bandwidth range (Mbps) fields, enter the lowest and highest values that the service provisioner can enter.
- In the Increment (Mbps) field, enter a value that defines which values in the range will be made available to the service provisioner. For example, a range of 10 through 50 with an increment of 10 makes the following values available to the service provisioner: 10, 20, 30, 40, and 50 Mbps.

6. Click **Finish** to save the UNI settings.

The service definition is complete.

Specifying UNI Settings for Services with 802.1Q interface Types

To set UNI attributes for 802.1Q interfaces:

1. In the Ethernet option field, select **dot1q**. The following screen shows options specific to 802.1Q interfaces.

UNI Settings

Traffic Treatment

Ethernet option:

Customer traffic type:

VLAN ID selection:

☐ Editable in service order

Interface Settings

Physical IF encapsulation:

Logical IF encapsulation:

MTU Settings

Default MTU (Bytes):

MTU range (Bytes):

☒ Editable in service order

Bandwidth Settings

☒ Enable rate limiting

Default bandwidth (Mbps):

Bandwidth range (Mbps):

Increment (Mbps):

☒ Editable in service order

2. In the Customer Traffic type field, select **Transport single vlan** to transport the traffic for a specific VLAN across the network. Single VLAN is the only option for 802.1Q interface types.
3. In the VLAN ID selection field, specify how the VLAN ID will be determined:
 - To allow the service provider to specify the VLAN ID, choose **Select manually**. This option is used typically when no VLAN normalization is applied.
 - To cause the VLAN ID to be selected automatically from the VLAN ID pool, select **Auto pick**. This option is used typically when VLAN normalization is applied.

To enable the service provisioner to override this setting in a service order, select **Editable in service order**.

4. In the Physical IF encapsulation field, select the default physical encapsulation scheme to be used by service orders based on this service definition. We recommend you select **flexible-ethernet-services**.
5. The Logical IF encapsulation field is constrained by your selection in the Physical IF encapsulation field. If you selected the recommended physical encapsulation mode of **flexible-ethernet-services**, then your only option is to select **vlan-vpls** for the logical encapsulation method.
6. In the Default MTU field, specify the MTU for each UNI.

To allow the service provisioner to override the MTU setting, select **Editable in service order** and, in the MTU range fields, enter the highest and lowest MTU values that the service provisioner can enter.

7. To enable a service to limit the available bandwidth, select **Enable rate limiting** and enter a default bandwidth limit in the Default bandwidth (Mbps) field.

To enable the service provisioner to override the default bandwidth value, check the **Editable in service order** field. The Bandwidth Range (Mbps) and Increment (Mbps) fields become active.

- In the Bandwidth range (Mbps) fields, enter the lowest and highest values that the service provisioner is allowed to enter.
- In the Increment (Mbps) field, enter a value that defines which values in the range will be made available to the service provisioner. For example, a range of 10 through 50 with an increment of 10 makes the following values available to the service provisioner: 10, 20, 30, 40, and 50 Mbps.

8. Click **Finish** to save the UNI settings.

The service definition is complete.

Specifying UNI Settings for Services with Q-in-Q interface Types

To set UNI attributes for Q-in-Q interfaces:

1. In the Ethernet option field, select **qinq**. The screen expands to include options specific to Q-in-Q interfaces, as shown in the following example screen:

The screenshot shows the 'UNI Settings' configuration window with the following sections and values:

- Traffic Treatment:**
 - Ethernet option: **qinq**
 - Customer traffic type: **Transport vlan range**
 - VLAN ID selection: **Auto pick**
 - ☐ Editable in service order
- Interface Settings:**
 - Physical IF encapsulation: **flexible-ethernet-service**
 - Logical IF encapsulation: **vlan-vpls**
- MTU Settings:**
 - Default MTU (Bytes): **1522**
 - MTU range (Bytes): **1522** to **9192**
 - ☒ Editable in service order
- Bandwidth Settings:**
 - ☒ Enable rate limiting
 - Default bandwidth (Mbps): **1**
 - Bandwidth range (Mbps): **1** to **50**
 - Increment (Mbps): **1**
 - ☒ Editable in service order

2. In the Customer traffic type field:

- Select **Transport all traffic** if you want to transport the traffic from all VLANs across the network.

- Select **Transport vlan range** if you want to limit the traffic across the network to a specific range of VLANs.

If you select this option, the service provisioner will be prompted for the VLAN-ID range when creating a service order based on this policy.

3. In the VLAN ID selection field, specify how the service VLAN ID will be set during service order creation:
 - To cause the provisioning software to automatically select the service VLAN ID from the VLAN ID pool, select **Auto pick**. This option is used typically when no VLAN normalization is applied.
 - To allow the service provisioner to specify the service VLAN ID, choose **Select manually**. This option is used typically when VLAN normalization is applied.

To enable the service provisioner to override this setting, select **Editable in service order**.

4. In the Physical IF encapsulation field, select the default physical encapsulation scheme to be used by service orders based on this service definition. We recommend you choose **flexible-ethernet-services**.
5. The Logical IF encapsulation field is constrained by your selection in the Physical Interface Encapsulation field. If you selected the recommended physical encapsulation mode of **flexible-ethernet-services**, then your only option is to select **vlan-vpls** for the logical encapsulation method.
6. In the Default MTU field, specify the MTU for each UNI.

To allow the service provisioner to override the MTU setting, select **Editable in service order** and, in the MTU range fields, enter the lowest and highest values for MTU that the service provisioner can enter.

7. To enable a service to limit the available bandwidth, select **Enable rate limiting** and enter a default bandwidth limit in the Default bandwidth (Mbps) field.

To enable the service provisioner to override the default bandwidth value, check the **Editable** field. The Bandwidth Range (Mbps) and Increment (Mbps) fields become active.

- In the Bandwidth range (Mbps) fields, enter the lowest and highest values that the service provisioner can enter.
- In the Increment (Mbps) field, enter a value that defines which values in the range will be made available to the service provisioner. For example, a range of 10 through 50 with an increment of 10 makes the following values available to the service provisioner: 10, 20, 30, 40, and 50 Mbps.

8. Click **Finish** to complete the service definition.

Related Topics

- Publishing a Customized Service Definition on page 129
- Predefined Service Definitions on page 61
- Viewing Service Definitions on page 109
- Creating a Point-to-Point Ethernet Service Definition on page 114

Publishing a Customized Service Definition

The service designer must publish a customized service definition before a service provisioner can use that definition to create a service request.



NOTE: Predefined service definitions are already in the Published state.

To publish a service definition, follow these steps:

1. In the task ribbon, select the **Service Design** workspace icon.
2. In the Ethernet Activator task ribbon, select the **Manage Service Definitions** task icon.
3. In the Manage Service Definitions screen, select the service definition you want to publish.

In table view, the State column lists unpublished service definitions. In thumbnail view, the decoration in the top left of the icon indicates the service definitions that are in the unpublished state.

4. Select the unpublished service definition that you want to publish.
5. In the command panel, select **Publish Service Definition**.

The Publish Service Definitions window appears and prompts you to confirm your action.

6. Click **Publish**.

The Manage Service Definitions screen reappears. The selected service definition is now in the published state.

- Related Topics**
- Creating a Point-to-Point Ethernet Service Definition on page 114
 - Creating a VPLS Service Definition on page 121
 - Unpublishing a Service Definition on page 129

Unpublishing a Service Definition

The service designer can unpublish a custom service definition to make it unavailable to service provisioners for creating a service request. You cannot unpublish a predefined service definition.

To unpublish a service definition, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Design** workspace icon.
2. In the task ribbon, select the **Manage Service Definitions** task icon.
3. In the Manage Service Definitions screen, select the service definition you want to unpublish.

In table view, the State column lists published service definitions. In the thumbnail view, the decoration in the upper left corner of the thumbnail indicates the service definitions that are in the published state.

4. Select the published service definition that you want to unpublish.
5. In the command panel, select **Unpublish Service Definition**.

The Unpublish Service Definitions window appears and prompts you to confirm your action.

6. Click **Unpublish**.

The Manage Service Definitions screen reappears. The selected service definition is now in the unpublished state.

Related Topics ■ Publishing a Customized Service Definition on page 129

Deleting a Customized Service Definition



NOTE: Before you can delete a service definition, it must be in the unpublished state.

You cannot delete a predefined service definition.

To delete a customized service definition, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Design** workspace icon.
2. In the task ribbon, select the **Manage Service Definitions** task icon.
3. In the Manage Service Definitions screen, select the customized service definition you want to delete.
4. In the Actions panel, select **Delete Service Definition**.
5. In the confirmation window, click **Delete**.

The Manage Service Definitions screen refreshes with the selected service definition removed.

Related Topics ■ Unpublishing a Service Definition on page 129

Chapter 7

Monitoring Service Definitions

- Viewing Service Design Statistics on page 131

Viewing Service Design Statistics

The following topics describe viewing statistics in the Service Design workspace:

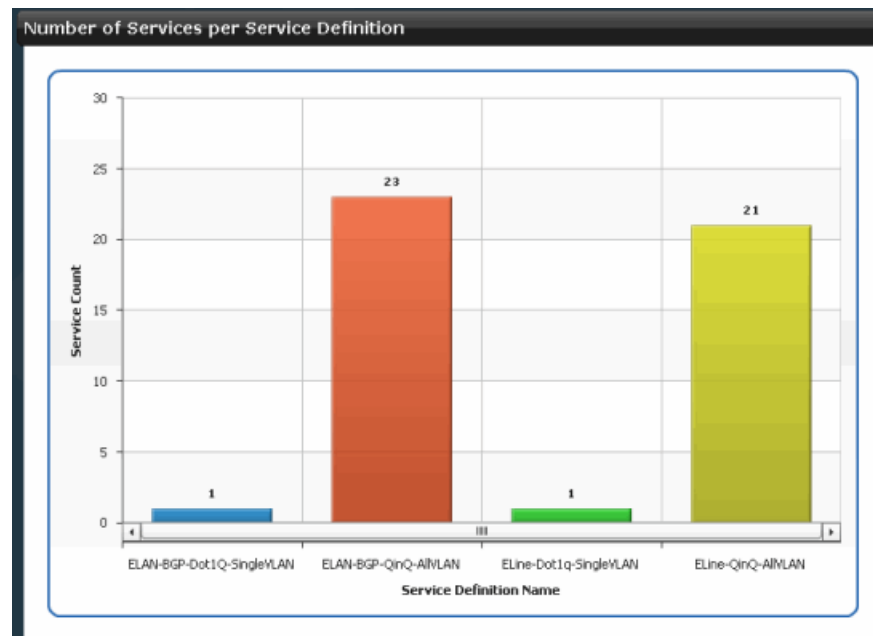
- Viewing Services Created From a Service Definition on page 131
- Viewing How Many Service Definitions are in Each Service Definition State on page 132

Viewing Services Created From a Service Definition

To view the number of services made from each service definition, follow these steps:

1. In the task ribbon, select the **Service Design** workspace icon.

The Junos Space software displays the chart named Number of Services Per Service Definition. An example follows:



Each vertical bar represents a service definition. The number of services is shown on the Y axis. Drag the slider across the bottom of the graph to display all service definitions. This example shows 23 services have been created from the service definition named ELAN-BGP-QinQ-AllVLAN.

2. To see which services have been created from a specific service definition, click on the bar that represents the service definition.

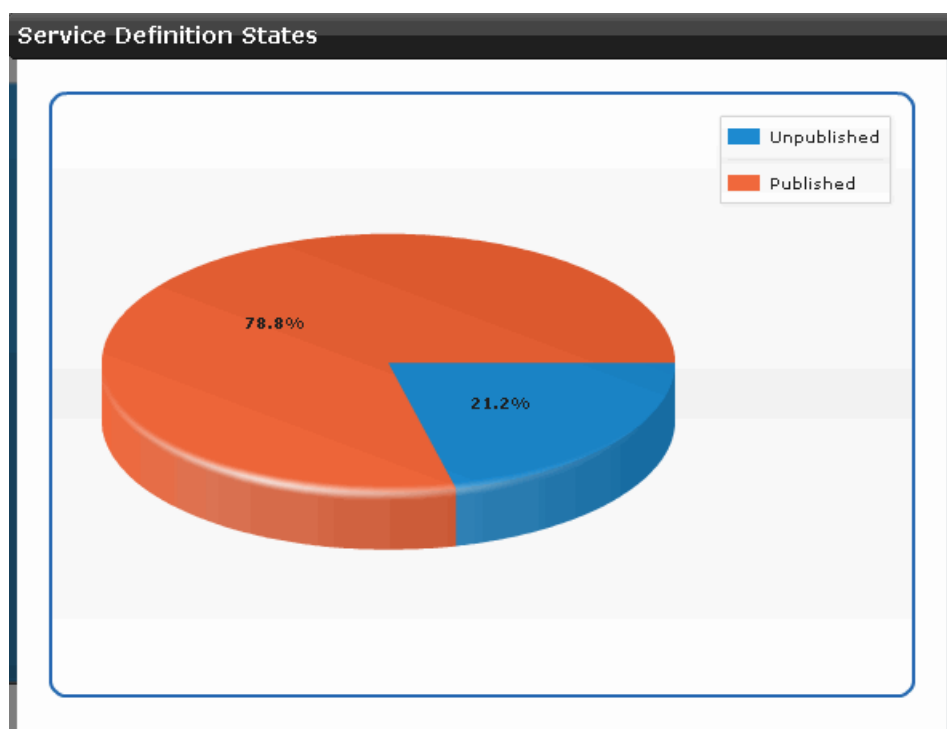
The Manage Services screen shows only the services created from that service definition.

Viewing How Many Service Definitions are in Each Service Definition State

To view the percentage or number of service definitions that are in each service definition state, follow these steps:

1. In the task ribbon, select the **Service Design** workspace icon.

The Junos Space software displays the chart named Service Definition States. An example follows:



Each segment of the pie chart represents the proportion of service definitions in the indicated state. In this example, 78.8 percent of all completed service definitions are in the Published state.

To view the number of service definitions in a state, move the mouse cursor over the segment.

2. To see which service definitions are in each state, click a segment in the pie chart.

The Manage Service Definitions screen shows only those service definitions from the selected segment.

- Related Topics**
- [Workspace Statistics Pages Overview](#)
 - [Viewing Service Definitions on page 109](#)
 - [Viewing Services on page 185](#)

Part 4

Provisioning and Troubleshooting Layer 2 Services

- Managing Customers on page 137
- Managing Services Orders on page 143
- Managing Services on page 159
- Monitoring Services and Service Orders on page 171
- Troubleshooting Services on page 197

Chapter 8

Managing Customers

- Viewing Customers on page 137
- Adding a New Customer on page 139
- Editing an Existing Customer on page 140
- Deleting Customers on page 141

Viewing Customers

The following topics describe how to view customer information either as graphics or in a table.

- Viewing Customers as Graphics on page 137
- Viewing Customers in a Table on page 138

Viewing Customers as Graphics

To view thumbnails of your customers, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select the **Manage Customers** task icon.
3. To display the customer inventory as thumbnails, in the filter bar, select the thumbnail view icon.

Thumbnails representing customers appear in the main display area of the screen:





4. To restrict the display of customers, enter a search criterion of one or more characters in the Search bar and press Enter. All customer names that match the search criterion are shown in the main display area.
5. For a quick look view of a specific customer, click once on the customer icon. Summary information about the customer appears in the right panel.

Viewing Customers in a Table

To view a list of your customers in a table, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the Ethernet Activator task ribbon, select the **Manage Customers** task icon.
3. To display the customer inventory in a table, in the filter bar, select the table view icon.

A list of customers appears in a table in the main display area of the screen. For each customer, it shows the customer name, account number, contact name, and email address, as shown in the following example:

Manage Customers  				
<input type="checkbox"/>	Name	Account	Contact	Email
<input checked="" type="checkbox"/>	A1	663629614	Joe Customer	joe.customer@a1.com
<input type="checkbox"/>	Best Custmr	869824772	Barry Diller	bdiller@bc.com
<input type="checkbox"/>	Chartman	169499218	Barton zoe	bzoe@chatman.com
<input type="checkbox"/>	Eclipse	422936043	Craig Silverstein	csilver@eclipse.com
<input type="checkbox"/>	FestaCorp	1108876164	Shane Robison	srobison@festa.com
<input type="checkbox"/>	FirstServ	45893	Joe Smith	jsmith@firstserv.com
<input type="checkbox"/>	RedSky	809627196	Lynn Tyson	ltyson@redsky.com
<input type="checkbox"/>	ZZB	875124701	Dan Rosensweig	drosenweig@zzb.com

- To restrict the display of customers, enter a search criterion of one or more characters in the Search bar and press Enter. All customer names that match the search criterion are shown in the main display area.
- For a quick look view of a specific customer, click once on the customer icon. Summary information about the customer appears in the right panel.

- Related Topics**
- Adding a New Customer on page 139
 - Editing an Existing Customer on page 140
 - Deleting Customers on page 141

Adding a New Customer

New customers must be identified to the system before you can provision and activate a service order for them.

To add a customer to the database, follow these steps:

- In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
- In the task ribbon, select the **Manage Customers** task icon.
An inventory of existing customers appears in the Manage Customers screen.
- In the task ribbon, select the **Create Customer** task icon.
- On the Create Customer screen, provide the information requested for the customer, similar to the following example:

Name: A1-Enterprises

Account number: 1234568

Contact name: Joe Customer

Contact email: joe.customer@a1.com

Contact information:

Image File:

Fill out the fields in the form.

The Name and Account number fields are required. All other fields are optional.

5. Optionally, use the Image File field to upload a graphical image of the customer. This image will be used for the thumbnail representation of the customer in Junos Space screens to easily identify information about that customer. For example, the image might use the customer's corporate logo.

To upload an image file for the customer, follow these steps:

- a. In the Image File field, click **Browse**.
 - b. Navigate to the file that contains the image you want to use for this customer.
 - c. Click **Upload**.
6. Click **Create**.

The Manage Customers inventory page shows the new customer.

- Related Topics**
- Viewing Customers on page 137
 - Editing an Existing Customer on page 140
 - Deleting Customers on page 141

Editing an Existing Customer

To edit the information about an existing customer, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select **Manage Customers**.
The Manage Customers screen shows the customers already added to the system.
3. In the Manage customers screen, select the customer whose information you want to edit.

4. In the Actions panel, click **Modify Customer**.
5. Make the required changes to the customer information.
6. Click **Modify**.

The Manage Customers screen shows the modified information.

- Related Topics**
- Viewing Customers on page 137
 - Adding a New Customer on page 139
 - Deleting Customers on page 141

Deleting Customers

You cannot delete customer from the database if an active service exists for that customer. You must decommission all such services before you can delete the customer.

To delete a customer from the database, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select **Manage Customers**.
The Manage Customers screen shows the customers in the database.
3. Select the customer you need to delete. To delete several customers at the same time, use the multiple selection capability in the quick-look panel.
4. In the Actions panel, click **Delete Customer**.
A pop-up window appears requesting confirmation.
5. Click **Delete**.

The Manage Customers screen no longer lists the deleted customer.

- Related Topics**
- Viewing Customers on page 137
 - Adding a New Customer on page 139
 - Editing an Existing Customer on page 140
 - Decommissioning a Service on page 168

Chapter 9

Managing Services Orders

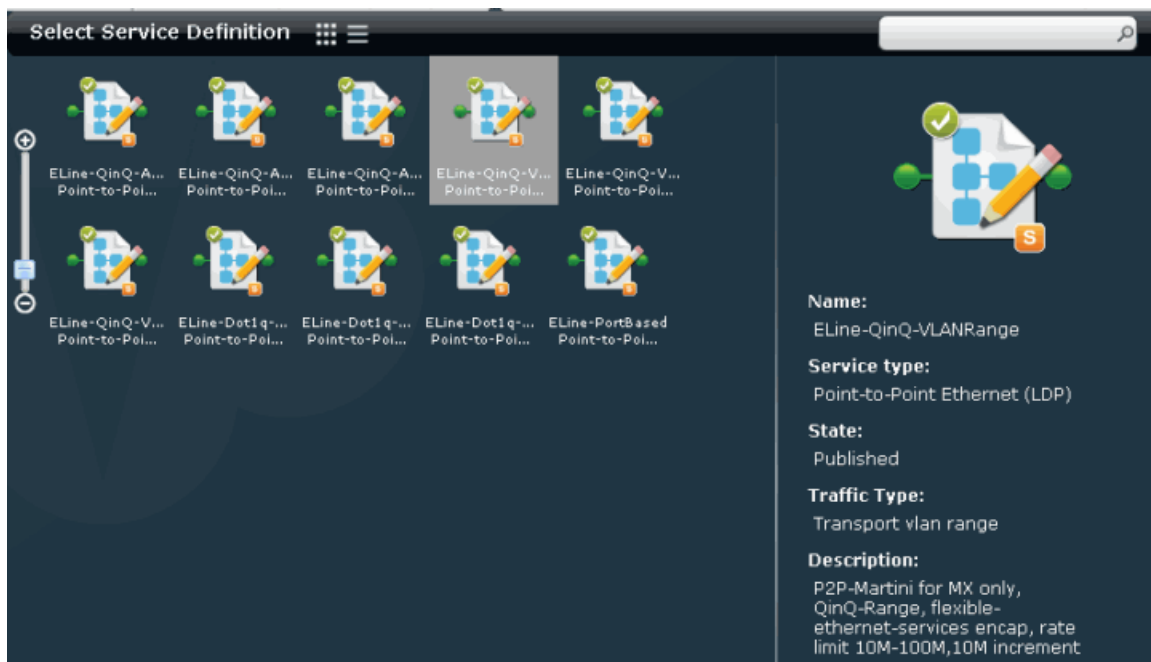
- Creating a Point-to-Point Ethernet Service Order on page 143
- Creating a Multipoint Ethernet Service Order on page 149
- Deleting a Service Order on page 157
- Deploying a Service on page 157

Creating a Point-to-Point Ethernet Service Order

To create a point-to-point Ethernet service order, follow these steps:

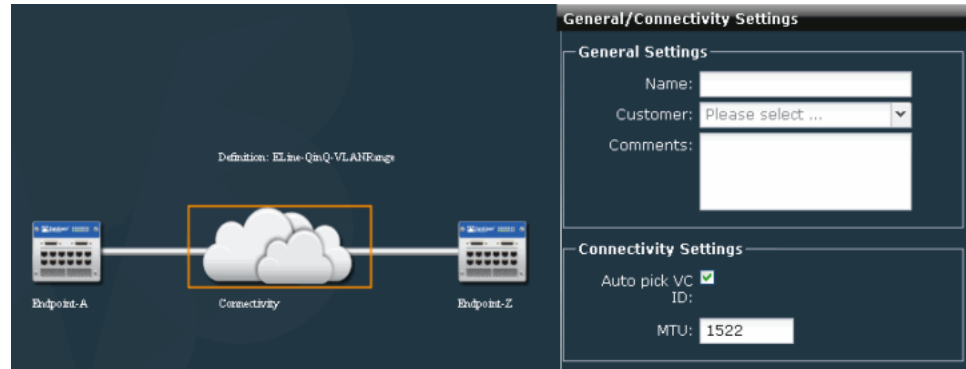
1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select the **Manage Service Orders** task icon.
3. In the task ribbon, select the **Create P2P Service Order** task icon.

The Select Service Definition screen appears and shows an inventory of all available point-to-point service definitions. An example follows:



4. Select the service definition you want to base your service order on, and then click **Next**.

A graphical image of a service order appears as shown in the following example:



The image in the left part of the main display area has four selectable elements. The right panel requests information depending on which element is selected. The two router images represent the two endpoints of the point-to-point service. Text above the cloud image provides general information about the service. The cloud represents the connectivity across the network between the two endpoints. When you select the cloud or the text, the right panel requests general information about the service order as well as connectivity information.

The General/Connectivity Settings panel appears initially in the right panel, as shown in the previous example.

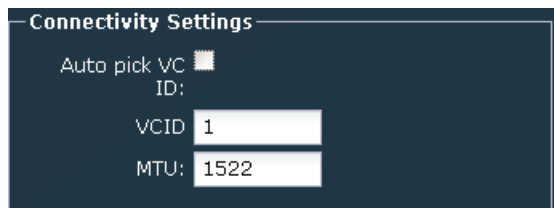
5. In the General Settings box, enter the following information:
 - a. In the Name field, enter a unique name for the service.
The service order name can consist of only letters, numbers, and underscores.
 - b. In the Customer field, select the customer who is requesting the service.
If the customer is not in the list, you must add the customer to the database before proceeding. See “Adding a New Customer” on page 139.
 - c. In the Comments field, enter a description of the service. This description will appear in information screens about the request or service instance created from the request.
6. In the Connectivity Settings box, enter VCID and MTU information, as allowed by the service definition. This box might include:

- VCID—An integer that uniquely identifies the virtual circuit that the service will use.

The VCID can be either set automatically by the Junos Space software, or it can be set manually by the service provisioner in the service order. The service definition could force the system to pick the VCID, force the service provisioner to pick the VCID, or allow the service provisioner to override the settings in the service definition.

We recommend allocating the VCID automatically, however, service providers who have their own systems for allocating VCIDs will choose manual setting.

In the previous example, by default, the system picks a VCID from its pool automatically, but allows the service provisioner to override this value in the service order. Uncheck the box to override the service definition setting. The form expands to include an additional field for entering the VCID manually as follows: .



The **Connectivity Settings** form is displayed. It includes a checkbox for "Auto pick VC" which is unchecked. Below this is a label "ID:" followed by a text input field containing the value "1". Below that is a label "VCID" followed by a text input field containing the value "1". At the bottom is a label "MTU:" followed by a text input field containing the value "1522".

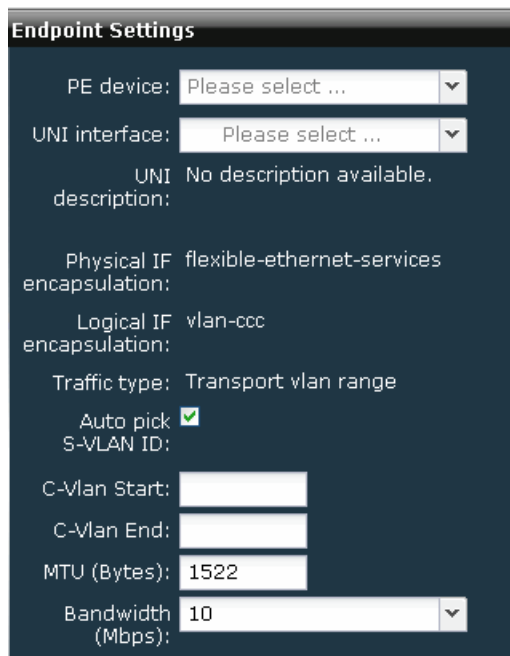
- MTU for the connection across the network.

Again, the service definition can constrain the MTU to a specific value or allow the service provisioner to override it in the service order. In this example, the service definition sets the MTU, but allows the service provisioner to change the value.

When you advance to the next step in creating your service order, your new connectivity settings appear under the Connectivity image in the main graphic and new general information is added to the text above the cloud. If you have incomplete or invalid information the General/Connectivity Settings panel, a warning icon appears next to the cloud image.

7. To provide endpoint information for the first endpoint, click the **Endpoint A** graphic element (or click **Next**).

The Endpoint Settings form appears in the right panel. An example follows:



The **Endpoint Settings** form is displayed. It includes a dropdown menu for "PE device:" with the text "Please select ...". Below this is a dropdown menu for "UNI interface:" with the text "Please select ...". Below that is a label "UNI description:" followed by the text "No description available.". Below that is a label "Physical IF encapsulation:" followed by the text "flexible-ethernet-services". Below that is a label "Logical IF encapsulation:" followed by the text "vlan-ccc". Below that is a label "Traffic type:" followed by the text "Transport vlan range". Below that is a checkbox for "Auto pick" which is checked. Below that is a label "S-VLAN ID:" followed by a text input field. Below that is a label "C-Vlan Start:" followed by a text input field. Below that is a label "C-Vlan End:" followed by a text input field. Below that is a label "MTU (Bytes):" followed by a text input field containing the value "1522". At the bottom is a label "Bandwidth (Mbps):" followed by a dropdown menu with the value "10".

The fields in this example are for a service with Q-in-Q endpoint interfaces. Some of the fields differ from one interface type to another and also differ depending on permissions assigned in the service definition.

Fill in the requested information as follows:

- a. In the PE Device field, select the N-PE device you want to use for the first endpoint.

If you are unsure about which PE device to choose, go to the Prestaging Devices workspace landing page, which shows capacity information about UNIs on PE devices. You need to pick a device that has available UNIs.

This step is required for all service orders.

- b. In the UNI interface field, select a UNI.

The dropdown list includes all UNIs available on the selected device.

This step is mandatory for all service orders.

- c. If the service definition requires a backup interface, in the Backup interface field, select a second interface to use for the backup.

If the service definition did not specify a backup interface, the field is not shown.

- d. In the Physical IF encapsulation field, select a physical encapsulation mode.

This field is always present in the service order, but is selectable only if allowed by the service definition. Also, for some endpoint interface types, the physical encapsulation is predetermined.

If you are allowed to select this field, depending on the interface type, you can choose from the following options:

- flexible-ethernet-services
- extended-vlan-ccc
- vlan-ccc

- e. In the Logical IF encapsulation field, select a logical encapsulation for the service. Your choice is constrained by your selection for the Physical IF encapsulation field.

- If you selected flexible-ethernet-services in the Physical encapsulation field, you must select **vlan-ccc** in the Logical IF encapsulation field.
- If you selected vlan-ccc in the Physical IF encapsulation field, you must select **vlan-ccc** in the Logical IF encapsulation field.
- If you selected extended-vlan-ccc in the Physical IF encapsulation field, you must select **extended-vlan-ccc** in the Logical IF encapsulation field.

This field is not present for all types of endpoint interface. If it is present, you can set its value only if the service definition allows you to.

- f. In the Traffic type field, designate whether the service will transport all traffic, a single VLAN, or multiple VLANs.

Although this field is present for all service orders, it is predetermined for some types of interface. For example, a port-to-port interface will always transport all traffic. Moreover, for interface types that do support multiple traffic types, you can select this value only if the service definition allows you to do so.

If you are allowed to select this field, depending on the interface type, you can choose from the following values:

- Transport single vlan
- Transport vlan range
- Transport all traffic

- g. In the C-VLAN ID field (or VLAN ID field), enter the customer's VLAN ID.

This field is mandatory for service orders that transport a single customer VLAN. The service provisioner must enter this ID in the service order. The information is provided by the customer.

- h. In the C-Vlan Start and C-Vlan End fields, enter the beginning and end of the range of customer VLANs that the service will transport.

This field is mandatory for all services that transport a specific range of customer VLANs. The service provisioner must enter these values in the service order. This information is provided by the customer.

- i. In the Auto pick S-VLAN ID field, check the box to have the system choose a service VLAN ID automatically.

This field is present only for interface types that provide double tagging; that is, only for Q-in-Q endpoint interface types. If this field is not set, then you must enter a service VLAN ID manually.

- j. In the S-VLAN ID field, enter the service VLAN ID that will be used to provide the outer tag for the service.

This field is present only for interface types that provide double tagging, and only if the Auto-pick S-VLAN ID field is unchecked.

- k. In the MTU field, enter the maximum transmission unit size for the UNI.

This field is present in all service orders. However, you can set this field only if the service definition allows you to do so.

- l. In the Bandwidth field, select a value from the list to limit the bandwidth of the service you are creating.

This field is present only if bandwidth limiting is allowed by the service definition, and is configurable in the service order only if the service definition allows you to do so.

When you click on another graphic element in the main graphic area, the selected device name and interface name appear beneath the endpoint image in the main graphic.

8. To provide endpoint information for the second endpoint, click the **Endpoint Z** graphic element (or click **Next**).

The Endpoint Settings form appears in the right panel for the second endpoint. Complete this form as for the first endpoint.

9. Click **Create**.

The deployment Options window appears as shown in the following example:

10. Perform one of these actions:

- To save the request without deploying the service, select **Save only**, and then click **OK**.

See “Deploying a Service” on page 157 for information about how to deploy a saved service at a later time.

- To deploy the service immediately, select **Deploy now**, and then click **OK**.
- To deploy the service later, select **Schedule deployment**, select a date and time, and then click **OK**.

The time field specifies the time kept by the server, but in the time zone of the client.

11. To monitor the progress and status of the deployment, use the Jobs workspace. See Viewing Scheduled Jobs for details.

The service order is now complete.

The Manage Service Orders inventory panel shows the service order you just added.

Related Topics

- Viewing Service Orders on page 174
- Viewing Scheduled Jobs
- Service Attributes Overview on page 12
- Adding a New Customer on page 139
- Deploying a Service on page 157

Creating a Multipoint Ethernet Service Order

The Ethernet Activator software implements multipoint Ethernet services as virtual private LAN (VPLS) services. The terms “multipoint Ethernet service” and “VPLS service” are used interchangeably.

To create a multipoint Ethernet service order, follow the steps in these procedures:

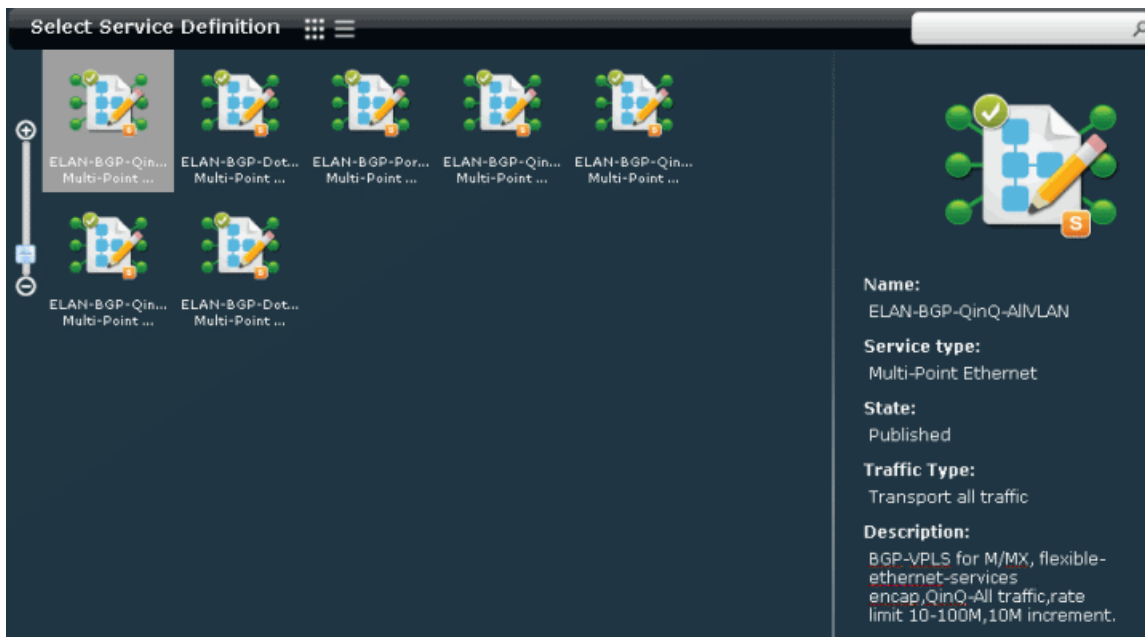
1. Selecting the Service Definition on page 149
2. Entering General Settings Information on page 150
3. Setting Attributes for All Endpoints on page 151
4. Selecting N-PE Devices on page 152
5. Modifying Endpoint Settings on page 153
6. Deploying the New Service on page 155

Selecting the Service Definition

To select a service definition on which to base the new service order, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select the **Manage Service Orders** task icon.
3. In the task ribbon, select the **Create VPLS Service Order** task icon.

The Select Service Definition screen appears and shows a filtered inventory view of only those published service definitions designed to work with multipoint Ethernet services:



4. Select the service definition you want to base your service order on, and then click Next.

The Enter Order Information screen appears.

Entering General Settings Information

This part of the create multipoint Ethernet service order procedure sets general information about the service order in the General Settings box of the Enter Order information screen:

The screenshot shows the 'General Settings' form. The 'Service definition' is set to 'ELAN-BGP-QinQ-Range-Normalized-VLAN'. The 'Name' field is empty. The 'Customer' field is a dropdown menu with 'Please select ...' as the current selection. The 'Comments' field is a large text area. The 'Customer traffic type' is set to 'Transport vlan range'. The 'Autopick Route Target' checkbox is checked.

Enter the following information:

1. In the Name field, enter a unique name for the multipoint service.
The service order name can consist of only letters, numbers, and underscores.
2. In the Customer field, select the customer who is requesting the service.

If the customer is not in the list, you must add the customer to the database before proceeding. See “Adding a New Customer” on page 139.

3. In the Comments field, enter a description of the service. This description will appear in information screens about the request or service instance created from the request.

The Customer traffic type field is not selectable. Its value is set in the service definition.

The Autopick Route Target field cannot be changed. Route targets are always selected automatically.

Setting Attributes for All Endpoints

This part of the create multipoint Ethernet service order procedure sets the attributes that are usually common for all endpoints in the service. The values that you enter will vary, depending on the service definition on which the service order is based.

If these attributes will not be the same on all endpoints you can set them to be the same for now and then make changes later, or you can choose to skip this step and apply the attribute values one at a time later.

This procedure sets the attributes listed in the End Point Settings box of the Enter Order Information screen:

End Point Settings

These settings from the selected Service Definition can be applied to all end points.

Apply to all: ☒

MTU (Bytes): 1522

Bandwidth (Mbps): 10

Autopick SVLAN ID: ☒

Customer VLAN Range Start:

Customer VLAN Range End:

Physical IF encapsulation: flexible-ethernet-services

Logical IF encapsulation: vlan-vpls

To skip this step and enter all the endpoint attributes individually later, uncheck the **Apply to all** box.

To set attributes common to most endpoints, follow these steps:

1. In the Endpoint Settings box, leave the Apply to all box checked so that you enter the endpoint parameter values only once.
2. In the MTU field, enter the maximum transmission unit size for the UNI.

This field is present in all service orders. However, you can set this field only if the service definition allows it.

3. In the Bandwidth field, select a value from the list to limit the bandwidth of the service you are creating.

This field is present only if bandwidth limiting is allowed by the service definition, and is configurable in the service order only if the service definition allows it.

4. In the Autopick SVLAN-ID field, choose whether you want the service VLAN ID to be chosen automatically, or have it manually assigned.

This field is present only for service orders with UNIs that have Q-in-Q interface types.

5. In the Customer VLAN Range Start and Customer VLAN Range End fields, enter the first and last VLAN ID of the range of customer VLANs to be transported over the network.

These fields are present only for services with UNIs that have Q-in-Q interface types and allow a range of VLANs to be transported.

6. In the Autopick VLAN ID field, choose whether you want the customer VLAN ID to be automatically selected by the Ethernet Activator software, or whether you want to specify the customer VLAN ID yourself.

This field is present only for services with 802.1Q UNI endpoints and is configurable in the service order only if the service definition allows it.

7. In the VLAN ID field, enter a value for the customer VLAN.

This field is present only if Autopick CVLAN ID is turned off in step 6.

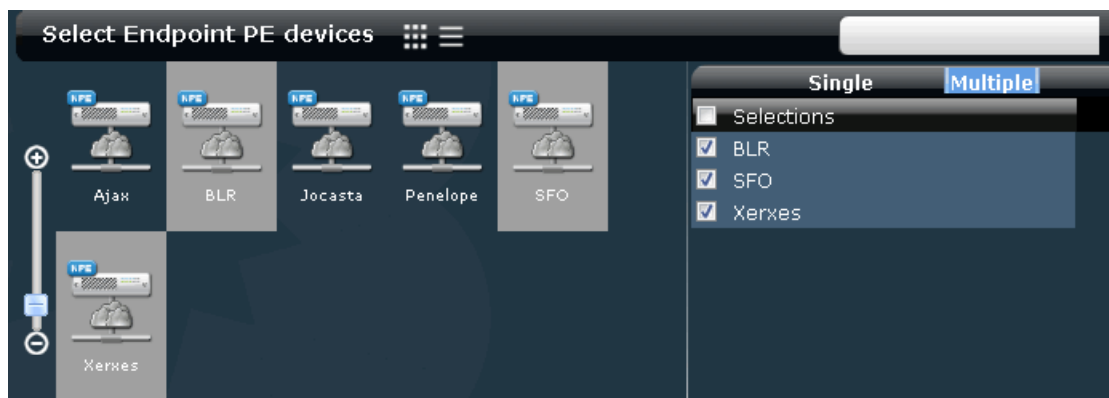
The Physical IF encapsulation and Logical IF encapsulation fields are not selectable. These values are set in the service definition.

8. Click **Next**.

The Select Endpoint PE Devices screen appears.

Selecting N-PE Devices

This part of the create multipoint Ethernet service order procedure selects the N-PE devices that will host the service endpoints. Selection is made from the Select Endpoint PE Devices screen:





NOTE: The Select Endpoint PE Devices screen shows only assigned NPE devices that have an AS number configured. If you do not see the device you are looking for, use the CLI on the device to check for and assign an AS number.

To select endpoint N-PE devices, follow these steps:

1. In the Select Endpoint PE devices screen, select the devices that you want to participate in the service. Use the multiple selection feature to select more than one device.
2. Click Next.

The Endpoint Settings screen appears.

Modifying Endpoint Settings

This part of the create multipoint Ethernet service order procedure sets the attributes for each endpoint in the service. Selection is made using the Endpoint Settings screen:

Endpoint Settings								
Add Endpoints								
Device	UNI Interface	Bandwidth	AutoPick	S-VLAN	C-VLAN	C-VLAN	MTU	Action
Device: BLR (1 Item)								
BLR	ge-0/0/1	10	<input checked="" type="checkbox"/>	0	100	300	1522	Delete UNI Interface
Device: SFO (1 Item)								
SFO	ge-0/0/1	10	<input checked="" type="checkbox"/>	0	100	300	1522	Delete UNI Interface
Device: Xerxes (1 Item)								
Xerxes	ge-2/0/2	10	<input checked="" type="checkbox"/>	0	100	300	1522	Delete UNI Interface

This screen shows one endpoint for each device that you selected from the Select Endpoint PE devices screen, as described in “Selecting N-PE Devices” on page 152.

The interface shown in the UNI Interface field is automatically selected by the Ethernet Activator software, which chooses the UNI that has the highest available capacity among interfaces that are in the Up state. To calculate the available capacity of the interface, the system subtracts the bandwidth reserved for each service deployed on that interface from the total capacity of the interface.

For each endpoint, the Endpoint Settings screen shows the value for each UNI attribute.

- For port-port services, the displayed values are Bandwidth and MTU.
- For 802.1Q UNIs, the displayed attributes are Bandwidth, Autopick VLAN ID, VLAN ID, and MTU.
- For Q-in-Q UNIs, the displayed attributes include Bandwidth, AutoPick S-VLAN ID, and S-VLAN ID. For a service with Q-in-Q UNIs that specifies a customer

VLAN range, the displayed attributes also include C-VLAN ID Start and C VLAN End.

The values shown are initially the values you set earlier on the Enter Order Information screen, as described in “Setting Attributes for All Endpoints” on page 151.

To modify the endpoint settings, follow these steps:

1. To select a different UNI on a device, on the Endpoint Settings screen, click the UNI name you want to change and choose another interface from the list, as shown in the following example:

Device	UNI Interf	Bandwidth	AutoPick S	S-VLAN ID	C-VLAN St	C-VLAN En	MTU (Byte)	Action
Device: BLR (1 Item)								
BLR	ge-0/0/1	10	<input checked="" type="checkbox"/>	0	100	300	1522	Add UNI Interface Delete UNI Interface
Device: IND (1 Item)								
IND	ge-0/0/1	10	<input checked="" type="checkbox"/>	0	100	300	1522	Add UNI Interface Delete UNI Interface
Device: SFO (1 Item)								
SFO	ge-0/0/1	10	<input checked="" type="checkbox"/>	0	100	300	1522	Add UNI Interface Delete UNI Interface

Modified values are indicated by a small red triangle in the corner of the table cell.

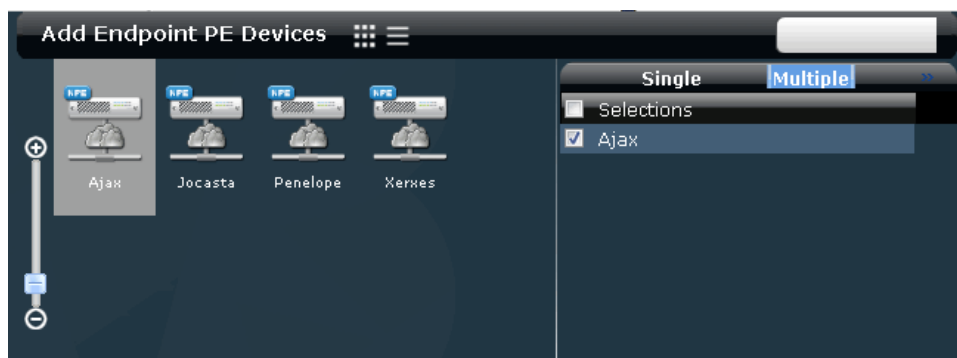
2. To change the bandwidth on an endpoint, click the bandwidth value for the endpoint and select another value from the list:

Device	UNI Interf	Bandwidth	AutoPick S	S-VLAN ID	C-VLAN St	C-VLAN En	MTU (Byte)	Action
Device: BLR (1 Item)								
BLR	ge-0/0/1	10	<input checked="" type="checkbox"/>	0	100	300	1522	Add UNI Interface Delete UNI Interface
Device: IND (1 Item)								
IND	ge-0/0/1	10	<input checked="" type="checkbox"/>	0	100	300	1522	Add UNI Interface Delete UNI Interface
Device: SFO (1 Item)								
SFO	ge-0/0/1	10	<input checked="" type="checkbox"/>	0	100	300	1522	Add UNI Interface Delete UNI Interface

3. For Q-in-Q interface endpoints, you can change the way the service VLAN ID is selected:
 - To change an automatically selected service VLAN ID to manual selection, uncheck the AutoPick S-VLAN ID box, and enter an S-VLAN ID value in the S-VLAN ID field.

- To change from manual selection to automatic selection, check the AutoPick S-VLAN ID box.
 - To change the value of a manually selected service VLAN ID, enter a new value in the S-VLAN ID field.
4. For Q-in-Q interface endpoints with customer VLAN ranges specified, you can also change the range limits for an endpoint.
 5. For 802.1Q interface endpoints, you can change the customer VLAN ID.
 6. To change the MTU for the UNI, click the value in the MTU field and enter a new value.
 7. To add a UNI on a selected device, select **Add UNI Interface** in the Action column, and then select the interface you want from the UNI interface list.
 8. To delete a UNI from a device, in the Actions column, click **Delete UNI Interface**.
If the deleted UNI is the only UNI selected from the device, then the device is deleted from the service configuration.
 9. To add an endpoint on a device not listed in the Endpoint Settings screen, follow these steps:
 - a. Click **Add Endpoints**.

The Add Endpoint PE Devices screen appears.



This screen lists the available N-PE devices that you did not assign when you first made your device selections from the Select Endpoint PE Devices screen.

- b. Select additional devices, and then click **Next**.
The Endpoint Settings screen appears with the new devices added.
 - c. Modify the endpoint settings for this device as required.
10. When you have finished modifying the endpoint settings, click **Create**.
The Deployment Options window appears.

Deploying the New Service

This part of the create multipoint Ethernet service order procedure deploys the service.

To deploy the service, make selections from the Deployment Options window:

The screenshot shows a window titled 'Deployment Options'. It contains three radio buttons: 'Save only' (which is selected), 'Deploy now', and 'Schedule deployment'. Below the radio buttons is a section labeled 'Date and time:'. This section includes a date input field, a time input field, and a dropdown menu currently showing 'PDT'. At the bottom of the window are two buttons: 'OK' and 'Cancel'.

1. Perform one of these actions:
 - To save the request without deploying the service, select **Save only** and then click **OK**.
See “Deploying a Service” on page 157 for information about how to deploy a saved service at a later time.
 - To deploy the service immediately, select **Deploy now** and then click **OK**.
 - To deploy the service later, select **Schedule deployment**, select a date and time, and then click **OK**.
The time field specifies the time kept by the server, but in the time zone of the client.
2. To monitor the status of the deployment, use the Jobs workspace.

The service order is now complete.

The Manage Service Orders inventory panel shows the service order you just added. See Viewing Scheduled Jobs for details about the Jobs workspace.

- Related Topics**
- Viewing Scheduled Jobs
 - Viewing Service Orders on page 174
 - Service Attributes Overview on page 12
 - Adding a New Customer on page 139
 - Deploying a Service on page 157

Deleting a Service Order

You can delete a service order that is in the requested state, the scheduled state, the invalid state, or the failed deployment state. To correct a service order in the invalid state, you must delete it and then recreate it; the Ethernet Activator software does not support modifying the service order directly.

To delete a service order from the database, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select the **Manage Service Requests** workspace icon.
3. In the Manage Service Orders inventory page, select the service order you want to delete. To delete several service orders at once, use the multiple selection feature.
4. In the command panel, select **Delete Service Order**.

A pop-up window appears requesting confirmation.

5. Click **Delete**.

The Manage Service Requests inventory page reappears with the deleted service orders removed.

- Related Topics**
- Creating a Point-to-Point Ethernet Service Order on page 143
 - Creating a Multipoint Ethernet Service Order on page 149
 - Viewing Service Orders on page 174

Deploying a Service

This procedure schedules a service for deployment on the network. Use this procedure to perform the following tasks:

- Deploy a new service.
- Deploy a modified service.
- Redeploy a service order that failed deployment.

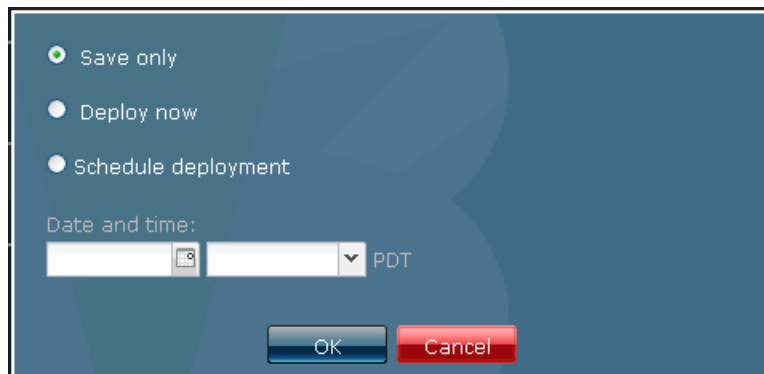
You cannot deploy an invalid service order.

To schedule a service for deployment, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the Service Orders States pie chart, click the **Requested** segment.
3. The Manage Service Orders screen shows only those service orders in the Requested state.

4. Click the service order you want to deploy. To deploy several service orders at once, use the multiple selection feature to select all the requests you want to deploy.
5. In the Actions panel, click **Deploy Service**.

The Deploy Service screen appears as follows:



The screenshot shows a dialog box with a dark blue background. At the top, there are three radio buttons: 'Save only' (which is selected and has a green dot), 'Deploy now', and 'Schedule deployment'. Below the radio buttons, there is a label 'Date and time:' followed by a date input field, a time input field, and a dropdown menu currently set to 'PDT'. At the bottom of the dialog, there are two buttons: 'OK' and 'Cancel'.

6. To deploy the service immediately, select **Deploy now**, and click **OK**.
To deploy the service at a later time, select **Schedule deployment**, select a date and time for deployment, and then click **OK**.
The time field specifies the time kept by the server, but in the time zone of the client.
After scheduling the service order for deployment, the provisioning software begins validating the service order.
7. Use the Jobs workspace to monitor the outcome of the deployment. See Viewing Scheduled Jobs for details about the Jobs workspace.

- Related Topics**
- Viewing Scheduled Jobs
 - Viewing Services on page 185

Chapter 10

Managing Services

- Validating a Service on page 159
- Modifying a Point-to-Point Service on page 161
- Modifying a Multipoint Ethernet Service on page 163
- Decommissioning a Service on page 168

Validating a Service

These procedures validate a deployed service instance. You can perform a functional audit or a configuration audit. You can perform the audit immediately, or you can schedule it.

Use these procedures to validate a service instance:

- Performing a Functional Audit on page 159
- Performing a Configuration Audit on page 160

Performing a Functional Audit

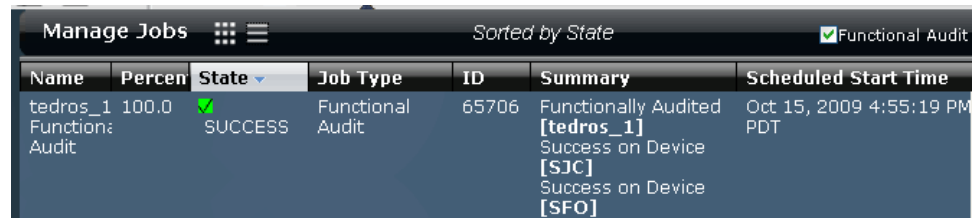
A functional audit verifies that a deployed service instance is functioning on the device.

To perform a functional audit, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select **Manage Services**.
The Audit Services screen appears. It lists all deployed services.
3. In the Manage Services screen, select the service you want to audit.
4. In the Actions panel, select **Perform Functional Audit**.
5. In the Schedule Functional Audit window, either:
 - Select **Audit Now**, and then click **OK**.

An Audit Information window appears and provides a link to details about the audit in the Jobs workspace.

- Select **Audit Later**, enter a date and time, and then click **OK**.
6. To monitor the progress of an audit after selecting **Audit Now** in the previous step, click the Job ID in the Audit Information window. The Manage Jobs screen shows information about the functional audit job. An example follows:



Name	Percent	State	Job Type	ID	Summary	Scheduled Start Time
tedros_1 Functional Audit	100.0	✓ SUCCESS	Functional Audit	65706	Functionally Audited [tedros_1] Success on Device [SJC] Success on Device [SFO]	Oct 15, 2009 4:55:19 PM PDT

The State field tells you whether the service passed or failed the audit. If the service failed the audit, then the Summary field provides information about the failure.

To monitor the progress of an audit after selecting **Audit Later** in the previous step, after the scheduled time of the audit, follow these steps:

- a. In the task ribbon, select the **Job Management** workspace icon.
- b. In the Job Types window, select the **Functional Audit** segment of the pie chart.
- c. Select the functional audit of interest from the inventory list.
Summary information about the audit appears in the quick look panel.
- d. In the filter bar, select the table view icon to see additional information about the job. If the service failed the audit, information about the failure appears in the Summary field.

Performing a Configuration Audit

A configuration audit checks that the network devices are correctly configured to support the requested services and to ensure that the configuration on the device is synchronized with the Junos Space database.

To perform a configuration audit, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select **Manage Services**.
The Manage Services screen appears. It lists all deployed services.
3. In the Manage Services screen, select the service you want to audit.
4. In the Actions panel, select **Perform Configuration Audit**.
5. In the Schedule Configuration Audit window, either:
 - Select **Audit Now**, and then click **OK**.

An Audit Information window appears and provides a link to details about the audit in the Jobs workspace.

- Select **Audit Later**, enter a date and time, and then click **OK**.
6. To monitor the progress of an audit after selecting **Audit Now** in the previous step, click the Job ID in the Audit Information window. The Manage Jobs screen shows information about the configuration audit job. An example follows:



Name	Percent	State	Job Type	ID	Summary	Scheduled Start Time
tedros_1 Config Audit	100.0	✓ SUCCESS	Configuration Audit	65616	Audited [tedros_1_audit200' 23:39:08.209] Success on Device [SFO] Success on Device [SJC]	Oct 15, 2009 4:41:14 PM PDT

The State field tells you whether the service passed or failed the audit. If the service failed the audit, then the Summary field provides information about the failure.

To monitor the progress of an audit after selecting **Audit Later** in the previous step, after the scheduled time of the audit, follow these steps:

- a. In the task ribbon, select the **Job Management** workspace icon.
 - b. In the Job Types window, select the **Configuration Audit** segment of the pie chart.
 - c. Select the configuration audit of interest from the inventory list.
Summary information about the audit appears in the quick look panel.
 - d. In the filter bar, select the table view icon to see additional information about the job. If the service failed the audit, information about the failure appears in the Summary field.
7. If the configuration audit failed, view the results of the configuration audit as follows:
- a. Return to the Manage Services inventory screen and select the service.
 - b. In the Actions panel, select **View Configuration Audit Results**.

The Configuration Audit Results screen shows the configuration elements that are inconsistent or missing on the device.

- Related Topics**
- Service Troubleshooting Overview on page 197
 - Troubleshooting Service Problems on page 199
 - Viewing Scheduled Jobs

Modifying a Point-to-Point Service

You can modify the following entities of a point-to-point Ethernet service:

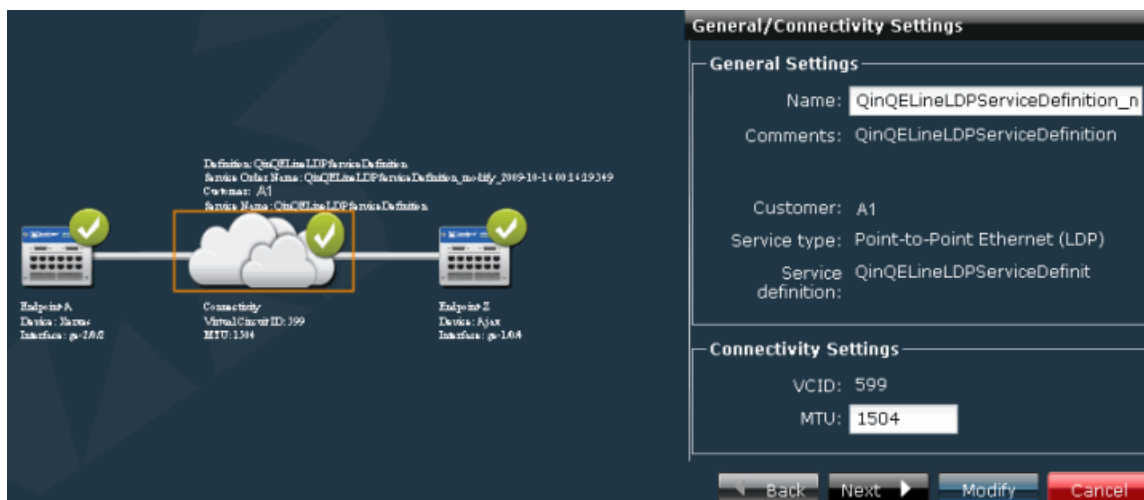
- MTU across the network

- Rate limiting bandwidth of an endpoint
- MTU of an endpoint

To modify the attributes of a service, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select the **Manage Services** task icon.
3. In the Manage Services screen, select the service you want to modify.
4. In the Actions panel, select **Modify Service**.

A graphical image of the service appears, showing device images that represent the service endpoints and a cloud image that represents the network core. By default, the cloud image is selected, which displays general settings and connectivity information in the right panel. The General Settings box contains a unique name for the service order that will request the change.



5. In the Name field, change the name of the modification service order, if desired.
6. Change the MTU setting, as required.
7. Click **Next**.

The service order endpoint settings information for endpoint A appears in the right panel, as shown in the following example:

Endpoint Settings

PE device: SFO

UNI interface: ge-0/0/3

UNI description: SHAHID

Physical IF encapsulation: flexible-ethernet-services

Logical IF encapsulation: vlan-ccc

Traffic type: QINQORANGE

S-VLAN ID: 1

MTU (Bytes): 1522

Bandwidth (Mbps): 10

8. Change the bandwidth or MTU setting as required.
9. Click **Next** and make any required changes to endpoint Z.
10. Click **Modify**.

The Ethernet Activator software modifies the service.

11. Use the Jobs workspace to check for successful completion of the action. See Viewing Scheduled Jobs for details.

- Related Topics**
- Viewing Scheduled Jobs
 - Viewing Services on page 185
 - Deploying a Service on page 157
 - Creating a Point-to-Point Ethernet Service Order on page 143
 - Modifying a Multipoint Ethernet Service on page 163

Modifying a Multipoint Ethernet Service

For a multipoint service, you can change the bandwidth or MTU of a specific UNI, add or delete a UNI, or add a new device endpoint.

You cannot change the interface of an existing UNI. Neither can you change the S VLAN ID.

To perform the equivalent of changing the interface on an existing UNI, add a new UNI with the desired interface, and then delete the old UNI.

Modifying a service creates a new service order based on the attribute settings of the existing service.

The following topics provide instructions for modifying a multipoint Ethernet (VPLS) service:

- Adding an Endpoint on page 164
- Adding a UNI Interface on page 165
- Deleting a UNI Interface and Deleting an Endpoint on page 166
- Changing the Endpoint Bandwidth on page 167

Adding an Endpoint

To add an endpoint to a multipoint Ethernet service, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select the **Manage Services** task icon.
3. In the Manage Services inventory, select the service to which you want to add an endpoint.
4. In the Actions panel, select **Modify Service**.

Current service settings appear in the main display area. The General Settings box contains a unique name for the service order that will request the change.

General Settings

Service order name: ELAN-8GP-Dot1q-Normalized-VLAN-None-1_modify_2009-10
 Customer: BMW
 Service name: ELAN-8GP-Dot1q-Normalized-VLAN-None-1
 Service definition: ELAN-8GP-Dot1q-Normalized-VLAN-None
 Comments: ELAN-8GP-Dot1q-Normalized-VLAN-None-1

Endpoint Settings

Add endpoints

Device	UNI Interface	Bandwidth (Mbps)	AutoPick VLAN ID	VLAN ID	MTU (Bytes)	Action
Device: SFO (1 Item)						
SFO	ge-0/0/1	50	<input type="checkbox"/>	1	1522	Add UNI Interface Delete UNI Interface
Device: SX (1 Item)						
SX	ge-0/0/1	50	<input type="checkbox"/>	1	1522	Add UNI Interface Delete UNI Interface

Modify Cancel

5. In the Service order name field, change the name of the modification service order, if desired.
6. In the Endpoint Settings table, click **Add Endpoints**, as shown in the following example:

The Add Endpoint PE Devices screen shows available N-PE devices that are not part of the service.

Add Endpoint PE Devices

Single Multiple

Selections

☒ Odysseus

Ajan Archilles Odysseus Xerxes

7. Select the devices on which you want to add new endpoints, and then click **Next**.

The service modification screen shows the added devices with system recommended choices for UNI. To select a different UNI, see “Adding a UNI Interface” on page 165. To select a different bandwidth than the applied default, see “Changing the Endpoint Bandwidth” on page 167.

8. Click **Modify**.
9. In the Deployment Options window, select one of the following:
 - Save the change without scheduling it.
 - Schedule the change for immediate deployment.
 - Schedule the change for later deployment.
10. Click **OK**.
11. Use the Jobs workspace to monitor the progress and status of the deployment. See Viewing Scheduled Jobs for details.

Adding a UNI Interface

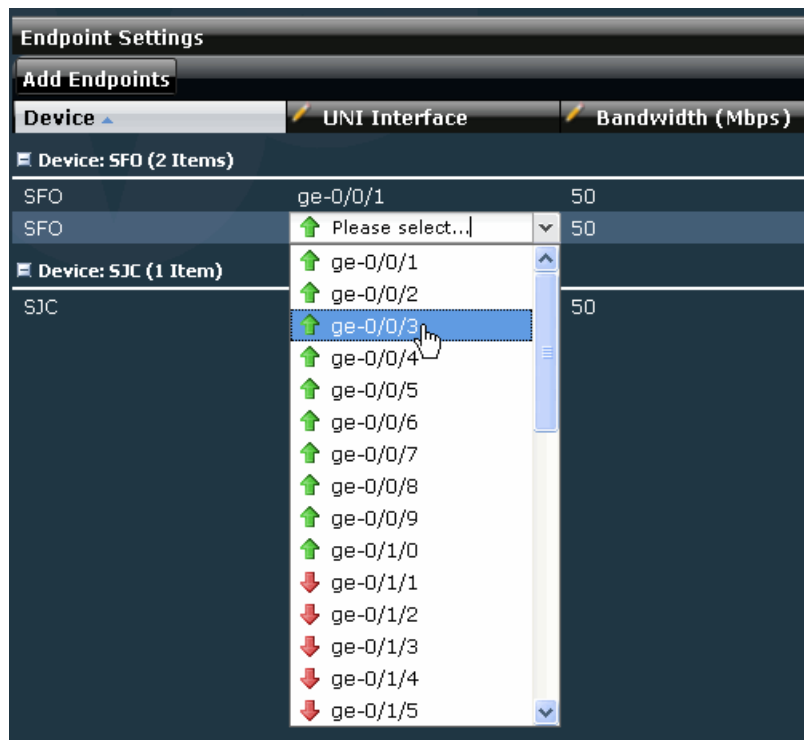
To add a UNI on a device that is already part of a multipoint Ethernet service, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select the **Manage Services** task icon.
3. In the Manage Services inventory, select the service to which you want to add a UNI.
4. In the Actions panel, select **Modify Service**.
Current service settings appear in the main display area. The General Settings box contains a unique name for the service order that will request the change.
5. In the Service order name field, change the name of the modification service order, if desired.
6. In the Action column of the Endpoint Settings table, click **Add UNI Interface** for the device, as shown in the following example, which adds a UNI to the device named SFO.

Device	UNI Interface	Bandwidth (Mbps)	AutoPick VLAN ID	VLAN ID	MTU (Bytes)	Action
Device: SFO (2 Items)						
SFO	ge-0/0/1	50	<input type="checkbox"/>	1	1522	Delete UNI Interface
SFO	Please select...	50	<input type="checkbox"/>	1	1522	Delete UNI Interface
Device: SXC (1 Item)						
SXC	ge-0/0/1	50	<input type="checkbox"/>	1	1522	Delete UNI Interface

An additional UNI appears in the endpoint table.

7. Select an interface from the UNI Interface column:



8. Click **Modify**.
9. In the Deployment Options window, select one of the following:
 - Save the change without scheduling it.
 - Schedule the change for immediate deployment.
 - Schedule the change for later deployment.
10. Click **OK**.
11. Use the Jobs workspace to monitor the progress and status of the deployment. See Viewing Scheduled Jobs for details.

Deleting a UNI Interface and Deleting an Endpoint

To delete a UNI from a multipoint Ethernet service, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select the **Manage Services** task icon.
3. In the Manage Services inventory, select the service from which you want to delete a UNI.
4. In the Actions panel, select **Modify Service**.

Current service settings appear in the main display area. The General Settings box contains a unique name for the service order that will request the change.

5. In the Service order name field, change the name of the modification service order, if desired.
6. In the Action column of the Endpoint Settings table, find the UNI you want to delete and click **Delete UNI Interface** for that table row, as shown in the following example:

Endpoint Settings						
Add Endpoints						
Device	UNI Interface	Bandwidth (M	AutoPick S-VL	S-VLAN ID	MTU (Bytes)	Action
Device: Jocasta (1 Item)						
Jocasta	ge-2/0/3	10	<input type="checkbox"/>	1	1522	Delete UNI Interface
Device: Odysseus (1 Item)						
Odysseus	ge-0/1/2	100	<input checked="" type="checkbox"/>	0	1522	Delete UNI Interface
Device: Penelope (2 Items)						
Penelope	ge-1/0/2	10	<input type="checkbox"/>	11	1522	Delete UNI Interface
Penelope	ge-1/1/2	10	<input type="checkbox"/>	11	1522	Delete UNI Interface

The selected UNI is removed from the table. If the deleted UNI was the only UNI selected on that device, then the device is deleted from the Endpoint Settings table.

7. Click **Modify**.
8. In the Deployment Options window, select one of the following:
 - Save the change without scheduling it.
 - Schedule the change for immediate deployment.
 - Schedule the change for later deployment.
9. Click **OK**.
10. Use the Jobs workspace to monitor the progress and status of the deployment. See Viewing Scheduled Jobs for details.

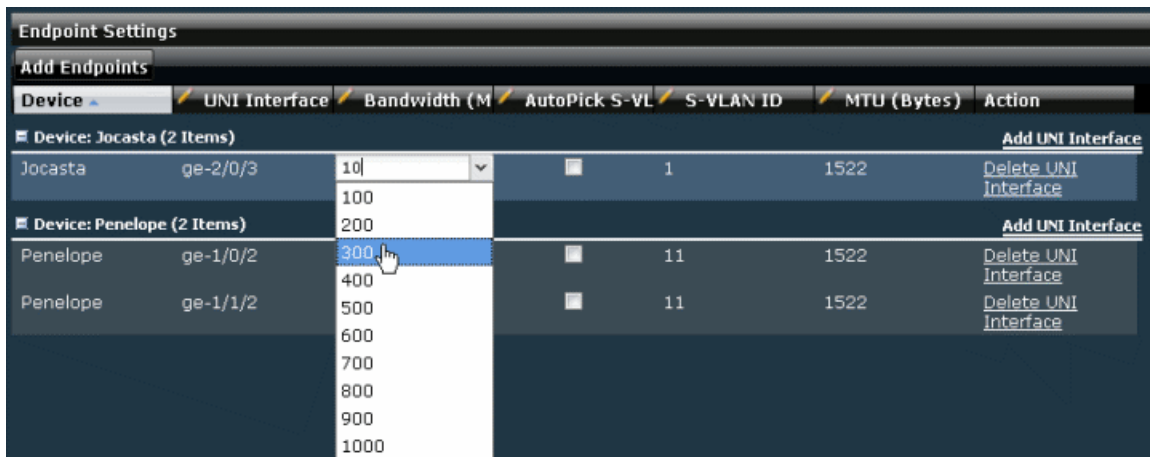
Changing the Endpoint Bandwidth

To change the rate limit or bandwidth for an endpoint of a multipoint Ethernet service, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select the **Manage Services** task icon.
3. In the Manage Services inventory, select the service on which you want to change the bandwidth of an endpoint.
4. In the Actions panel, select **Modify Service**.

Current service settings appear in the main display area. The General Settings box contains a unique name for the service order that will request the change.

5. In the Service order name field, change the name of the modification service order, if desired.
6. In the Action column of the endpoint Settings table, click on the Bandwidth entry for the UNI on which you want to change the bandwidth, as shown:



Device	UNI Interface	Bandwidth (M)	AutoPick S-VL	S-VLAN ID	MTU (Bytes)	Action
Device: Jocasta (2 Items)						
Jocasta	ge-2/0/3	10	<input type="checkbox"/>	1	1522	Delete UNI Interface
Device: Penelope (2 Items)						
Penelope	ge-1/0/2	300	<input type="checkbox"/>	11	1522	Delete UNI Interface
Penelope	ge-1/1/2	500	<input type="checkbox"/>	11	1522	Delete UNI Interface

7. From the list of valid bandwidth settings, select the one you want, and then click **Modify**.
8. In the Deployment Options window, select one of the following:
 - Save the change without scheduling it.
 - Schedule the change for immediate deployment.
 - Schedule the change for later deployment.
9. Click **OK**.
10. Use the Jobs workspace to monitor the progress and status of the deployment. See Viewing Scheduled Jobs for details.

- Related Topics**
- Creating a Multipoint Ethernet Service Order on page 149
 - Deploying a Service on page 157
 - Viewing Scheduled Jobs
 - Viewing Services on page 185
 - Modifying a Point-to-Point Service on page 161

Decommissioning a Service

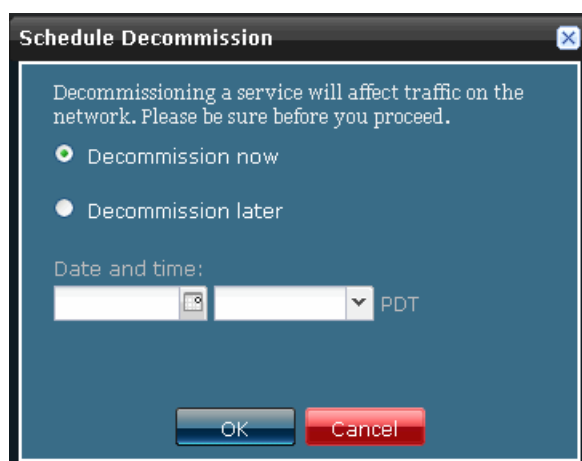
You can decommission a service that a customer no longer needs.

You cannot decommission a service if a service order requesting action on that service is in the Requested, Scheduled, In Progress, or Invalid state.

To decommission a service, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select the **Manage Services** task icon.
3. In the Manage Services inventory panel, select the service you want to decommission. To decommission multiple services in one operation, use the multiple selection feature to select all the services you want to decommission.
4. In the Actions panel, click **Decommission Service**.

The Schedule Decommission window appears as follows:



5. To decommission the service immediately, select **Decommission now**, and click **OK**.

In the Order Information window, click the job ID of the decommission job.

The Jobs workspace window appears and shows a filtered view of the job inventory, showing only the decommission job. See [Viewing Scheduled Jobs](#) for details.

To deploy the service at a later time, select **Decommission later**, select a date and time to perform the operation, and then click **OK**.

- Related Topics**
- [Viewing Scheduled Jobs](#)
 - [Viewing Services on page 185](#)

Chapter 11

Monitoring Services and Service Orders

- Viewing Service Provisioning Statistics on page 171
- Viewing Service Orders on page 174
- Viewing Services on page 185

Viewing Service Provisioning Statistics

The Service Provisioning workspace provides a visual overview of customers and service orders on your network and enables you to access related commonly needed information quickly.

The following topics describe viewing statistics in the Service Provisioning workspace.

- Viewing Service Orders by Customer on page 171
- Viewing the Percentage of Service Orders in Each Service Order State on page 172

Viewing Service Orders by Customer

To view the number of service orders created for each customer, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.

The system displays the chart named Services by Customer, as shown in the following example:



Each vertical bar represents a customer. The number of service orders is shown on the Y axis. In this example, three service orders has been issued on behalf of Best Customer.

- To list the service orders created for a specific customer, click on the bar that represents the customer.

The Manage Service Orders screen shows only those service orders made on behalf of the selected customer.

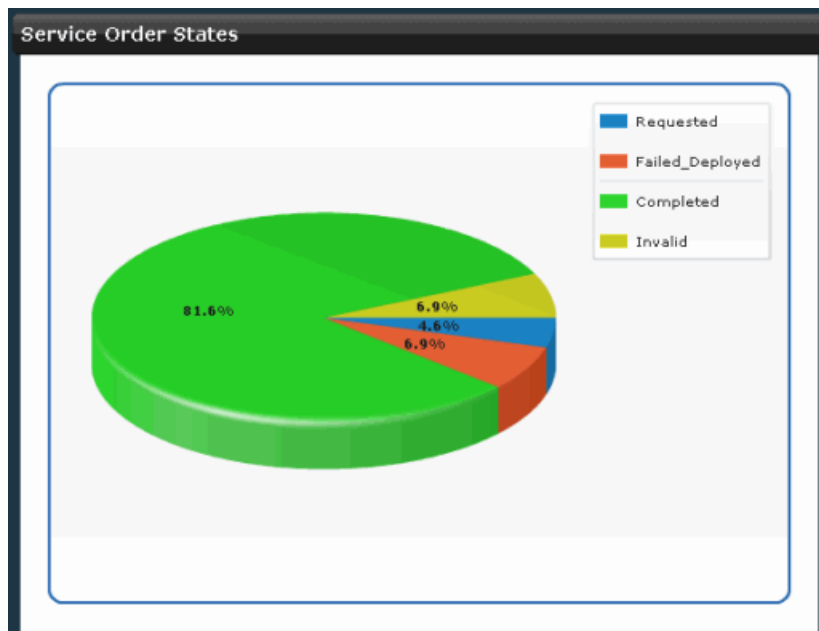
Viewing the Percentage of Service Orders in Each Service Order State

You can view service orders in a specific state. For example, you can check for failed service orders and then access a list of failed requests so you can begin to take corrective action.

To view service orders by service order state, follow these steps:

- In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.

The system displays the chart named Service Order States, as shown in the following example:



Each segment of the pie chart represents the proportion of service orders in a specific service order state:

- Completed—The service order has been successfully deployed.
 - Scheduled for deployment—The service provisioner has scheduled the service order for deployment.
 - Deployment Failed—An attempted service deployment was not successfully completed or failed an audit.
 - In Progress—The Ethernet Activator software is in the process of deploying the service.
 - Requested—The service provisioner has created the service order, but has not yet attempted to deploy it or schedule it for deployment.
 - Invalid—The service order is not valid.
2. To list the service orders in a specific state, click on the state's segment of the pie chart.

The Manage Service Orders screen shows only those services in the specified state.

- Related Topics**
- Workspace Statistics Pages Overview
 - Viewing Services on page 185
 - Viewing Service Orders on page 174

Viewing Service Orders

The following topics describe how you can view service orders either graphically, or in a table:

- Viewing Point-to-Point Ethernet Service Orders as Graphics on page 174
- Viewing Multipoint Ethernet Service Orders as Graphics on page 178
- Viewing Service Orders in a Table on page 183

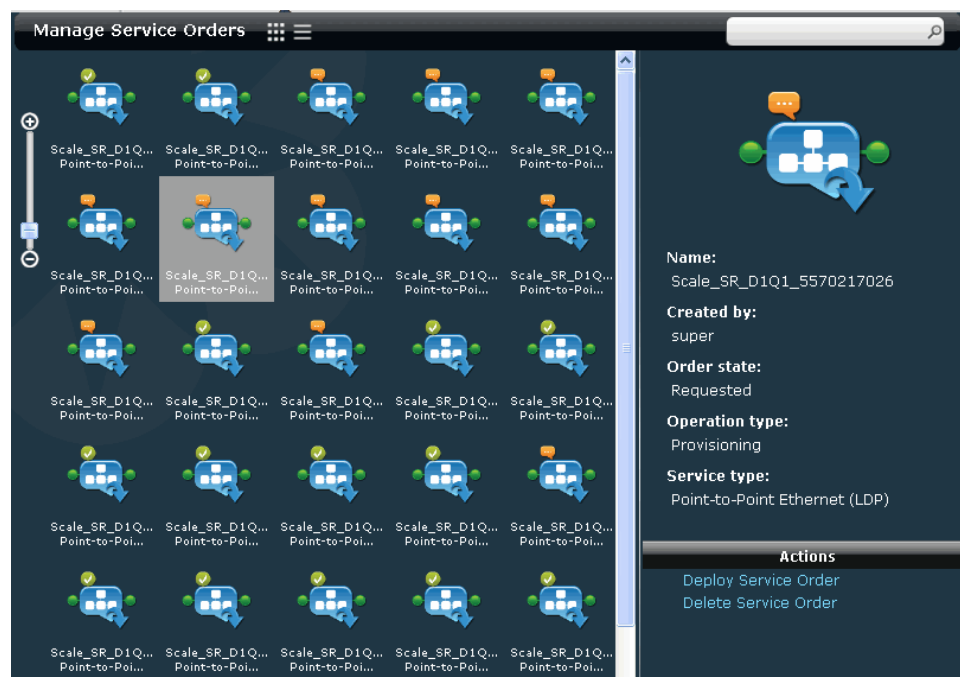
Viewing Point-to-Point Ethernet Service Orders as Graphics

To view an inventory of service orders in a graphical form, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select the **Manage Service Orders** task icon.
3. In the filter bar, click the thumbnail view icon.

Thumbnails of service orders appear in the main display area of the screen.

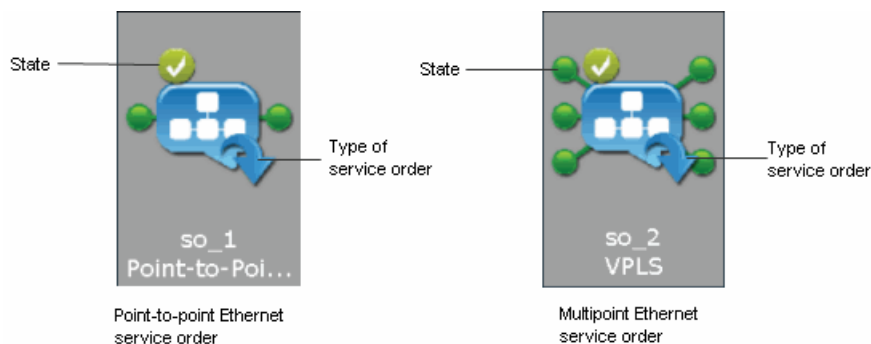
The following example shows a sample graphical display of a service order inventory.



From the thumbnail, you can see whether the service order is for a point-to-point Ethernet service or a multipoint Ethernet (or VPLS) service. In Figure 13 on page 175, the thumbnail on the left shows one service endpoint either side of the service order, indicating a point-to-point service order. The thumbnail on the right shows three service endpoints either side of the service order, indicating a multipoint, or VPLS service order. This topic describes point-to-point service

orders. For details about viewing multipoint service orders, see “Viewing Multipoint Ethernet Service Orders as Graphics” on page 178.

Figure 13: Service Order Thumbnail



Each service order thumbnail includes decorations that show the state and type of service order. The service order state is indicated by a symbol in the upper left corner of the thumbnail. The type of service order is indicated by a symbol in the lower right corner. Table 10 on page 175 explains each of the thumbnail decorations that represents a service order state:

Table 10: Service Order State Thumbnail Decorations










Decoration	State	Meaning
	Completed	Service deployment is complete.
	In Progress	The Ethernet Activator software is in the process of deploying the service.
	Deployment Failed	The device is down or the Ethernet Activator software was unable to push the service configuration to a device configured for the service.
	Invalid	The service order contains invalid data.
	Requested	The service provisioner has created the service request, but has not yet attempted to deploy it or schedule it for deployment.
	Scheduled	The service provisioner has scheduled the service request for deployment.

Table 11 on page 176 explains each of the service type icons.

Table 11: Service Order Type Icons

Service Order Type Icon	Meaning
	Configuration audit—The service provisioner has requested a configuration audit on a service.
	Function audit—The service provisioner has requested a functional audit on a service.
	Provision—The service provisioner has placed a service order for a new service.

- To restrict the display of service orders, enter a search criterion of one or more characters in the search bar and press Enter. All service orders that match the search criterion are shown in the main display area.
- For a quick look view of a specific service order, click the service order icon. A service order summary appears in the right panel. Table 12 on page 176 explains each of the fields in the quick look display.

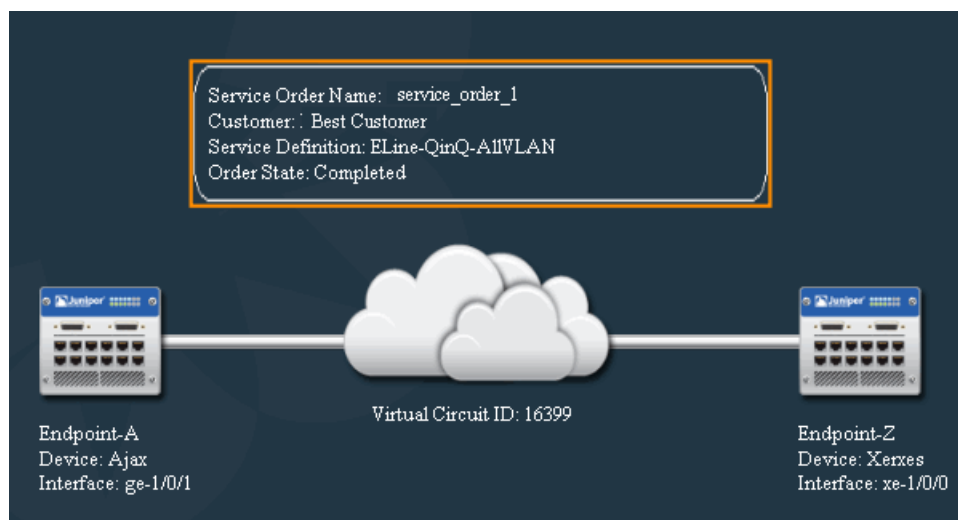
Table 12: Fields in the Service Order Quick-Look Table

Field	Meaning
Name	The unique name assigned to the service order.
Created by	The user name of the service provisioner who created the request.
Order state	One of the following: <ul style="list-style-type: none"> ■ Scheduled for deployment—The service provisioner has scheduled the service order for deployment. ■ Deployment failed—The device is down or the Ethernet Activator software was unable to push the service configuration to a device configured for the service. ■ In progress—The Ethernet Activator software is in the process of deploying the service. ■ Requested—The service provisioner has created the service order, but has not yet attempted to deploy it or schedule it for deployment. ■ Completed—The request has been successfully deployed. ■ Invalid—The service order contains invalid data.

Table 12: Fields in the Service Order Quick-Look Table *(continued)*

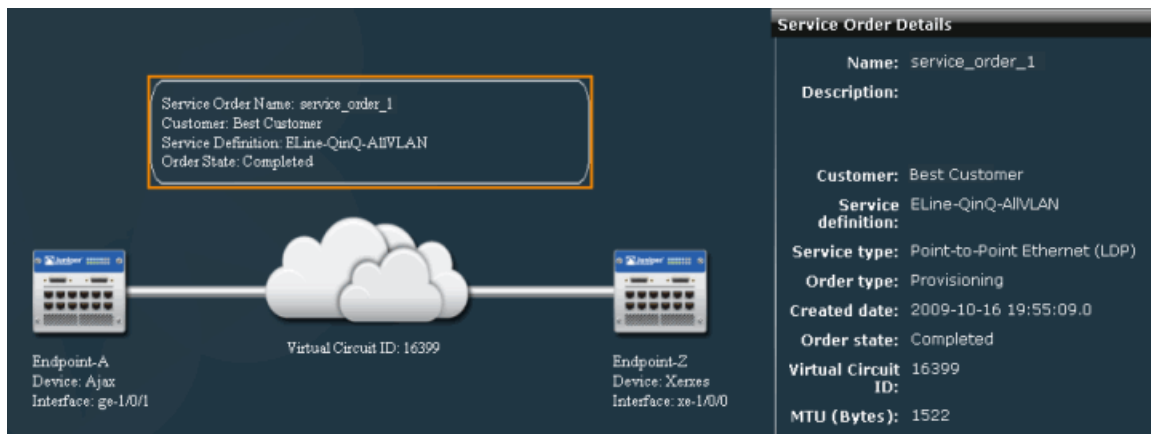
Field	Meaning
Operation type	Specifies the operation to be performed on the service: <ul style="list-style-type: none"> ■ Provisioning ■ Decommission ■ Configuration audit ■ Functional audit ■ Modification
Service type	One of the following: <ul style="list-style-type: none"> ■ Point-to-Point Ethernet (LDP) ■ Multipoint Ethernet

6. To see details of a specific service order, double-click the service order icon. A new screen appears and shows a graphical representation of the service order, as shown in the following example:



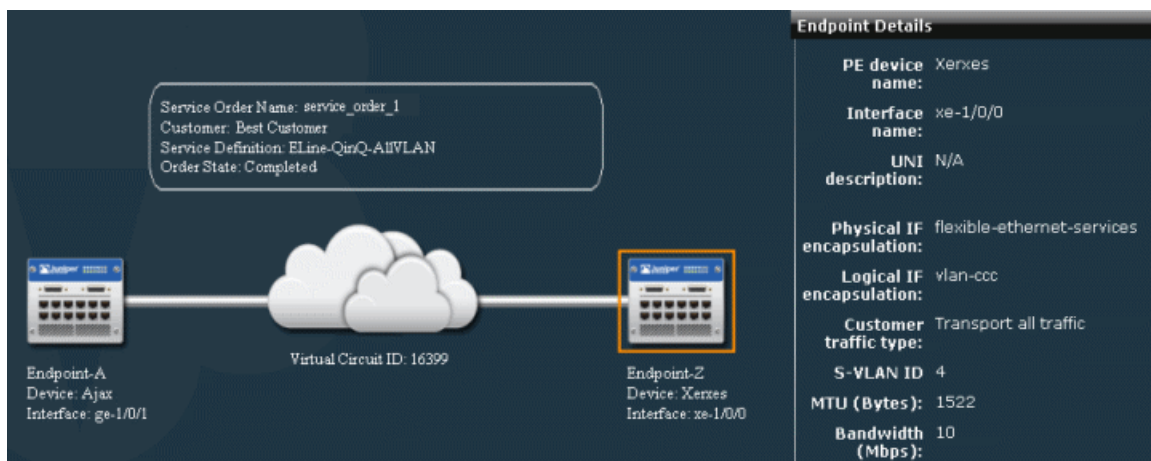
The graphic is made up of several selectable items. Each selectable item represents part of the information provided in the service order. The cloud represents the connectivity, the server images represent endpoints, and the information box above the cloud provides summary information about the service request.

7. To view general information about the service, such as the customer name, type of service, and order status, click the information box. General information about the service order appears in the panel to the right, as shown in the following example:



This view also provides the connectivity details in the Virtual Circuit ID and MTU fields. Clicking on the cloud icon provides the same information as clicking on the information box.

8. To view additional information about an endpoint, click on the server image that represents the endpoint. Endpoint information contained in the service order appears in the right panel, as shown in the following example:



9. When you are finished viewing the service order details, click **Cancel**. The Manage Service Orders screen reappears.

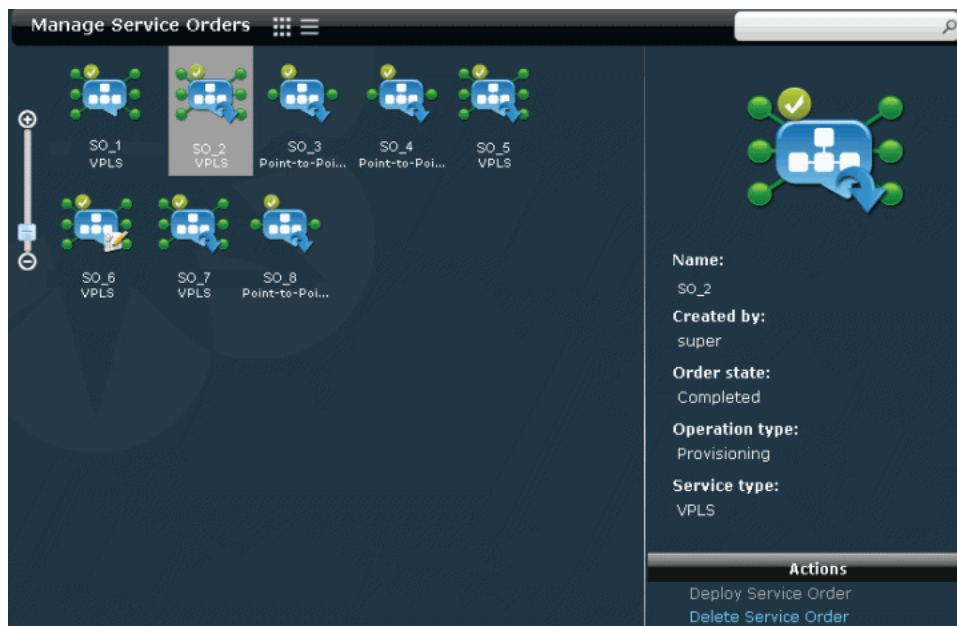
Viewing Multipoint Ethernet Service Orders as Graphics

To view an inventory of service orders in a graphical form, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select the **Manage Service Orders** task icon.
3. In the filter bar, click the thumbnail view icon.

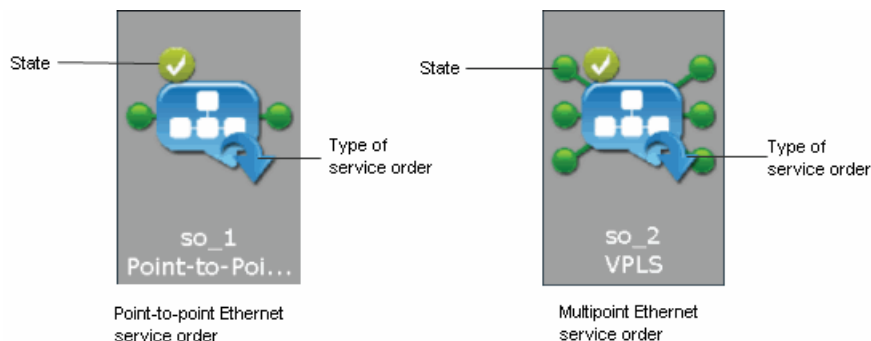
Thumbnails of service orders appear in the main display area of the screen.

The following example shows a sample graphical display of a service order inventory.



From the thumbnail, you can see whether the service order is for a point-to-point Ethernet service or a multipoint Ethernet (or VPLS) service. In Figure 14 on page 179, the thumbnail on the left shows one service endpoint either side of the service order, indicating a point-to-point service order. The thumbnail on the right shows three service endpoints either side of the service order, indicating a multipoint, or VPLS service order. This topic describes multipoint service orders. For details about viewing point-to-point service orders, see “Viewing Point-to-Point Ethernet Service Orders as Graphics” on page 174.

Figure 14: Service Order Thumbnail



Each service order thumbnail includes decorations that show the state and type of service order. The service order state is indicated by a symbol in the upper left corner of the thumbnail. The type of service order is indicated by a symbol in the lower right corner. Table 13 on page 180 explains each of the thumbnail decorations that represents a service order state:

Table 13: Service Order State Thumbnail Decorations










Decoration	State	Meaning
	Completed	Service deployment is complete.
	In Progress	The Ethernet Activator software is in the process of deploying the service.
	Deployment Failed	The device is down or the Ethernet Activator software was unable to push the service configuration to a device configured for the service.
	Invalid	The service order contains invalid data.
	Requested	The service provisioner has created the service request, but has not yet attempted to deploy it or schedule it for deployment.
	Scheduled	The service provisioner has scheduled the service request for deployment.

Table 14 on page 180 explains each of the service type icons.

Table 14: Service Order Type Icons

Service Order Type Icon	Meaning
	Configuration audit—The service provisioner has requested a configuration audit on a service.
	Function audit—The service provisioner has requested a functional audit on a service.
	Provision—The service provisioner has placed a service order for a new service.

- To restrict the display of service orders, enter a search criterion of one or more characters in the search bar and press Enter. All service orders that match the search criterion are shown in the main display area.

5. For a quick look view of a specific service order, click the service icon. A service order summary appears in the right panel. Table 15 on page 181 explains each of the fields in the quick look display.

Table 15: Fields in the Service Order Quick-Look Table

Field	Meaning
Name	The unique name assigned to the service order.
Created by	The user name of the service provisioner who created the request.
Order state	One of the following: <ul style="list-style-type: none"> ■ Scheduled for deployment—The service provisioner has scheduled the service order for deployment. ■ Deployment failed—The device is down or the Ethernet Activator software was unable to push the service configuration to a device configured for the service. ■ In progress—The Ethernet Activator software is in the process of deploying the service. ■ Requested—The service provisioner has created the service order, but has not yet attempted to deploy it or schedule it for deployment. ■ Completed—The request has been successfully deployed. ■ Invalid—The service order contains invalid data.
Operation type	Specifies the operation to be performed on the service: <ul style="list-style-type: none"> ■ Provisioning ■ Decommission ■ Configuration audit ■ Functional audit ■ Modification
Service type	One of the following: <ul style="list-style-type: none"> ■ Point-to-Point Ethernet (LDP) ■ Multipoint Ethernet

6. To see details of a specific multipoint service, double-click the service icon. The Service Order Details screen shows details of the multipoint service order.

The screenshot shows the 'Service Order Details' window. The 'General Settings' section includes fields for Name (so_2), Order type (ADD), Customer (Best Customer), Order state (Completed), Created date (2009-10-05 07:53:48.0), and Comments. It also shows Service definition (ELAN-BGP-QinQ-AllVLAN), Service type (VPLS), Customer traffic type (Transport all traffic), Route target (65410:9), and Created by (jmp). The 'End Point Settings' section is a table with columns: Device, UNI Interface, Bandwidth (Mbps), S-VLAN ID, and MTU (Bytes). It lists two devices: Delhi and Karachi, both with a bandwidth of 10 Mbps, S-VLAN ID of 3, and MTU of 1522 bytes.

Device	UNI Interface	Bandwidth (Mbps)	S-VLAN ID	MTU (Bytes)
Device: Delhi (1 Item)				
Delhi	ge-0/0/2	10	3	1522
Device: Karachi (1 Item)				
Karachi	ge-0/0/2	10	3	1522

The Service Order Details screen provides general information about the service and information about each service endpoint. Table 16 on page 182 explains each of the general information fields.

Table 16: VPLS Service Order Details—General Settings

Service Attribute	Meaning
Name	Name of the service order
Service definition	Name of the service definition that the service order is based on
Order type	One of the following: <ul style="list-style-type: none"> ■ ADD—Provisions a new service or performs an audit on a service ■ DELETE—Decommissions a service
Customer	Customer name
Order state	One of the following: <ul style="list-style-type: none"> ■ Scheduled for deployment—The service provisioner has scheduled the service order for deployment. ■ Deployment failed—The device is down or the Ethernet Activator software was unable to push the service configuration to a device configured for the service. ■ In progress—The Ethernet Activator software is in the process of deploying the service. ■ Requested—The service provisioner has created the service order, but has not yet attempted to deploy it or schedule it for deployment. ■ Completed—The request has been successfully deployed. ■ Invalid—The service order contains invalid data.
Created date	The date and time at which the service order was created

Table 16: VPLS Service Order Details—General Settings *(continued)*

Service Attribute	Meaning
Comments	Comments entered in the service order
Service definition	Name of the service definition that the service is based on
Service type	VPLS
Customer traffic type	One of the following: <ul style="list-style-type: none"> ■ Transport all traffic ■ Transport VLAN range ■ Transport single VLAN
Route target	The unique route target assigned to this service
Created by	The provisioner who created the service order

Table 17 on page 183 describes each of the endpoint information fields.

Table 17: VPLS Service Order Details—Endpoint Settings

Endpoint Attribute	Meaning
Device	The name of the N-PE device
UNI interface	The name of the interface on the N-PE device that connects to the customer site
Bandwidth	Rate limit in Mbps set for this endpoint
S-VLAN ID	The service VLAN ID (Q-in-Q interfaces only)
MTU	The MTU of the UNI

- When you have finished viewing the service order details, click **OK**. The Manage Service Orders screen reappears.

Viewing Service Orders in a Table

To view and determine the status of service orders in a tabular form, follow these steps:

- In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
- In the task ribbon, select the **Manage Service Orders** task icon.
- In the filter bar, click the table view icon.

A table of service orders on the system appears in the main display area, as shown in the following example:

Manage Service Orders					
Name	Order State	Customer	Service Type	Created Date	Created By
SO_1_decommissio	Complete	A1	VPLS	2009-10-19 17:00:50.0	super
SO_1	Complete	A1	VPLS	2009-10-19 16:53:34.0	super
SO_2	Complete	Best Custmr	Point-to-Point Ethernet (LDP)	2009-10-19 16:28:04.0	super
SO_3	Complete	Chartman	Point-to-Point Ethernet (LDP)	2009-10-19 16:27:01.0	super
SO_4	Complete	Eclipse	VPLS	2009-10-19 16:25:14.0	super
SO_5audit2009-16:20:03.162	Complete	FestaCorp	VPLS	2009-10-19 16:20:03.0	super
SO_5	Complete	FestaCorp	VPLS	2009-10-19 16:19:36.0	super
SO_6	Complete	RedSky	Point-to-Point Ethernet (LDP)	2009-10-19 16:16:40.0	super

Table 18 on page 184 describes each of the fields in the service orders table.

Table 18: Fields in the Service Orders Table

Field	Description
Created By	Screen name of the service provisioner who created the service order.
Created Date	Date that the service provisioner created the request.
Name	Name of the service order assigned during service creation or edit.
Order State	<p>Status of the service order:</p> <ul style="list-style-type: none"> Completed—The service order has been successfully deployed. Deploy failed—The device is down or the Ethernet Activator software was unable to push the service configuration to a device configured for the service. In-progress—The Ethernet Activator software is in the process of deploying the service. Requested—The service provisioner has created the service order, but has not yet attempted to deploy it or schedule it for deployment. Scheduled—The service provisioner has scheduled the service order for deployment. Invalid—The service order contains invalid data.

- To view details of a specific service order, double click the table row that summarizes the service order.

For a point-to-point service order, a graphical illustration of the service order appears. See “Viewing Point-to-Point Ethernet Service Orders as Graphics” on page 174 for information about interpreting this graphic.

For a multipoint service order, a table of information about the service order appears. See “Viewing Multipoint Ethernet Service Orders as Graphics” on page 178 for details.

- Related Topics**
- Deploying a Service on page 157
 - Deleting a Service Order on page 157
 - Viewing Services on page 185

Viewing Services

The following topics describe how to view services either graphically using thumbnails, or in a tabular form:

- Viewing Point-to-Point Ethernet Services as Graphics on page 185
- Viewing Multipoint Ethernet Services as Graphics on page 189
- Viewing Services in a Table on page 194

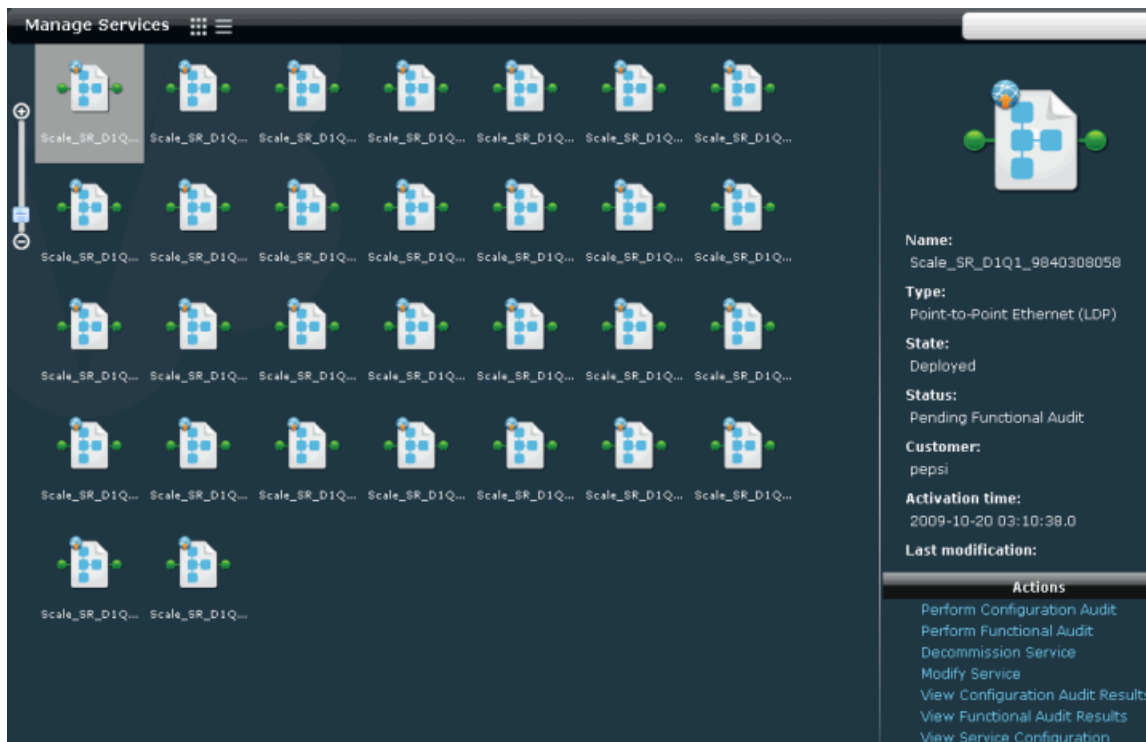
Viewing Point-to-Point Ethernet Services as Graphics

You can view thumbnail, quick look, and detailed information about services on your network. Typically, you use this feature to determine which services need attention.

To view the services on your network, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select the **Manage Services** task icon.
3. To display the service inventory in graphical form, in the filter bar, select the thumbnail view icon.

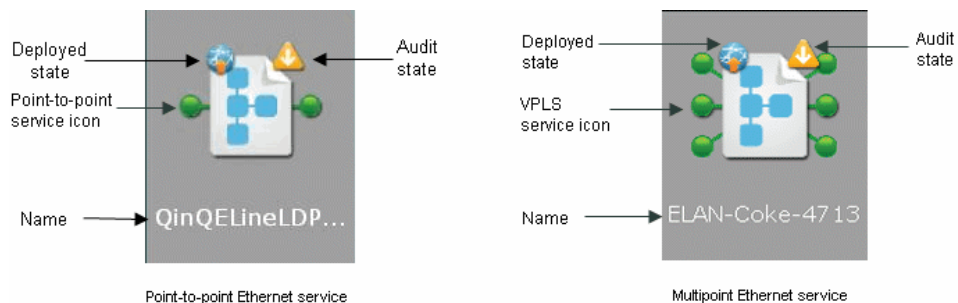
The services appear in the main display area of the screen, each represented by an icon that also shows its name. The following example shows a sample service inventory.



From the thumbnail, you can see whether a service is a point-to-point Ethernet service or a multipoint Ethernet service. In Figure 16 on page 186, the thumbnail on the left shows one connector either side of the service, indicating a point-to-point service. The thumbnail on the right shows three connectors either side of the service, indicating a multipoint, or VPLS service.

This topic describes point-to-point services. For details about viewing VPLS services, see “Viewing Multipoint Ethernet Services as Graphics” on page 189.

Figure 16: Service Thumbnails



Each service thumbnail can include decorations that show the deployed state of the service and its audit state. The deployed state is indicated by a symbol in the top left corner of the thumbnail. The audit state is indicated by a symbol in the upper right corner. Table 19 on page 187 explains each of the thumbnail decorations that represents a deployed or audit state.

Table 19: Service Deployment State Decorations




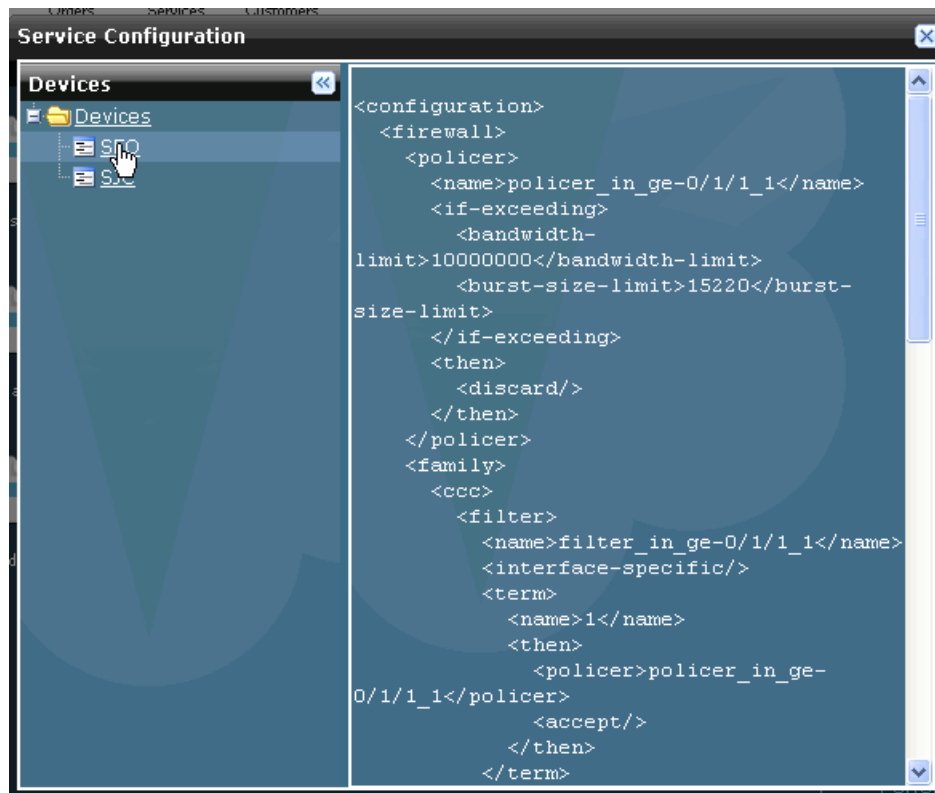
Decoration	Meaning
	Deployed—A service does not exist until it is deployed.

Table 20 on page 187 explains each of the thumbnail decorations that represent an audit state.

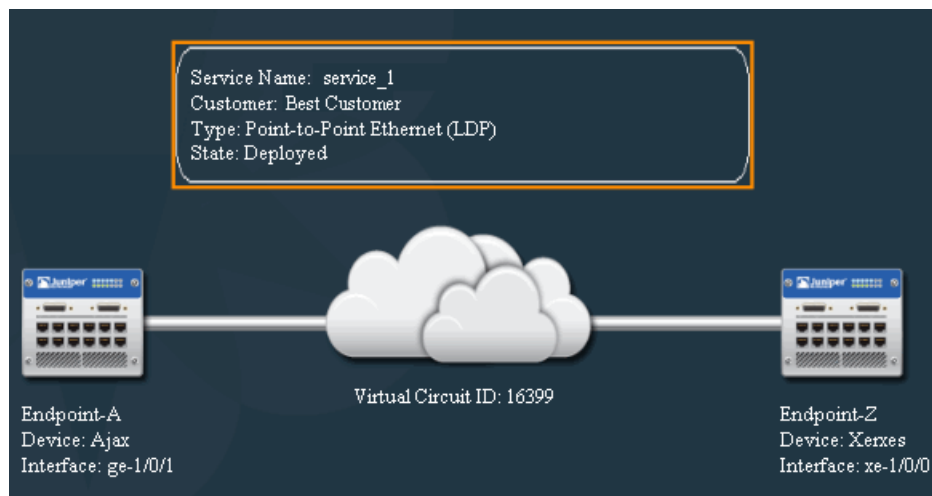
Table 20: Service Audit Status Decorations

Decoration	Meaning
	Up—The service passed a functional audit.
	Down—The service failed a functional audit.

4. To restrict the display of services, enter a search criterion of one or more characters in the search bar and press Enter. All services that match the search criterion appear in the main display area.
5. For a quick look view of a specific service, click the service icon. Summary information about the service appears in the right panel:
 - Name—The unique name assigned to the service.
 - Type—Point-to-point Ethernet (LDP) or VPLS.
 - State—one of:
 - Deployed—The service does not exist until it is deployed.
 - Failed Deploy—An attempt to modify the service failed.
 - Status—One of the following values:
 - Up—The service passed functional audit.
 - Down—The service failed functional audit.
 - Customer—Name of the customer the service is provided for.
 - Activation time—Date and time the service was activated.
 - Last modification—Date and time at which the service was last modified.
6. To view XML coding of the service configuration, click **View Service Configuration**. An example output follows:



- To see details of a specific service, double-click the service icon. A new screen shows a graphical representation of the service. The following example shows a point-to-point service.



The graphic shows selectable items that each represent part of the service. The cloud represent the connectivity, the server images represents endpoints, and the information box above the cloud provides summary information about the service.

8. To view details about the service itself, click on the information box above the graphic. Details about the service appear in the quick look panel to the right, as shown in the following example:

Service Details

Name: service_1
 Customer: Best Customer
 Service definition: ELine-QinQ-AllVLAN
 Type: Point-to-Point Ethernet (LDP)
 State: Deployed
 Created by SR#: 360579
 Activation date: Fri Oct 16 19:55:20 UTC 2009
 Last modified date: Fri Oct 16 19:55:20 UTC 2009
 Description:

9. To view details about an endpoint, click on the box that represents the endpoint. Endpoint details appear in the quick view panel, as shown in the following example:

Endpoint Details

PE device name: Xerxes
 PE device loopback IP: 192.168.13.1
 Neighbor loopback IP: 192.168.8.1
 Interface name: xe-1/0/0
 UNI description: N/A
 Physical IF encapsulation: flexible-ethernet-services
 Logical IF encapsulation: vlan-ccc
 Customer traffic type: Transport all traffic
 S-VLAN ID: 4
 MTU (Bytes): 1522
 Bandwidth (Mbps): 10

10. To view connectivity details, click on the cloud. The following connectivity details appear in the quick look panel:

- The unique virtual circuit ID used by this service.
- The MTU for the connectivity.

Viewing Multipoint Ethernet Services as Graphics

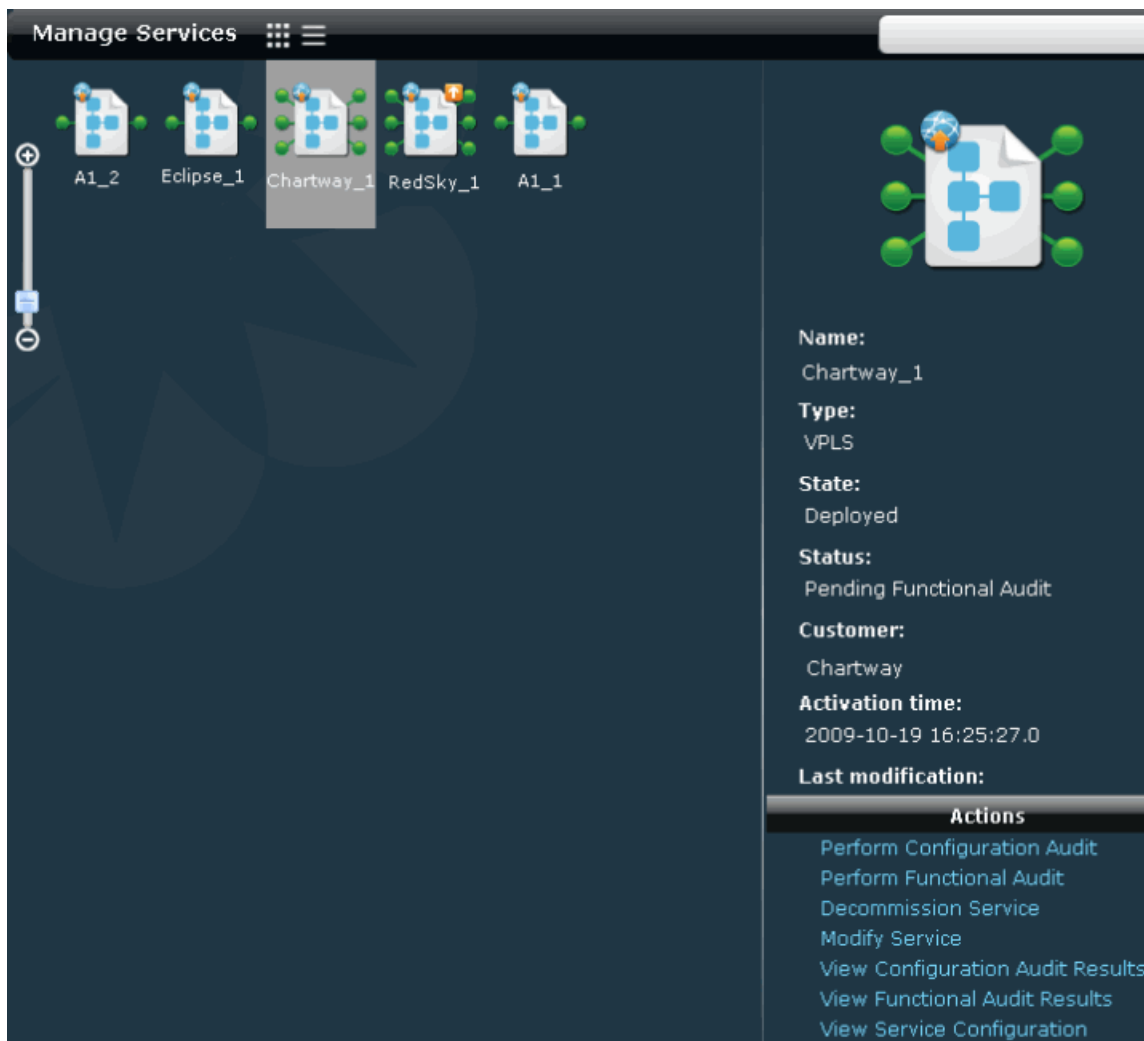
You can view thumbnail, quick look, and detailed information about services on your network. Typically, you will use this feature to view the state of services and determine which services need attention.

To view the services on your network, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select the **Manage Services** task icon.

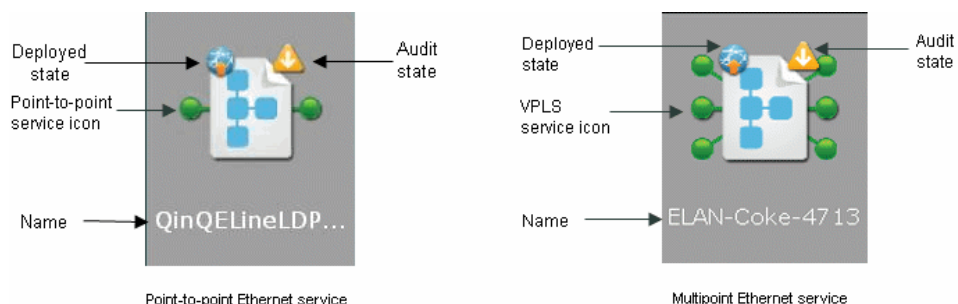
3. To display the service inventory in graphical form, in the filter bar, select the thumbnail view icon.

The service thumbnails appear in the main display area of the screen. A sample service inventory follows.



From the thumbnail, you can see whether the service is a point-to-point Ethernet service or a multipoint Ethernet service. In Figure 17 on page 191, the thumbnail on the left shows one service endpoint either side of the service, indicating a point-to-point service. The thumbnail on the right shows three service endpoints either side of the service, indicating a multipoint, or VPLS service.

This topic describes multipoint Ethernet services. For details about viewing point-to-point services, see “Viewing Point-to-Point Ethernet Services as Graphics” on page 185.

Figure 17: Service Thumbnails

Each service thumbnail can include decorations that show the deployed state of the service and its audit state. The deployed state is indicated in the upper-left corner of the thumbnail. The audit state is indicated in the upper-right corner. Table 21 on page 191 explains each of the thumbnail decorations that represents a deployed state.

Table 21: Service Deployment State Decorations




Decoration	Meaning
	Deployed—A service does not exist until it is deployed.

Table 22 on page 191 explains each of the thumbnail decorations that represent a service audit status.

Table 22: Service Audit Status Decorations

Decoration	Meaning
	Up—The service passed a functional audit.
	Down—The service failed a functional audit.

- To restrict the display of services, enter a search criterion of one or more characters in the search bar and press Enter. All services that match the search criterion appear in the main display area..
- For a quick look view of a specific service, click the service icon. Summary information about the service appears in the right pane:
 - Name—The unique name assigned to the service.
 - Type—Point-to-point Ethernet (LDP) or VPLS.

- State—one of:
 - Deployed—The service does not exist until it is deployed.
 - Failed Deploy—An attempt to modify the service failed.
 - Status—One of:
 - Up—The service passed functional audit.
 - Down—The service failed functional audit.
6. To view XML coding of the service configuration, click **View Service Configuration**. An example output follows:



7. To see details of a VPLS service, double-click the service icon. A new screen appears and shows service details in a table, as shown in the following example:

Service Details

General Information

Name:

qqa-nv

Type:

VPLS

Customer:

cuda

State:

Deployed

Comments:

qqa-nv

Service definition:

ELAN-BGP-QinQ-AllVLAN-Normalize

Activation date:

Wed Sep 30 01:15:48 PDT 2009

Last modified date:

Wed Sep 30 01:30:43 PDT 2009

Route target:

65412:123

End Point Settings

Device	UNI Interface	Bandwidth (Mbps)	S-VLAN ID	MTU (Bytes)
Device: Jocasta (1 Item)				
Jocasta	ge-2/0/3	10	1	1522
Device: Penelope (2 Items)				
Penelope	ge-1/0/2	10	11	1522
Penelope	ge-1/1/2	10	11	1522

The Service details screen provides general information about the service and information about each service endpoint. Table 23 on page 193 explains each of the general information fields.

Table 23: VPLS Service Details—General Information

Service Attribute	Meaning
Name	Name of the service
Service definition	Name of the service definition that the service is based on
State	Deployed or Failed Deploy
Activation date	The date on which the service was activated
Route target	The unique route target assigned to this service
Customer	Customer name
Type	VPLS
Comments	Comments entered in the service order
Last modified date	The date on which the service was last modified

Table 24 on page 193 describes each of the endpoint information fields.

Table 24: VPLS Service Details—Endpoint Information

Endpoint Attribute	Meaning
Device	The name of the N-PE device
UNI interface	The name of the interface on the N-PE device that connects to the customer site

Table 24: VPLS Service Details—Endpoint Information (continued)

Endpoint Attribute	Meaning
Bandwidth	Rate limit in Mbps set for this endpoint
S-VLAN ID	The service provider VLAN ID (Q-in-Q service only)
MTU	The MTU of the UNI

Viewing Services in a Table

To view the services inventory in a table, follow these steps:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select the **Manage Services** task icon.
3. To display the service inventory in a table, in the filter bar, click the table view icon.

The services appear in a table in the main display area of the screen. A sample service inventory follows:

Name	Customer	State	Status	Definition	Activation Date	Last Modified Date
Scale_SR_D1Q1_A1		Deployed	Pending Functional Audit	ELine-Dot1q-SingleVLAN	2009-10-20 03:10:38.0	2009-10-20 03:10:38.0
Scale_SR_D1Q1_A1		Deployed	Pending Functional Audit	ELine-Dot1q-SingleVLAN	2009-10-20 03:10:33.0	2009-10-20 03:10:33.0
Scale_SR_D1Q1_A1		Deployed	Pending Functional Audit	ELine-Dot1q-SingleVLAN	2009-10-20 03:10:29.0	2009-10-20 03:10:29.0
Scale_SR_D1Q1_A1		Deployed	Pending Functional Audit	ELine-Dot1q-SingleVLAN	2009-10-20 03:10:26.0	2009-10-20 03:10:26.0
Scale_SR_D1Q1_A1		Deployed	Pending Functional Audit	ELine-Dot1q-SingleVLAN	2009-10-20 03:10:21.0	2009-10-20 03:10:21.0
Scale_SR_D1Q1_A1		Deployed	Pending Functional Audit	ELine-Dot1q-SingleVLAN	2009-10-20 03:10:17.0	2009-10-20 03:10:17.0
Scale_SR_D1Q1_A1		Deployed	Pending Functional Audit	ELine-Dot1q-SingleVLAN	2009-10-20 03:10:11.0	2009-10-20 03:10:11.0
Scale_SR_D1Q1_A1		Deployed	Pending Functional Audit	ELine-Dot1q-SingleVLAN	2009-10-20 03:10:06.0	2009-10-20 03:10:06.0

The Manage Services table provides the following information about each service:

- Name—The unique name assigned to the service.
- Customer—Name of the customer the service is provided for.
- State—one of:
 - Deployed—The service does not exist until it is deployed.
 - Failed Deploy—An attempt to modify the service failed.

- Status—One of:
 - Up—The service passed functional audit.
 - Down—The service failed functional audit.
 - Definition—The service definition the service is based on.
 - Activation Date—Date and time the service was activated.
 - Last Modified Date—Date and time at which the service was last modified
4. To restrict the display of services, enter a search criterion of one or more characters in the search bar and press Enter. All services that match the search criterion are shown in the main display area.
 5. To view details of a specific service, double click the table row that summarizes the service. For a point-to-point Ethernet service, a graphical illustration of the service appears. See “Viewing Point-to-Point Ethernet Services as Graphics” on page 185 for information about interpreting this graphic and obtaining additional information.
- For a VPLS service, a table of service details appears. See “Viewing Multipoint Ethernet Services as Graphics” on page 189.

Related Topics

- Validating a Service on page 159
- Decommissioning a Service on page 168
- Modifying a Point-to-Point Service on page 161
- Modifying a Multipoint Ethernet Service on page 163
- Viewing Service Orders on page 174
- Deploying a Service on page 157

Chapter 12

Troubleshooting Services

- Service Troubleshooting Overview on page 197
- Troubleshooting Service Problems on page 199

Service Troubleshooting Overview

Common reasons for the failure of a service are that a PE device configured for that service is down, or that device has had its service configuration changed so that it no longer matches the service configuration in the Junos Space database.

The primary tools in the Junos Space product for troubleshooting service problems are:

- Functional audit
- Configuration audit
- Job manager

Overview information is provided here. For step-by-step instructions on recommended troubleshooting procedures, see “Troubleshooting Service Problems” on page 199.

Functional Audit

A functional audit can help you determine whether a device is down.

A functional audit checks the control plane only. It does not check the data plane. It checks for connectivity by running and analyzing the output of the following commands:

- For point-to-point services:

```
show l2circuit connections
```
- For multipoint services:

```
show vpls connections
```

You can view the results of a functional audit from the Manage Services inventory screen.

Troubleshooting Service Problems

To troubleshoot a problem with a service, use the following procedures:

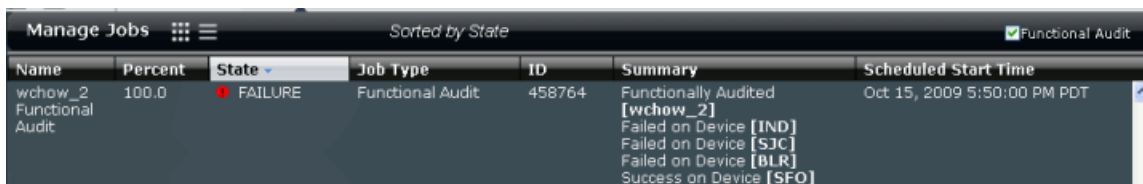
1. Performing a Functional Audit on page 199
2. Performing a Configuration Audit on page 200

Performing a Functional Audit

Perform a functional audit of the service to find out whether the service is up or down:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select the **Manage Services** task icon.
3. In the Manage Services inventory list, select the service you want to investigate.
4. In the Actions panel, select **Perform Functional Audit**.
5. In the Schedule Functional Audit window, select **Audit now**, and then click **OK**.
6. In the Order Information window, click the job ID of the functional audit.

The Job Manager window appears and shows a filtered view of the job inventory, showing only the functional audit job.



The screenshot shows the 'Manage Jobs' window with a table of job entries. The table has columns for Name, Percent, State, Job Type, ID, Summary, and Scheduled Start Time. A single job entry is visible, labeled 'wchow_2 Functional Audit', with a state of 'FAILURE' (indicated by a red X icon) and a summary that lists failures on devices [IND], [SJC], and [BLR], and success on device [SFO].

Name	Percent	State	Job Type	ID	Summary	Scheduled Start Time
wchow_2 Functional Audit	100.0	FAILURE	Functional Audit	458764	Functionally Audited [wchow_2] Failed on Device [IND] Failed on Device [SJC] Failed on Device [BLR] Success on Device [SFO]	Oct 15, 2009 5:50:00 PM PDT

7. In the State column, check the status of the audit.
A checkmark indicates that the audit passed. An X indicates that the audit failed. If the State field indicates a failed functional audit, the device is down.
8. If the State field indicates the device is up, skip to “Performing a Configuration Audit” on page 200.
9. If the State field indicates the device is down, check the Summary column for further information about the problem.
10. Check also the detailed results of the functional audit:
 - a. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
 - b. In the task ribbon, select the **Manage Services** task icon.

- c. In the Manage Services inventory panel, select the service you are investigating.
 - d. In the Actions panel, select **View Functional Audit Results**.
11. Use the information from the Summary field of the Job Manager and the output of the View Functional Audit results to determine the device with a problem so that the device can be brought up.

Performing a Configuration Audit

If the functional audit shows the service to be running, the next step is to perform a configuration audit to see whether the service configuration has been changed out of band, and is no longer consistent with the service configuration in the Junos Space database:

1. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
2. In the task ribbon, select the **Manage Services** task icon.
3. In the Manage Services inventory panel, select the service you want to investigate.
4. In the Actions panel, select **Perform Configuration Audit**.
5. In the Schedule Configuration Audit window, select **Audit now**.
6. In the Audit Information window, click the job ID of the functional audit.

The Job Manager window appears and shows a filtered view of the job inventory, showing only the configuration audit job. An example follows:

Manage Jobs Sorted by State Configuration Audit						
Name	Percent	State	Job Type	ID	Summary	Scheduled Start Time
alex2 Config Audit	100.0	❌ FAILURE	Configuration Audit	65774	Audited [alex2_audit2009-10-16 00:23:08.466] Failed on Device [SFO] Failed on Device [SJC]	Oct 15, 2009 5:23:08 PM PDT

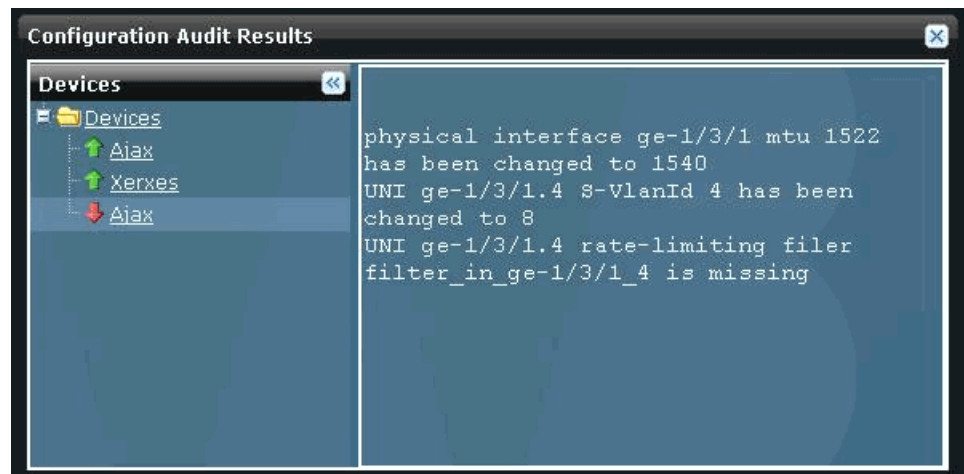


NOTE: If a resynchronization between a device and the Junos Space database is ongoing when the configuration audit job starts, the configuration audit job suspends until the resynchronization job finishes. If the resynchronization job fails to complete, the audit could be suspended indefinitely. To allow the audit to proceed, go to the Job Manager workspace and cancel the resynchronization job, as described in [Canceling a Job](#).

7. In the State column, check the status of the audit to determine whether it succeeded or failed.

Check also the Summary column, which contains useful service information such as the VC ID and endpoint information. For some failed deployments, this column also contains information about why the deployment failed.

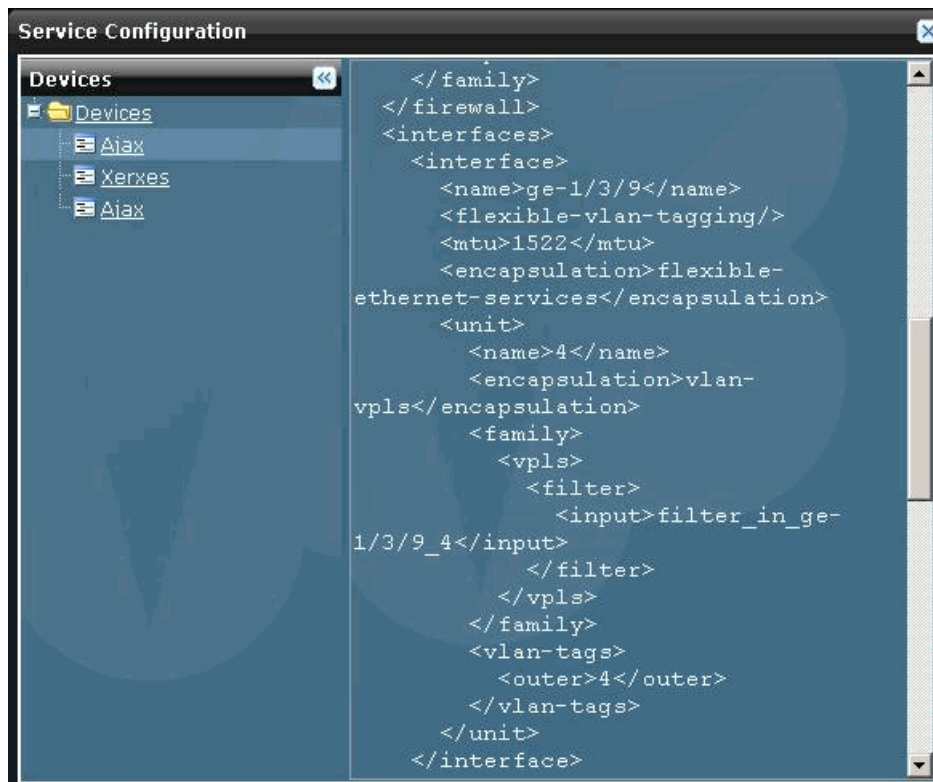
8. Check also the detailed results of the configuration audit:
 - a. In the Ethernet Activator task ribbon, select the **Service Provisioning** workspace icon.
 - b. In the task ribbon, select the **Manage Services** task icon.
 - c. In the Manage Services inventory panel, select the service you are investigating.
 - d. In the Actions panel, select View Configuration Audit Results. A sample result follows:



Examine the audit results for missing configuration information, and keep the window open for later comparison with the service configuration in the Junos Space database.

9. To view the service configuration in the Junos Space database, double click the service icon in the Manage Services inventory panel, and then in the Actions panel, select **View Service Configuration**.

A new window opens and shows the service configuration, as shown in the following example:



10. Compare the contents of the Service Configuration with those of the Configuration Audit Results window for each device in turn. If you see discrepancies, then it is likely that the service configuration was modified out-of-band. If so, you might need to synchronize the device with the Junos Space database.

For step-by-step instructions about synchronizing devices, see *Resynchronizing Managed Devices* for details.

For details about using the Job manager, see *Viewing Scheduled Jobs*.

- Related Topics**
- Resynchronizing Managed Devices
 - Viewing Scheduled Jobs
 - Service Troubleshooting Overview on page 197
 - Canceling a Job

Part 5

Examples

- End-to-End Examples on page 205

Chapter 13

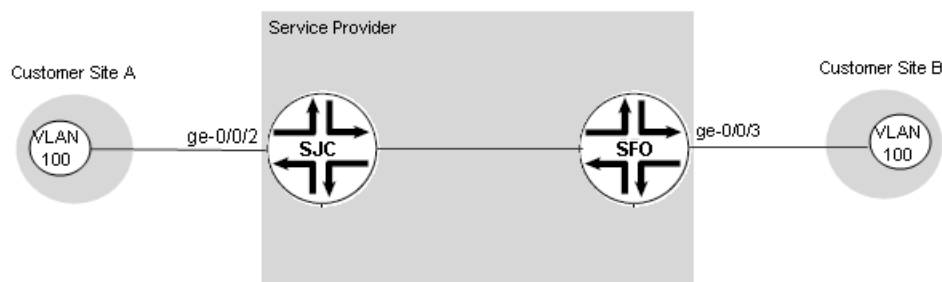
End-to-End Examples

- Point-to-Point Ethernet Service Example on page 205
- Multipoint Ethernet Service Example on page 215

Point-to-Point Ethernet Service Example

This example deploys and verifies a point-to-point Ethernet service starting with two MX Series devices. Figure 18 on page 205 shows the service.

Figure 18: Simple Point-to-Point Service



This service provides connectivity for one VLAN, using 802.1Q interface endpoints. Customer site A connects to the network through UNI ge-0/0/2 on an N-PE device named SJC. Customer site B connects to the network through UNI ge-0/0/3 on an N-PE device named SFO.

Each UNI is to have its bandwidth limited to 25 Mbps.

You can create this service by performing the following tasks:

1. Prepare Devices for Discovery on page 206
2. Discover Devices on page 206
3. Prepare Devices for Prestaging on page 208
4. Discover and Assign N-PE Roles on page 209
5. Choose or Create a Service Definition on page 210
6. Create a Customer on page 212

7. Create and Deploy a Point-to-Point Service Order on page 212
8. Perform a Functional Audit and a Configuration Audit on page 213

Prepare Devices for Discovery

Before you can add a device using device discovery, the following conditions must be met:

- SSH v2 is enabled on the device. To enable SSH v2 on a device, issue the following CLI command:

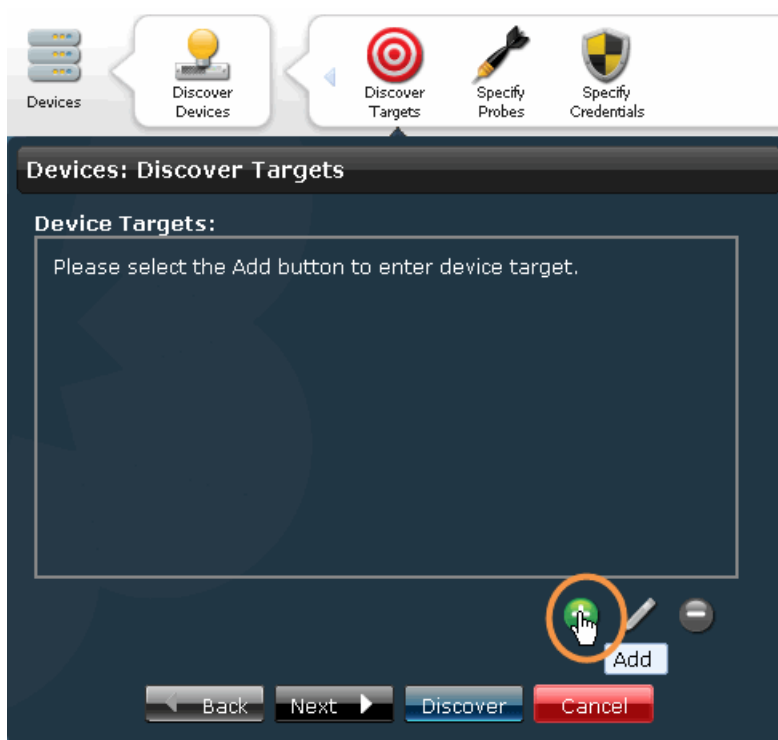

```
set system services ssh protocol-version v2
```
- NETCONF protocol over SSH is enabled on the device. To enable the NETCONF protocol over SSH on a device, issue the following CLI command:


```
set system services netconf ssh
```
- The device is configured with a static management IP address that is reachable from the Junos Space server. The IP address could be in-band or out-of-band.
- A user with full administrative privileges is created on the device for the Junos Space administrator.
- If you plan to use SNMP to probe devices as part of device discovery, SNMP should be enabled on the device with appropriate read-only V1/V2C/V3 credentials.

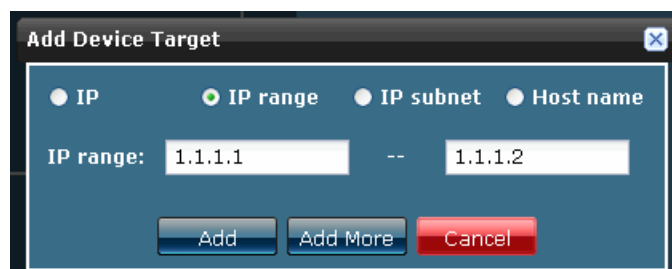
Discover Devices

Device discovery is a process that Junos Space uses to bring network devices under its control. This example brings two MX Series devices under Junos Space management:

1. Login to Junos Space using your credentials.
2. In the Application Chooser, Select **Network Application Platform**.
3. In the task ribbon, select the **Devices** workspace.
4. In the task ribbon, select **Discover Devices**.
5. In the task ribbon, select **Discover Targets**.
6. In the Device Discover Targets window, click +.



7. In the Add Device Target window, select IP Range.
8. Enter the IP address information. This example uses a range of two addresses.

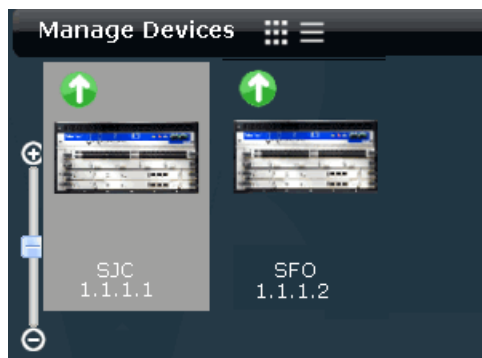


9. Click Add, and then click Next.
10. In the Devices: Specify Probes window, select both Ping and SNMP as probes.
11. Click Next.
12. In the Devices: Specify Credentials window, click +, and enter the device login credentials.
13. Click Finish.

Device discovery begins. It displays a graph showing the status of the discovery operation. Initially, it shows two devices discovered. When the Junos Space software has accessed both devices and brought them under its management,

both devices move from the Discovered column of the graph to the Managed column.

14. To check the results of the device discovery operation, select the **Devices** workspace again, and then select **Device Management**. The Device Management screen shows the added devices:



Prepare Devices for Prestaging

Before prestaging devices for point-to-point services, the following entities must be configured:

- MPLS must run on each N-PE device.
- LDP signaling must be established between N-PE devices that will participate in the same point-to-point service.

To satisfy the above, ensure that the following configuration exists on each N-PE device:

```

interfaces {
  ge-0/0/0 {
    unit 0 {
      family inet {
        address 10.1.18.2/30;
      }
      family mpls;
    }
  }
  lo0 {
    unit 0 {
      family inet {
        address 192.168.1.20/32;
      }
    }
  }
}
protocols {
  mpls {
    interface ge-0/0/0.0;
    interface lo0.0;
  }
}

```

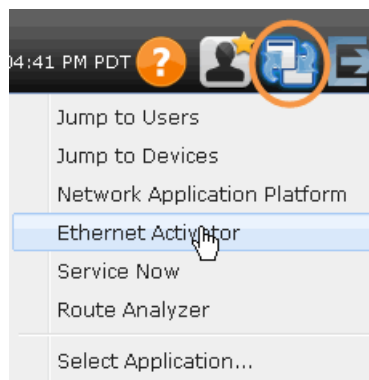


```
ospf {
  traffic-engineering;
  area 0.0.0.0 {
    interface lo0.0 {
      passive;
    }
    interface ge-0/0/0.0;
  }
}
ldp {
  interface ge-0/0/0.0;
  interface lo0.0;
}
```

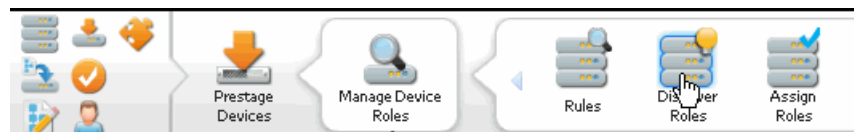
Discover and Assign N-PE Roles

Before you can provision services, you must prestage the devices. Prestaging includes assigning device roles and designating interfaces on those devices as UNIs. This example provides the steps to accept the recommendations of the Ethernet Activator software for N-PE devices and UNIs.

1. In the Application Switcher, select the **Ethernet Activator** application:



2. In the task ribbon, select the **Prestage Devices** workspace.
3. In the task ribbon, select **Manage Device Roles**.



4. In the task ribbon, select **Discover Roles**.

This action launches the role discovery process in which the Ethernet Activator software examines the devices under Junos Space management looking for devices that match predefined rules that identify N-PE devices. In this example, the Role Discovery Status graph shows that the Ethernet Activator software has discovered two such devices.

5. In the Assign Roles screen, switch to multiple selection mode and select both N-PE devices.
6. In the Actions panel, select **Assign NPE role**.
7. In the Assign NPE window, click **Assign** to confirm the assignment.

8. To view the assignment status, in the Job Details screen, click the job ID of the assignment job.

The Manage Jobs screen shows the progress and status of the role assignment job.

9. To verify the result, in the task ribbon, select **Prestage Devices > Manage Device Roles**. The Manage Device Roles screen shows two devices that can be used for provisioning.

Choose or Create a Service Definition

A service definition provides a template upon which services are built. It specifies service attributes that are not specific to a service instance. In our example, the service definition provides all service attributes except the N-PE devices, the UNIs, and bandwidth.

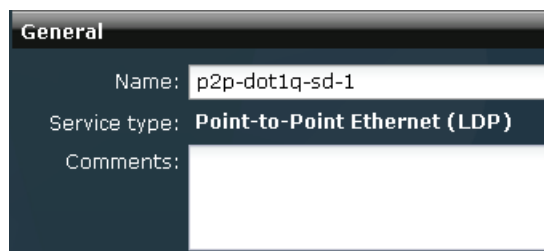
The Ethernet Activator software ships with standard service definitions. First, we check the standard service definitions to determine whether one already exists that will work.

1. In the task ribbon, select the **Service Design** workspace.
2. In the task ribbon, select **Manage Service Definitions**.

The Manage Service Definitions screen lists all service definitions in the system. In a new system, the screen lists only predefined service definitions.

This example needs a service definition with UNIs that use 802.1Q interfaces and allow you to set a bandwidth of 25 Mbps. The standard service definitions have several examples for provisioning 802.1Q UNIs, but none that allow the setting of a 25 Mbps bandwidth limit. So you need to create a new service definition.

3. In the task ribbon, select **Create P2P Service Definition**.
4. In the General screen, enter a name for the service definition. For this example, enter **p2p-dot1q-sd-1**.



General	
Name:	p2p-dot1q-sd-1
Service type:	Point-to-Point Ethernet (LDP)
Comments:	

5. Click **Next**.
6. In the Connectivity Settings screen, to pick the default connectivity settings, click **Next**.
7. In the UNI Settings screen, in the Ethernet option field, select **dot1q**.
8. In the Customer traffic type field, select **Transport single VLAN**.
9. In the VLAN ID selection field, choose **Select manually**.

10. In the Physical IF encapsulation field, select **flexible-ethernet-services**.
11. In the Logical IF encapsulation field, select **vlan-ccc**.
12. Check **Enable rate limiting**.
13. In the Default Bandwidth field, enter **10**, for a default bandwidth of 10 Mbps.
14. To the right of the value you just entered, check **Editable in service order**.
The Bandwidth range and Increment fields become active.
15. In the Bandwidth range fields enter **5** and **50**
16. In the increment field, enter **5**.

These settings of the Bandwidth range and Increment fields allow the bandwidth to be set in the service to any 5 Mbps increment in the range 5 Mbps through 50 Mbps.

The screenshot shows the 'UNI Settings' configuration window with the following sections:

- Traffic Treatment:**
 - Ethernet option: **dot1q**
 - Customer traffic type: **Transport single vlan**
 - VLAN ID selection: **Select manually**
 - ☐ Editable in service order
- Interface Settings:**
 - ☐ Protect UNI interface
 - Physical IF encapsulation: **flexible-ethernet-service**
 - Logical IF encapsulation: **vlan-ccc**
- MTU Settings:**
 - Default MTU (Bytes): **1522**
 - MTU range (Bytes): **1522** to **9192**
 - ☐ Editable in service order
- Bandwidth Settings:**
 - ☒ Enable rate limiting
 - Default bandwidth (Mbps): **10**
 - Bandwidth range (Mbps): **5** to **50**
 - Increment (Mbps): **5**
 - ☒ Editable in service order

17. To save and complete the service definition, click **Finish**.
The Service Definition Management screen includes the new service definition.
You have created a customized Service Definition, but it has not yet been published. Before a service definition can be used in provisioning, it must be published.
18. To publish the service definition, in the Manage Service Definitions screen, select the **p2p-dot1q-sd-1** service definition, and then in the Actions panel, select **Publish Service Definition**.
The Publish Service Definition window appears.
19. To confirm that you want to publish this service definition, click **Publish**.

In the Manage Service Definitions screen, the symbol in the upper left corner of the service definition thumbnail changes to a check mark, indicating that the status has changed to Published.

The service definition is now ready for use in provisioning.

Create a Customer

Before you can provision the service, customer details must be present in the Junos Space data base. To add a customer, follow these steps:

1. In the task ribbon, select the **Service Provisioning** workspace.
2. In the task ribbon, select **Manage Customers**.
3. In the task ribbon select **Create Customer**.
4. In the Name field, enter **Best Customer**.
5. In the Account number field, enter **1234**.
6. Click **Create**.

The Manage Customers screen shows the new customer.

Create and Deploy a Point-to-Point Service Order

Now that you have prestaged your devices, created a suitable service definition, and added the customer information to the database, you are ready to create and deploy a service order.

1. In the task ribbon, select the **Service Provisioning** workspace.
2. In the task ribbon, select **Manage Service Orders**.
3. In the task ribbon select **Create P2P Service Order**.
4. In the Select Service Definition screen, select the service named **p2p-dot1q-sd-1**.
This is the customized service definition you created earlier.
5. Click **Next**.
6. In the General/Connectivity Settings screen, in the Name field, enter **so_1**.
7. In the Customer field, select **Best Customer**.
8. Click **Next**.
9. In the Endpoint Settings screen for endpoint A, in the PE device field, select **SJC**.
10. In the UNI Interface field, select **ge-0/0/2**.

Endpoint Settings

PE device: SJC

UNI interface: ge-0/0/2

UNI description: No description available for selected UNI interface.

Physical IF encapsulation: flexible-ethernet-services

Logical IF encapsulation: vlan-ccc

Traffic type: Transport single vlan

Auto pick VLAN ID: ☐

VLAN-ID: 100

MTU (Bytes): 1522

Bandwidth (Mbps): 10

11. In the VLAN-ID field, enter **100**.
12. Click **Next**.
13. In the Endpoint Settings screen for endpoint Z, in the PE device field, select **SFO**.
14. In the UNI interface field, select **ge-0/0/3**.
15. In the Bandwidth field, select **25**.
16. Click **Create**.
17. In the Deployment Options window, you can save the service order for later deployment, schedule the service order for later deployment, or deploy the service order now. Select **Deploy now**.
18. Click **OK** to start the deployment.
19. To monitor the progress and status of the deployment, in the Order Information window, click the job ID. The Job Management screen shows the status of the job.
20. When you see in the Manage Jobs window that the deployment is successful, in the task ribbon, select the **Service Provisioning** workspace again.
21. In the task ribbon, select **Manage Services**.

The Manage Services screen shows the new service.

Perform a Functional Audit and a Configuration Audit

Now that your new service is deployed, you should validate its configuration and functional integrity. A functional audit runs operational commands on the device to verify that the service is up or down. A configuration audit verifies whether the configuration that was pushed to the device during deployment is actually on the device.

To perform a configuration audit and a functional audit of the service, follow these steps:

1. In the Manage Services screen, select the service instance you just deployed.
2. In the Actions panel, select **Perform Functional Audit**.
3. In the Schedule Functional Audit window, you can choose to perform the audit now or schedule it for later. Select **Audit now**, and then click **OK**.
4. In the Order Information screen, click **OK**.
5. In the Actions panel, select **Perform Configuration Audit**.
6. In the Schedule Configuration Audit window, you can choose to perform the audit now or schedule it for later. Select **Audit now**, and then click **OK**.
7. In the Order Information screen, click **OK**.
8. When the audit jobs have finished, success is indicated by an up arrow in the top right corner of the service thumbnail.
9. To view the functional audit results:
 - a. In the Manage Services screen, select the **so_1** service instance.
 - b. In the Actions panel, click **View Functional Audit Results**.
 - c. In the Functional Audit Results window, select each device to view the results.
10. To view the results of the configuration audit:
 - a. In the Actions panel, select **View Configuration Audit Results**.
 - b. In the Configuration Audit Results window, select each device in turn and review the results. This report indicates any part of the service configuration that is missing on the device, or inconsistent with the Junos Space database.

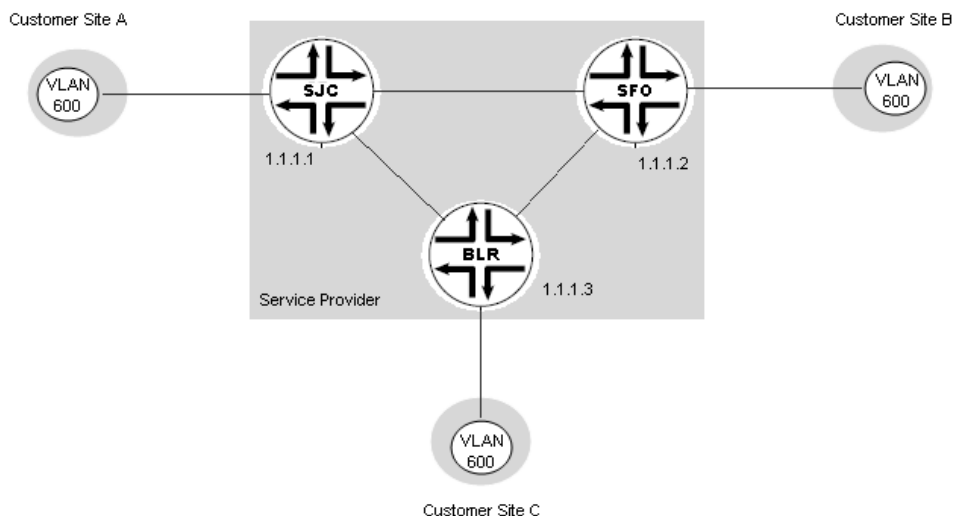
Following successful audit, the service is deployed and ready to be used.

- Related Topics**
- Device Discovery Overview
 - Discovering Devices
 - Prestaging Devices Overview on page 23
 - Discovering and Assigning All N-PE Devices on page 44
 - Discovering and Assigning N-PE Devices with Exceptions on page 47
 - Predefined Service Definitions on page 61
 - Creating a Point-to-Point Ethernet Service Definition on page 114
 - Publishing a Customized Service Definition on page 129
 - Adding a New Customer on page 139
 - Creating a Point-to-Point Ethernet Service Order on page 143
 - Deploying a Service on page 157
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Multipoint Ethernet Service Example

This example deploys and verifies a multipoint Ethernet service starting with three MX Series devices. Figure 19 on page 215 shows the service.

Figure 19: Simple Multipoint Service



This service provides connectivity for one VLAN, using 802.1Q interface endpoints. Customer site A connects to the network through an N-PE device named SJC (IP address 1.1.1.1). Customer site B connects to the network through an N-PE device named SFO (IP address 1.1.1.2). Customer site C connects to the network through an N-PE device named BLR (IP address 1.1.1.3). In this example, we will allow the Ethernet Activator software to select each UNI automatically.

Each UNI is to have its bandwidth limited to 25 Mbps.

You can create this service by performing the following tasks:

1. Prepare Devices for Discovery on page 216
2. Discover Devices on page 216
3. Prepare Devices for Prestaging on page 218
4. Discover and Assign N-PE Roles on page 219
5. Choose or Create a Service Definition on page 220
6. Create a Customer on page 222
7. Create and Deploy a Multipoint Service Order on page 222
8. Perform a Functional Audit and a Configuration Audit on page 224

Prepare Devices for Discovery

Before you can add a device using device discovery, the following conditions must be met:

- SSH v2 is enabled on the device. To enable SSH v2 on a device, issue the following CLI command:

```
set system services ssh protocol-version v2
```

- NETCONF protocol over SSH is enabled on the device. To enable the NETCONF protocol over SSH on a device, issue the following CLI command:

```
set system services netconf ssh
```

- The device is configured with a static management IP address that is reachable from the Junos Space server. The IP address could be in-band or out-of-band.
- A user with full administrative privileges is created on the device for the Junos Space administrator.
- If you plan to use SNMP to probe devices as part of device discovery, SNMP should be enabled on the device with appropriate read-only V1/V2C/V3 credentials.

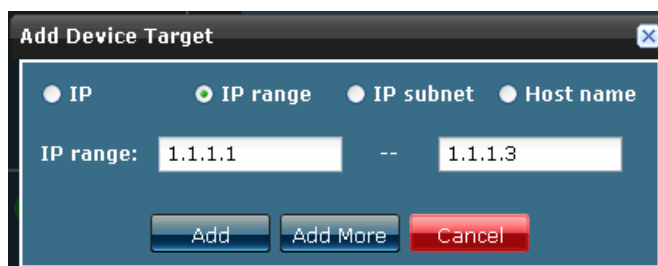
Discover Devices

Device discovery is a process that Junos Space uses to bring network devices under its control. This example brings two MX Series devices under Junos Space management:

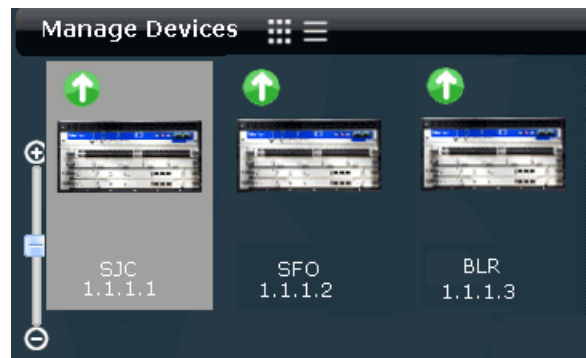
1. Login to Junos Space using your credentials.
2. In the Application Chooser, Select **Network Application Platform**.
3. In the task ribbon, select the **Devices** workspace.
4. In the task ribbon, select **Discover Devices**.
5. In the task ribbon, select **Discover Targets**.
6. In the Devices: Discover Targets window, click +.



7. In the Add Device Target window, select IP Range.
8. Enter the IP address information. This example uses a range of three addresses.



9. Click Add, and then click Next.
 10. In the Devices: Specify Probes window, select both Ping and SNMP as probes.
 11. Click Next.
 12. In the Devices: Specify Credentials window, click +, and enter the device login credentials.
 13. Click Finish.
- Device discovery begins. It displays a graph showing the status of the discovery operation. Initially, it shows three devices discovered. When the Junos Space software has accessed all three devices and brought them under its management, all three devices move from the Discovered column of the graph to the Managed column.
14. To check the results of the device discovery operation, select the **Devices** workspace again, and then select **Device Management**. The Device Management screen shows the added devices:



Prepare Devices for Prestaging

Before prestaging devices for multipoint services, the following entities must be configured:

- MPLS must run on each N-PE device.
- MPBGP must run on each N-PE device that will participate in a multipoint service.

To satisfy the above criteria, ensure that the following configuration exists on each N-PE device:

```

interfaces {
  ge-0/0/0 {
    unit 0 {
      family inet {
        address 10.1.22.2/30;
      }
      family mpls;
    }
  }
  lo0 {
    unit 0 {
      family inet {
        address 192.168.1.30/32;
      }
    }
  }
}
routing-options {
  autonomous-system 65410;
}
protocols {
  mpls {
    interface ge-0/0/0.0;
    interface lo0.0;
  }
  bgp {
    group CA-Peer {
      type internal;
      local-address 192.168.1.30;
      family l2vpn {

```

```

        signaling;
    }
    neighbor 192.168.1.40;
    neighbor 192.168.1.10;
    neighbor 192.168.1.20;
    neighbor 192.168.1.50;
    neighbor 192.168.1.60;
}
}
ospf {
    traffic-engineering;
    area 0.0.0.0 {
        interface lo0.0 {
            passive;
        }
        interface ge-0/0/0.0;
    }
}
ldp {
    interface ge-0/0/0.0;
    interface lo0.0;
}
}

```

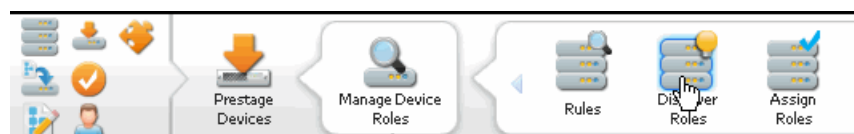
Discover and Assign N-PE Roles

Before you can provision services, you must prestage the devices. Prestaging includes assigning device roles and designating interfaces on those devices as UNIs. This example provides the steps to accept the recommendations of the Ethernet Activator software for N-PE devices and UNIs.

1. In the Application Switcher, select the **Ethernet Activator** application:



2. In the task ribbon, select the **Prestage Devices** workspace.
3. In the task ribbon, select **Manage Device Roles**.



4. In the task ribbon, select **Discover Roles**.

This action launches the role discovery process in which the Ethernet Activator software examines the devices under Junos Space management looking for devices that match predefined rules that identify N-PE devices. The Role Discovery

Status graph shows that, in this case, the Ethernet Activator software has discovered three such devices.

5. In the Assign Roles screen, switch to multiple selection mode and select both N-PE devices.
6. In the Actions panel, select **Assign NPE role**.
7. In the Assign NPE window, click **Assign** to confirm the assignment.
8. To view the assignment status, in the Job Details screen, click the job ID of the assignment job.

The Manage Jobs screen shows the progress and status of the role assignment job.

9. To verify the result, in the task ribbon, select **Prestage Devices > Manage Device Roles**. The Manage Device Roles screen shows three devices that can be used for provisioning.

Choose or Create a Service Definition

A service definition provides a template upon which services are built. It specifies service attributes that are not specific to a service instance. In this example, the service definition provides all service attributes except the N-PE devices, the UNIs, and bandwidth.

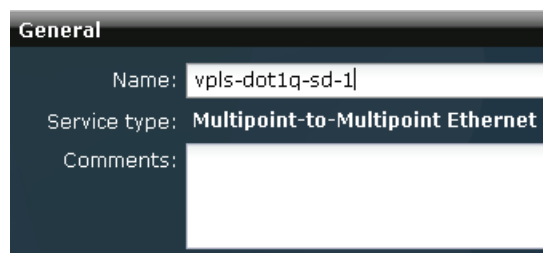
The Ethernet Activator software ships with standard service definitions. First, we check the standard service definitions to determine whether one already exists that will work.

1. In the task ribbon, select the **Service Design** workspace.
2. In the task ribbon, select **Manage Service Definitions**.

The Manage Service Definitions screen lists all service definitions in the system. In a new system, the screen lists only predefined service definitions.

This example needs a multipoint service definition with UNIs that use 802.1Q interfaces and allow you to set a bandwidth of 25 Mbps. The standard service definitions have several examples for provisioning 802.1Q UNIs, but none that allow the setting of a 25 Mbps bandwidth limit. So you need to create a new service definition.

3. In the task ribbon, select **Create VPLS Service Definition**.
4. In the General screen, enter a name for the service definition:



General

Name:

Service type: **Multipoint-to-Multipoint Ethernet**

Comments:

5. Click **Next**.

6. In the Connectivity Settings screen, because we will select a specific VLAN for each endpoint in the service, leave the Normalized VLAN setting as the the default **Normalized VLAN none**, and then click **Next**.
7. In the UNI Settings screen, in the Ethernet option field, select **dot1q**.
8. In the Customer traffic type field, select **Transport single VLAN**.
9. In the VLAN ID selection field, choose **Select manually**.
10. In the Physical IF encapsulation field, select **flexible-ethernet-services**.
11. In the Logical IF encapsulation field, select **vlan-vpls**.
12. Check **Enable rate limiting**.
13. In the Default Bandwidth field, enter **10**, for a default bandwidth of 10 Mbps.
14. To the right of the value you just entered, check **Editable in service order**.
The Bandwidth range and Increment fields become active.
15. In the Bandwidth range fields enter **10** and **50**.
16. In the increment field, enter **5**.

These settings of the Bandwidth range and Increment fields allow the bandwidth to be set in the service to any 5 Mbps increment in the range 10 Mbps through 50 Mbps.

The screenshot shows the 'UNI Settings' configuration window with the following sections and values:

- Traffic Treatment:**
 - Ethernet option: **dot1q**
 - Customer traffic type: **Transport single vlan**
 - VLAN ID selection: **Select manually**
 - ☐ Editable in service order
- Interface Settings:**
 - ☐ Protect UNI interface
 - Physical IF encapsulation: **flexible-ethernet-service**
 - Logical IF encapsulation: **vlan-ccc**
- MTU Settings:**
 - Default MTU (Bytes): **1522**
 - MTU range (Bytes): **1522** to **9192**
 - ☐ Editable in service order
- Bandwidth Settings:**
 - ☒ Enable rate limiting
 - Default bandwidth (Mbps): **10**
 - Bandwidth range (Mbps): **5** to **50**
 - Increment (Mbps): **5**
 - ☒ Editable in service order

17. To save and complete the service definition, click **Finish**.

The Service Definition Management screen includes the new service definition.

You have created a customized Service Definition, but it has not yet been published. Before a service definition can be used in provisioning, it must be published.

18. To publish the service definition, in the Manage Service Definitions screen, select the `vpls-dot1q-sd-1` service definition, and then in the Actions panel, select **Publish Service Definition**.

The Publish Service Definition window appears.

19. To confirm that you want to publish this service definition, click **Publish**.

In the Manage Service Definitions screen, the symbol in the upper left corner of the service definition thumbnail changes to a check mark, indicating that the status has changed to Published.

The service definition is now ready for use in provisioning.

Create a Customer

Before you can provision the service, customer details must be present in the Junos Space data base. To add a customer, follow these steps:

1. In the task ribbon, select the **Service Provisioning** workspace.
2. In the task ribbon, select **Manage Customers**.
3. In the task ribbon select **Create Customer**.
4. In the Name field, enter **Best Customer**.
5. In the Account number field, enter **1234**.
6. Click **Create**.

The Manage Customers screen shows the new customer.

Create and Deploy a Multipoint Service Order

Now that you have prestaged your devices, created a suitable service definition, and added the customer information to the database, you are ready to create and deploy a service order.

1. In the task ribbon, select the **Service Provisioning** workspace.
2. In the task ribbon, select **Manage Service Orders**.
3. In the task ribbon select **Create VPLS Service Order**.
4. In the Select Service Definition screen, select the service definition named `vpls-dot1q-sd-1`.

This service definition is the customized service definition you created earlier.

5. Click **Next**.
6. In the General Settings box of the Enter Order screen, in the Name field, enter `vpls_so_1`.
7. In the General Settings box of the Customer field, select **Best Customer**.

8. In the Endpoint Settings box of the Enter Order Information screen, in the Bandwidth field, select 25.

Enter Order Information

General Settings

Service definition: vpls-dot1q-sd-1

Name: vpls_so_1

Customer: Best Customer

Comments:

Customer traffic type: Transport single vlan

Autopick Route Target: ☒

End Point Settings

These settings from the selected Service Definition can be applied to all end points.
Apply to all: ☒

MTU (Bytes): 1522

Bandwidth (Mbps): 25

Autopick VLAN ID: 10

Physical IF encapsulation: 15

Logical IF encapsulation: 20

9. Uncheck the Autopick VLAN ID box.

The End Point Settings box expands to include the VLAN ID field.

10. In the VLAN ID field, enter **600**.

11. Click Next

12. In the Select Endpoint PE Devices screen, select BLR, SFO, and SJC.

Select Endpoint PE devices

Single Multiple

Selections

☒ BLR

☒ SFO

☒ SJC

13. Click Create.

14. In the Endpoint Settings screen click **Next** to accept the system-selected endpoints.
15. In the Deployment Options window, you can save the service order for later deployment, schedule the service order for later deployment, or deploy the service order now. Select **Deploy now**.
16. Click **OK** to start the deployment.
17. To monitor the progress and status of the deployment, in the Order Information window, click the job ID. The Job Management screen shows the status of the job.
18. When you see in the Manage Jobs window that the deployment is successful, in the task ribbon, select the **Service Provisioning** workspace again.
19. In the task ribbon, select **Manage Services**.

The Manage Services screen shows the new service.

Perform a Functional Audit and a Configuration Audit

Now that your new service is deployed, you should validate its configuration and functional integrity. A functional audit runs operational commands on the device to verify that the service is up or down. A configuration audit verifies whether the configuration that was pushed to the device during deployment is actually on the device.

To perform a configuration audit and a functional audit of the service, follow these steps:

1. In the Manage Services screen, select the service instance you just deployed.
2. In the Actions panel, select **Perform Functional Audit**.
3. In the Schedule Functional Audit window, you can choose to perform the audit now or schedule it for later. Select **Audit now**, and then click **OK**.
4. In the Order Information screen, click **OK**.
5. In the Actions panel, select **Perform Configuration Audit**.
6. In the Schedule Configuration Audit window, you can choose to perform the audit now or schedule it for later. Select **Audit now**, and then click **OK**.
7. In the Order Information screen, click **OK**.
8. When the audit jobs have finished, success is indicated by an up arrow in the top right corner of the service thumbnail.
9. To view the functional audit results:
 - a. In the Manage Services screen, select the **vpls_so_1** service instance.
 - b. In the Actions panel, click **View Functional Audit Results**.
 - c. In the Functional Audit Results window, select each device to view the results.
10. To view the results of the configuration audit:
 - a. In the Actions panel, select **View Configuration Audit Results**.

- b. In the Configuration Audit Results window, select each device in turn and review the results. This report indicates any part of the service configuration that is missing on the device, or inconsistent with the Junos Space database.

Following successful audit, the service is deployed and ready to be used.

- Related Topics**
- Device Discovery Overview
 - Discovering Devices
 - Prestaging Devices Overview on page 23
 - Discovering and Assigning All N-PE Devices on page 44
 - Discovering and Assigning N-PE Devices with Exceptions on page 47
 - Predefined Service Definitions on page 61
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