JUNIPER NETWORKS

JCS1200 Control System Software

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The information in this document is current as of the date on the title page.

YEAR 2000 NOTICE

Juniper Networks hardware and software products are Year 2000 compliant. Junos OS has no known time-related limitations through the year 2038. However, the NTP application is known to have some difficulty in the year 2036.

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Documentation and Release Notes

To obtain the most current version of all Juniper Networks® technical documentation, see the product documentation page on the Juniper Networks website at http://www.juniper.net/techpubs/.

If the information in the latest release notes differs from the information in the documentation, follow the product Release Notes.

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Supported Platforms

For the features described in this document, the following platforms are supported:

- JCS 1200

Using the Examples in This Manual

If you want to use the examples in this manual, you can use the **load merge** or the **load merge relative** command. These commands cause the software to merge the incoming configuration into the current candidate configuration. The example does not become active until you commit the candidate configuration.

If the example configuration contains the top level of the hierarchy (or multiple hierarchies), the example is a *full example*. In this case, use the **load merge** command.

If the example configuration does not start at the top level of the hierarchy, the example is a *snippet*. In this case, use the **load merge relative** command. These procedures are described in the following sections.

Merging a Full Example

To merge a full example, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration example into a text file, save the file with a name, and copy the file to a directory on your routing platform.

   For example, copy the following configuration to a file and name the file **ex-script.conf**. Copy the **ex-script.conf** file to the **/var/tmp** directory on your routing platform.

   ```
   system {
     scripts {
       commit {
         file ex-script.xsl;
       }
     }
   }
   interfaces {
     fxp0 {
       disable;
       unit 0 {
         family inet {
           address 10.0.0.1/24;
         }
       }
     }
   }
   ```

2. Merge the contents of the file into your routing platform configuration by issuing the **load merge** configuration mode command:

   ```
   [edit]
   user@host# load merge /var/tmp/ex-script.conf
   load complete
   ```

Merging a Snippet

To merge a snippet, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration snippet into a text file, save the file with a name, and copy the file to a directory on your routing platform.

   For example, copy the following snippet to a file and name the file **ex-script-snippet.conf**. Copy the **ex-script-snippet.conf** file to the **/var/tmp** directory on your routing platform.

   ```
   commit {
     file ex-script-snippet.xsl; }
   ```

2. Move to the hierarchy level that is relevant for this snippet by issuing the following configuration mode command:

```
[edit]
user@host# edit system scripts
[edit system scripts]
```

3. Merge the contents of the file into your routing platform configuration by issuing the **load merge relative** configuration mode command:

```
[edit system scripts]
user@host# load merge relative /var/tmp/ex-script-snippet.conf
load complete
```

For more information about the **load** command, see the CLI User Guide.

Documentation Conventions

Table 1 on page xv defines notice icons used in this guide.

Table 1: Notice Icons

Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.

Table 2 on page xv defines the text and syntax conventions used in this guide.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
Bold text like this	Represents text that you type.	To enter configuration mode, type the**configure** command: user@host> **configure**
`Fixed-width text like this`	Represents output that appears on the terminal screen.	`user@host>` **show chassis alarms** `No alarms currently active`

Table 2: Text and Syntax Conventions *(continued)*

Convention	Description	Examples
Italic text like this	• Introduces or emphasizes important new terms. • Identifies book names. • Identifies RFC and Internet draft titles.	• A policy *term* is a named structure that defines match conditions and actions. • *Junos OS System Basics Configuration Guide* • RFC 1997, *BGP Communities Attribute*
Italic text like this	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name: [edit] root@# **set system domain-name** *domain-name*
Text like this	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	• To configure a stub area, include the **stub** statement at the **[edit protocols ospf area area-id]** hierarchy level. • The console port is labeled **CONSOLE**.
< > (angle brackets)	Enclose optional keywords or variables.	**stub <default-metric** ***metric*****>;**
| (pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	**broadcast | multicast** **(*string1* | *string2* | *string3*)**
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	**rsvp { # Required for dynamic MPLS only**
[ ] (square brackets)	Enclose a variable for which you can substitute one or more values.	**community name members [** ***community-ids*** **]**

Indention and braces ({ })	Identify a level in the configuration hierarchy.	[edit]
		routing-options {
		  static {
		  route default {
		  nexthop *address*;
		  retain;
		  }
		  }
		}

; (semicolon)	Identifies a leaf statement at a configuration hierarchy level.	
J-Web GUI Conventions		
Bold text like this	Represents J-Web graphical user interface (GUI) items you click or select.	• In the Logical Interfaces box, select **All Interfaces**. • To cancel the configuration, click **Cancel**.
> (bold right angle bracket)	Separates levels in a hierarchy of J-Web selections.	In the configuration editor hierarchy, select **Protocols>Ospf**.

Documentation Feedback

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- URL or page number
- Software release version (if applicable)

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- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at http://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf .
- Product warranties—For product warranty information, visit http://www.juniper.net/support/warranty/ .
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- Find product documentation: http://www.juniper.net/techpubs/
- Find solutions and answer questions using our Knowledge Base: http://kb.juniper.net/
- Download the latest versions of software and review release notes: http://www.juniper.net/customers/csc/software/
- Search technical bulletins for relevant hardware and software notifications: https://www.juniper.net/alerts/

- Join and participate in the Juniper Networks Community Forum: http://www.juniper.net/company/communities/
- Open a case online in the CSC Case Management tool: http://www.juniper.net/cm/

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: https://tools.juniper.net/SerialNumberEntitlementSearch/

Opening a Case with JTAC

You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at http://www.juniper.net/cm/ .
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see http://www.juniper.net/support/requesting-support.html .

PART 1

Overview

CHAPTER 1

Product Overview

JCS1200 Chassis and T Series Core Routers as a Single Platform

The Juniper Networks JCS1200 Control System (JCS) chassis interconnected with up to three T Series routing chassis enables the control plane (route processing) and forwarding plane (packet forwarding) to be scaled independently within a single platform. The JCS1200 chassis houses up to 6 redundant Routing Engine pairs or up to 12 single Routing Engines running Junos OS. Matched with one or more Flexible PIC Concentrators (FPCs) on a T Series router, the selected Routing Engine pair (or single Routing Engine) forms a secure, virtual hardware router, or Protected System Domain (PSD). A PSD has the same capabilities as a separate, physical router with its own control plane, configuration file, routing tables, interfaces, and secure access.

Existing Juniper Networks technology already separates the tasks of the Routing Engine from the Packet Forwarding Engine on a single routing platform. Each component performs its primary tasks independently, while constantly communicating through a high-speed internal link. This arrangement provides streamlined forwarding and routing control and the capability to run Internet-scale networks at high speeds. Now, with Routing Engines located in a separate chassis, the JCS1200 platform provides a greatly expanded control plane capacity without sacrificing any forwarding slots in the T Series router. All memory-intensive processing occurs on the Routing Engines on the JCS chassis, whereas the FPCs on the T Series router are dedicated to efficient high-speed forwarding.

Related Documentation

- Root System Domains on page 4
- Protected System Domains on page 4
- Shared Interfaces on page 6

- Connections Between JCS1200 and T Series Chassis on page 11
- Benefits of JCS1200 and T Series as a Single Platform on page 13

Root System Domains

The Root System Domain (RSD) is the Junos OS running on a pair of redundant Routing Engines on a T Series router connected to the switch fabric on the JCS1200 platform. The configuration on these Routing Engines provides:

- The RSD identifier
- The parameters used to create Protected System Domains (PSDs) under the RSD, namely:
  - Which Routing Engine or redundant Routing Engine pair on the JCS1200 platform is assigned to the PSD.
  - Which Flexible PIC Concentrator (FPC) or FPCs on the T Series router are assigned to the PSD.

Because you can connect up to three T Series routers to the JCS1200 chassis, you can configure up to three RSDs. The PSD identifiers must be unique for each RSD. That is, PSD1 can only belong to RSD1, and not to RSD2 or RSD3.

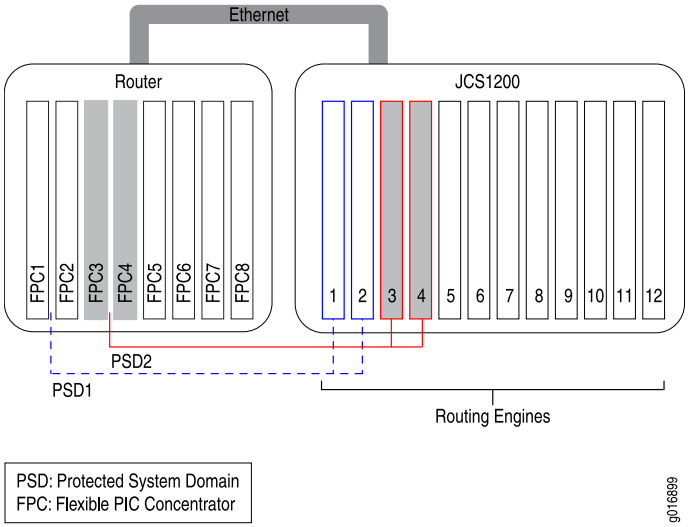
Related Documentation

- JCS1200 Chassis and T Series Core Routers as a Single Platform on page 3
- Protected System Domains on page 4
- Shared Interfaces on page 6
- Connections Between JCS1200 and T Series Chassis on page 11
- Benefits of JCS1200 and T Series as a Single Platform on page 13

Protected System Domains

A Protected System Domain (PSD) is a redundant Routing Engine pair (or single Routing Engine) on the JCS1200 platform matched with one or more Flexible PIC Concentrators (FPCs) on a T Series router. In Figure 1 on page 5, FPC1 and FPC2 and the Routing Engines in slots 1 and 2 belong to PSD1. In contrast, PSD2 is made up of the FPCs in slots 3 and 4 on the T Series router and the Routing Engines in slots 3 and 4 on the JCS1200 chassis.

Figure 1: Protected System Domain



Any number of FPCs can be assigned to a PSD. Only one redundant Routing Engine pair (or single Routing Engine) can be assigned to a PSD.

NOTE: When an FPC is not assigned to a PSD, it belongs to the Root System Domain (RSD) by default. A Physical Interface Card (PIC) on an FPC owned by the RSD can be configured as an interface that is shared by multiple PSDs. For more information, see "Shared Interfaces" on page 6.

You create each PSD under the RSD configuration through the Junos OS running on the Routing Engines on the T Series router. Once a PSD is configured, you access it as you would any separate physical router by connecting to the console port on the master Routing Engine on the JCS1200 chassis for the PSD you want to configure. Using the Junos OS, configure basis system properties, such as hostname, domain name, Ethernet management IP address, and so on. You can also download a configuration file to the PSD.

A PSD detects and manages only its own Routing Engines in the JCS1200 chassis and the assigned FPCs and PICs in the T Series router. In addition, failures on one PSD do not affect other PSDs.

Related Documentation

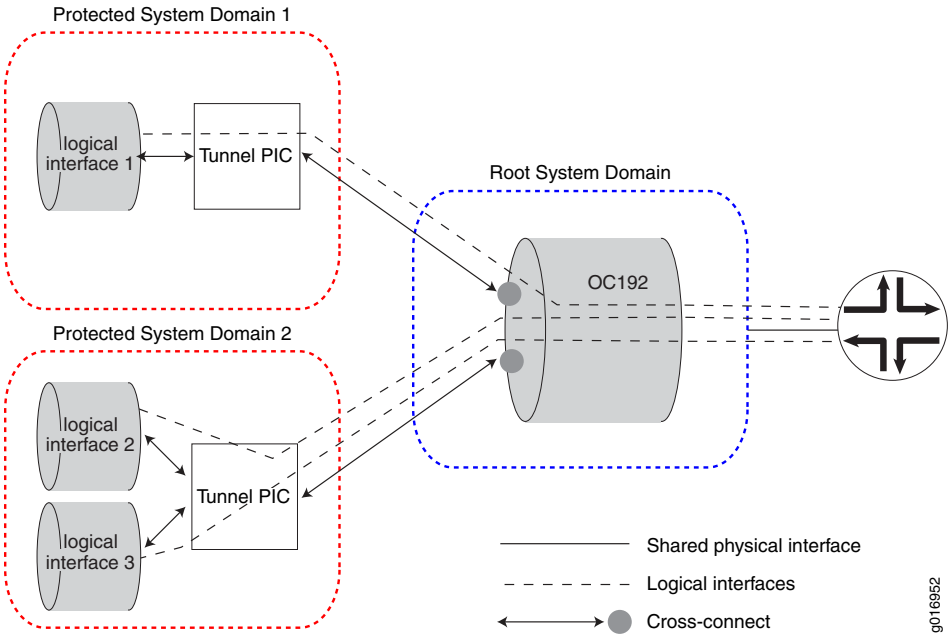
- Root System Domains on page 4
- Shared Interfaces on page 6
- Connections Between JCS1200 and T Series Chassis on page 11
- Benefits of JCS1200 and T Series as a Single Platform on page 13

Shared Interfaces

A single Physical Interface Card (PIC) can host a physical interface that is shared by different Protected System Domains (PSDs). The Flexible PIC Concentrator (FPC) and the physical shared interface are owned by the Root System Domain (RSD). However, the logical interfaces configured under the shared interface are assigned to and owned by different PSDs. By sharing a single interface among multiple PSDs, the cost of traffic forwarding is reduced and resources can be allocated flexibly at a more granular level.

Any FPC that has not been assigned to a specific PSD can be used to host shared interfaces. On the RSD, multiple logical interfaces are configured on the physical interface and each individual logical interface is assigned to a different PSD. On the PSD, each assigned logical interface is configured and peered with an uplink tunnel interface (**ut-*fpc/pic/slot***), which transports packets between the PSD and the shared interface on the RSD. See Figure 2 on page 6.

Figure 2: Shared Interfaces



NOTE:

When applied to shared interfaces:

- Junos features that are configured under logical interfaces, such as class-of-service (CoS) classifiers and rewrites, firewall filters, and policers, are configured on the PSD.
- Junos features that are configured under physical interfaces, such as drop profiles and schedule maps, are configured on the RSD.

The packets belonging to a shared interface pass between the Packet Forwarding Engine on the PIC in the RSD and the Packet Forwarding Engine on the uplink tunnel PIC in the PSD through a cross-connect in the forwarding fabric.

Traffic flow from the PSD to the RSD over a shared interface is as follows:

1. A packet destined for the shared PIC at the RSD is received on an interface at the PSD and sent to the Packet Forwarding Engine on the PSD's tunnel PIC. (The tunnel PIC is configured to peer with the shared PIC at the RSD.)
2. The packet is sent out of the tunnel interface.
3. The tunnel PIC loops the packet back to the input side of its Packet Forwarding Engine and the packet is sent over the switch fabric to the Packet Forwarding Engine on the shared PIC at the RSD.
4. The packet is then sent out the shared interface.

Traffic flow from the RSD to the PSD is as follows:

1. The Packet Forwarding Engine on the shared PIC at the RSD determines on which logical interface the packet arrived.
2. Based on the RSD configuration, the PSD that is associated with this logical interface is known and the packet is sent over the switch fabric to the tunnel PIC at that PSD.
3. The packet is sent out the tunnel interface.
4. The tunnel PIC loops the packet back to the input side of its Packet Forwarding Engine and the packet is then handled as if it had arrived on a directly-connected PIC.

Table 3 on page 7 lists the PICs that support shared interfaces:

Table 3: PICs Supporting Shared Interfaces

PIC Name	PIC Model Number	First Junos OS Release
Ethernet		
1-port 10-Gigabit Ethernet DWDM	PC-1XGE-DWDM-CBAND	9.4
1-port 10-Gigabit XENPAK	PC-1XGE-XENPAK	9.4
4-port 10-Gigabit Ethernet LAN/WAN, XFP	PD-4XGE-XFP	9.6
10-port 1-Gigabit SFP	PC-10GE-SFP	9.4
SONET/SDH		
4-port OC48 SONET, SFP	PC-4OC48-SON-SFP	9.3
1-port OC192 SONET, XFP	PC-10C192-SON-SFP	9.3
4-port OC192 SONET, XFP	PD-4OC192-SON-XFP	9.3

Table 3: PICs Supporting Shared Interfaces *(continued)*

PIC Name	PIC Model Number	First Junos OS Release
1-port OC768 SONET, SR	PD-1OC768-SON-SR	9.3

NOTE: Only SONET PICs that are installed on an Enhanced Services (ES) FPC on a T320 router or on a T1600 router can support shared interfaces.

Related Documentation

- JCS1200 Chassis and T Series Core Routers as a Single Platform on page 3
- Root System Domains on page 4
- Protected System Domains on page 4
- Connections Between JCS1200 and T Series Chassis on page 11
- Benefits of JCS1200 and T Series as a Single Platform on page 13

Inter-PSD Forwarding Overview

Inter-PSD forwarding enables PSDs on the JCS1200 platform to communicate on a peer-to-peer basis without requiring external links. Previously, PSDs could communicate with each other only through an external link.

Inter-PSD forwarding is achieved by using tunnel PICs that reside on the PSD. Each PSD you configure for inter-PSD forwarding must have a tunnel PIC available to the PSD. The PSDs communicate over logical interfaces configured on the tunnel PICs. Multiple logical interfaces can be configured on each tunnel PIC, allowing the PSD to communicate with multiple PSDs over the same tunnel PIC.

Currently, only Frame Relay encapsulation is supported for inter-PSD forwarding.

Related Documentation

- Root System Domains on page 4
- Protected System Domains on page 4

Route Reflection Overview

To decrease BGP control traffic and minimize the number of update messages, a BGP route reflector is used in many networks to distribute BGP routes within the AS. Routing Engines on the JCS1200 platform can be configured to act as BGP route reflectors. Because of large memory and 64-bit processor capacity, JCS1200 Routing Engines provide ideal support for route reflection.

Typically, route reflection is performed by a dedicated router. The router is not in the forwarding path (does not forward IP packets) but is equipped with a large memory and a good CPU.

The number of route reflectors in an IP network is much smaller than the number of routers. A network with 30 or more routers might have one route reflector (or possibly two for redundancy). Larger networks with hundreds of routers, might have 20 router reflectors.

Figure 3 on page 9 shows a typical network with route reflectors. These route reflectors are not in the forwarding path.

Figure 3: Typical Network of Route Reflectors

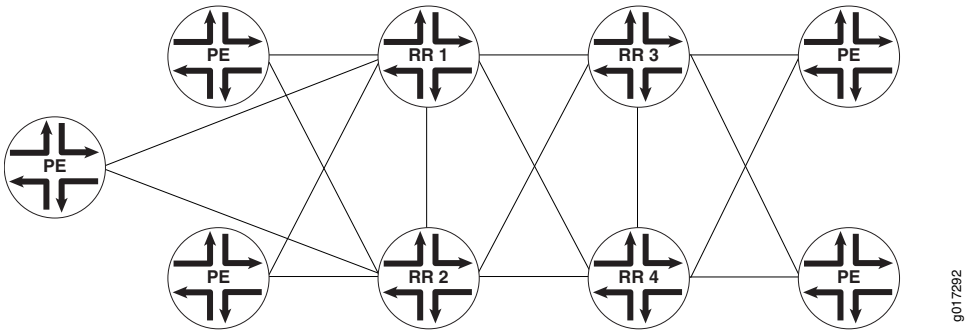


Figure 4 on page 9 shows the JCS1200 platform providing four distinct route reflectors and preserving the current network architecture.

Figure 4: Route Reflectors on the JCS1200 Platform

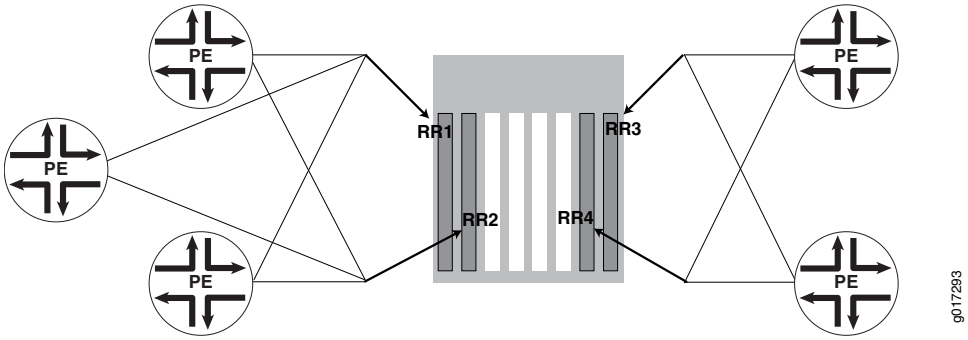
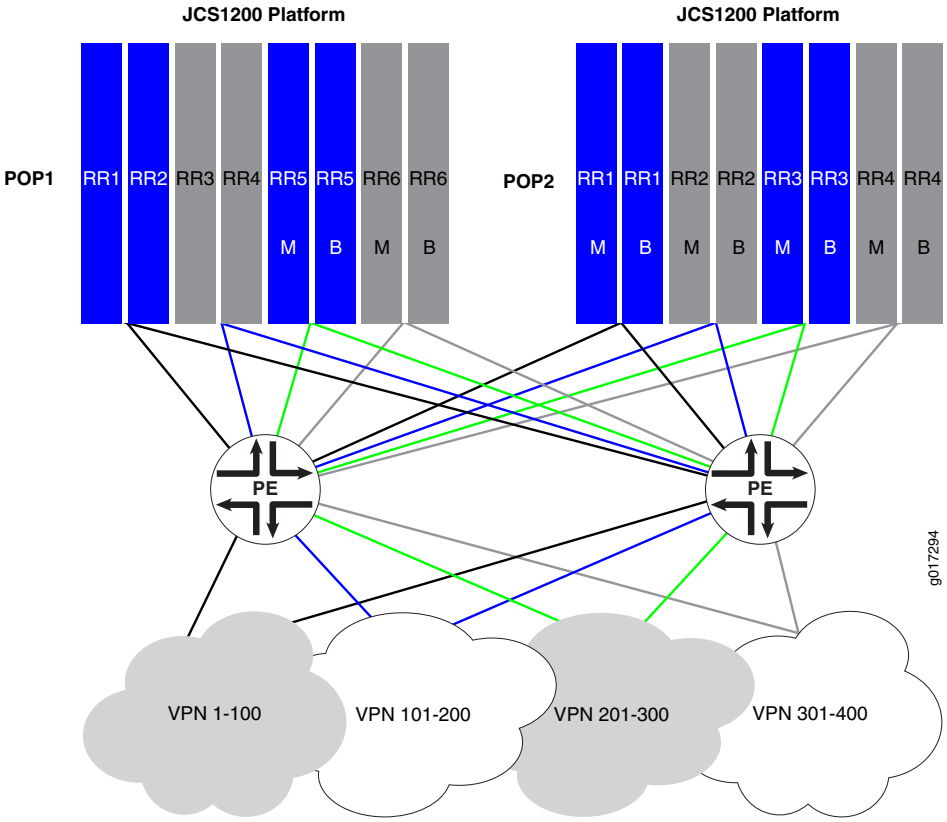


Figure 5 on page 10 shows an example of route reflector partitioning on the JCS1200 platform. Each JCS1200 chassis can hold up to 12 Routing Engines. You can get route scalability up to 12x as you incrementally add Routing Engines to the JCS1200 chassis and configure them for route reflection. You do not need to buy a new router to increase route reflector capacity.

Figure 5: Route Reflector Partitioning on the JCS1200 Platform



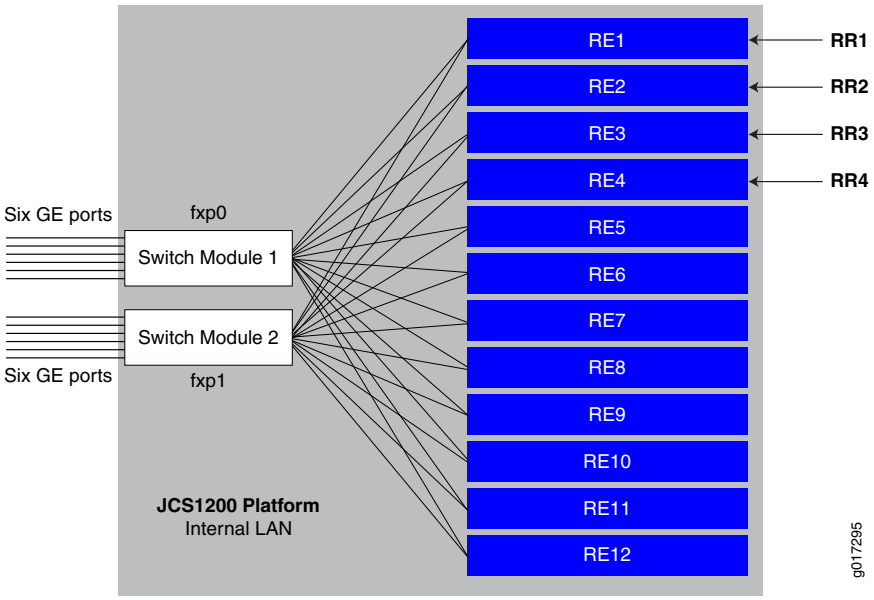
NOTE: Support for dual Routing Engines (master and backup) is currently not available, but is planned for a future release.

As shown in Figure 6 on page 11, each of the 12 Routing Engines can be configured as a standalone route reflector. The 12 Routing Engines on the JCS1200 platform are connected to the JCS switch modules in a dual-star configuration. Each Routing Engine has access to two interfaces (**fxp0** and **fxp1**), one on each switch. These interfaces are used for protocol peerings.

Each JCS switch module has 6 Gigabit Ethernet ports to connect to the outside world for a total of 12 ports. One port on each JCS switch module is used as a management port, three of the remaining ports on each JCS switch module can be used to connect to the network. (The remaining two ports are reserved.) Each Gigabit Ethernet port represents a separate LAN.

Multiple route reflectors can be configured to share the same port and hence be part of the same LAN. Port sharing enables JCS1200 route reflectors to conserve Gigabit Ethernet ports and reduce the cost of adding additional line cards for connectivity to the network. The result is a cost-effective solution for networks where multiple route reflectors are deployed.

Figure 6: Route Reflector Interfaces and Ports



Related Documentation

- Root System Domains on page 4
- Protected System Domains on page 4
- Example: Configuring the JCS1200 Platform as a Route Reflector on page 152
- Example: Configuring Client-to-Client Reflection (OSPF) on page 161

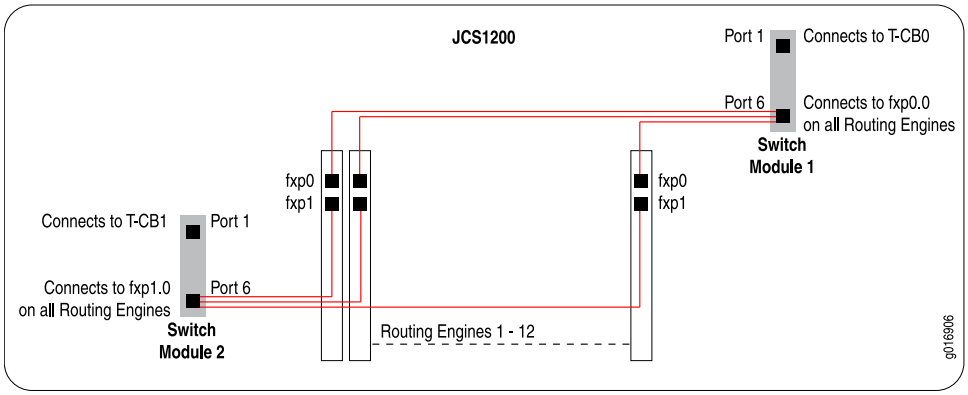
Connections Between JCS1200 and T Series Chassis

The JCS1200 and T Series routers are connected through standard Ethernet links between one or more JCS switch modules and one or more T Series Control Boards (T-CBs). The JCS switch module has six ports. Port 1 is connected to Root System Domain 1 (RSD1), port 2 to RSD2, and port 3 to RSD3. Port 6 connects to the management ports on all Routing Engines in the JCS chassis. Port 4 and port 5 are reserved.

In Figure 7 on page 12, Ethernet port 1 (RSD1) on JCS switch module 1 is connected to the T Series Connector Interface Panel (CIP) port on T-CB-0, whereas Ethernet port 1 (RSD1) on JCS switch module 2 is connected to the CIP port on T-CB-1.

When there are two JCS switch modules, each Routing Engine can be configured with two Ethernet management ports. One port (fxp0.0) is connected to port 6 on the JCS switch module in bay 1, whereas the other port (fxp1.0) is connected to port 6 on the JCS switch module in bay 2. Each connection is a dedicated 1000-Mbps link.

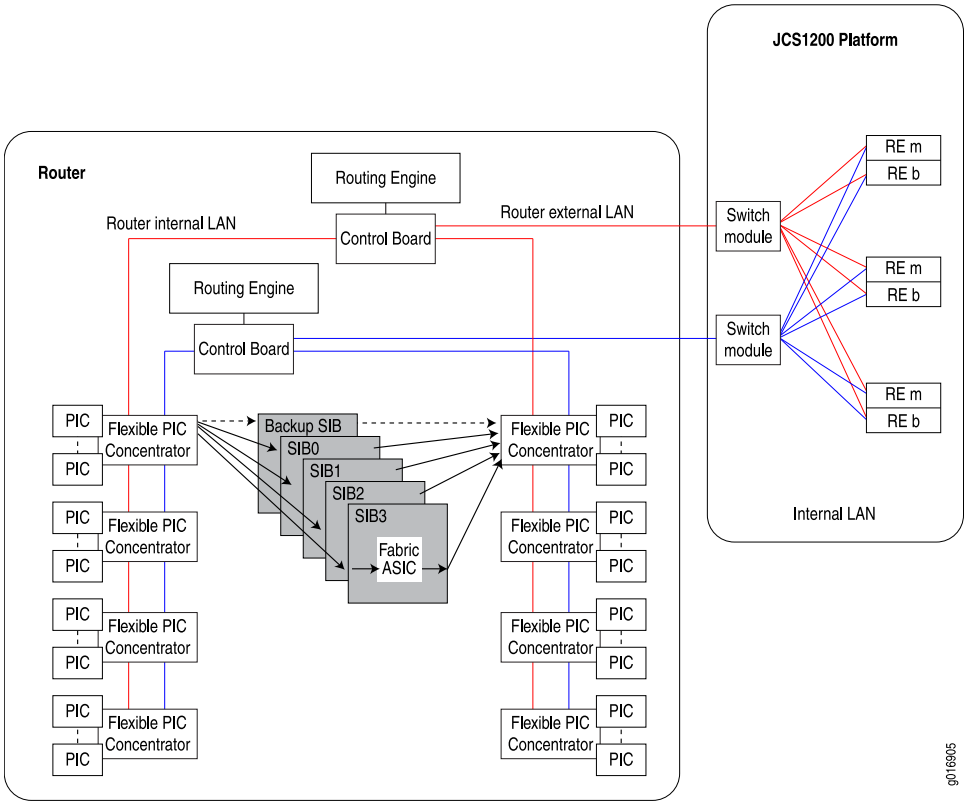
Figure 7: JCS Switch Module Ports



When you first access a PSD through the console port on the Routing Engine, you configure the IP address for one or both of these management ports.

Figure 8 on page 12 provides a more detailed look at the connections between the two platforms. RE m indicates a master Routing Engine on the JCS1200 platform, whereas RE b represents a backup Routing Engine.

Figure 8: Connections Between JCS1200 and T Series Platforms



Related Documentation

- Configuring a PSD with a Single Routing Engine on page 83
- Configuring a PSD with Redundant Routing Engines on page 85

- Connecting the JCS1200 Platform to a T Series Core Router

Benefits of JCS1200 and T Series as a Single Platform

The benefits of the JCS1200 and T Series routers as a single platform are:

- Increased efficiency and investment protection—A single T Series router used with the JCS1200 platform supports up to eight Protected System Domains (PSDs). With multiple (up to 3) T Series chassis connected to the JCS1200 chassis, 12 PSDs can be supported. Instead of purchasing 12 physical routers, a service provider can configure 12 PSDs using a single interconnected platform. In addition, operations and administration are simplified through consolidation of resources.
- Maximum scaling and flexibility—A highly scalable control plane chassis preserves slots in the router chassis that can be used for revenue-generating, high-speed forwarding of Internet traffic. Service providers can assign control processors and memory space on the Routing Engines in the JCS chassis to achieve the most efficient use of resources, while delivering outstanding performance. In addition, different PSDs can share interfaces on a single Physical Interface Card (PIC), reducing capital expenditure and enabling you to allocate resources with finer granularity.
- Rapid service rollout—New services can be planned, tested, and deployed more quickly with fewer resources. Each PSD provides a secure administration domain, where new features can be tested, while other PSDs continue to provide tested software to customers. Through fault isolation and streamlined administration domains, service providers achieve faster revenue and accommodate rapid customer growth. In addition, RSDs and PSDs can run different version of Junos OS; however, the supported Junos OS Release version must be one release up, or one release down, from the current Junos OS Release version. For example, if RSD is running Junos OS Release 10.1, then PSD can run Junos OS Release 10.0 or 10.2, however, it cannot run Junos OS Release 9.6 or 10.3. Each RSD and PSD must be running Junos Release 9.4 or later.

The following sections discuss some of these benefits:

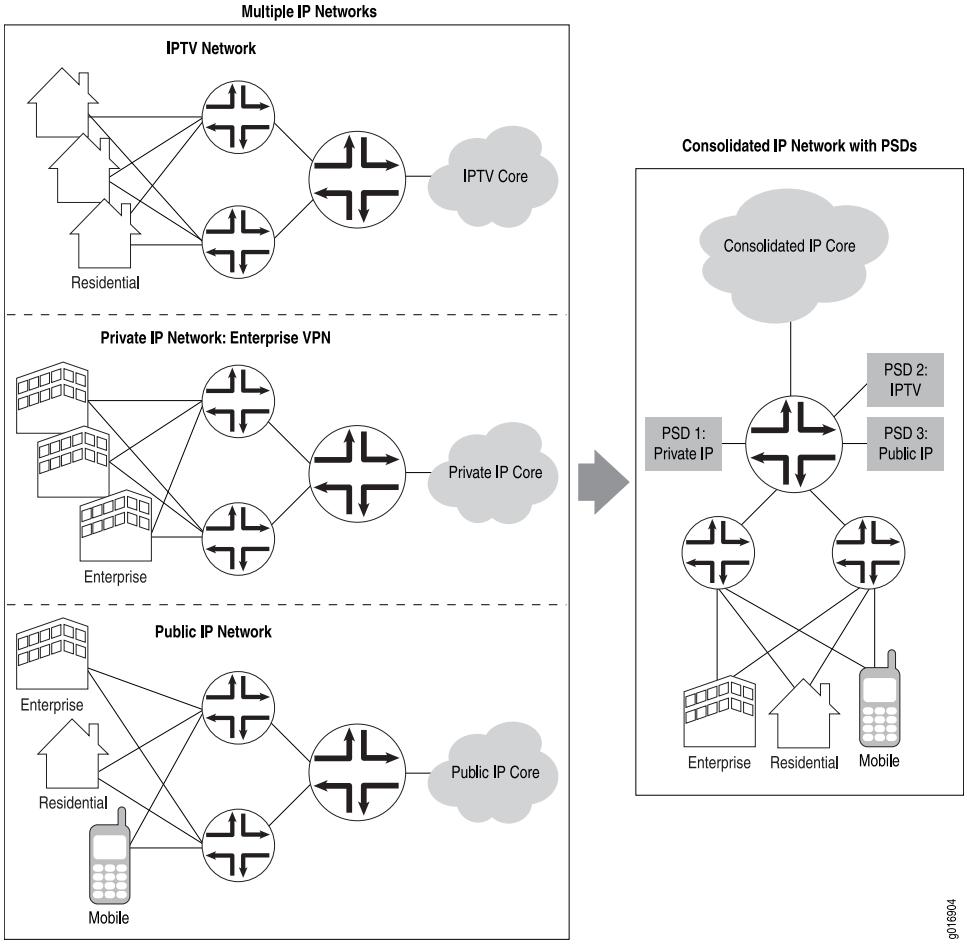
- Network Consolidation on page 13
- Enhanced Security and Administration on page 14
- Cost Efficiency on page 14
- Faster Deployment of New Services on page 15

Network Consolidation

Many carriers operate separate IP networks for public and private services. Others have application-specific IP networks (voice and video, for example). PSDs enable carriers to consolidate and simplify network architecture. Rather than adding more routing at the edge to support individual services, a single platform provides service-specific virtualization in the core of the network.

In Figure 9 on page 14, three separate networks (IPTV, enterprise VPN, and public IP) are consolidated into one network. Instead of three core routers, only the JCS 1200 platform interconnected with a single T640 router is required to support all three services.

Figure 9: Network Consolidation



Enhanced Security and Administration

By delineating fault and administrative domains on a single system, PSDs enable network administrators to decrease the number of nodes and fiber interconnections between routers, reducing the cost and complexity of existing point of presence (POP) architectures. Because each PSD maintains its own routing and processes in separate partitions, security is enhanced. With fault isolation, network anomalies in one PSD do not affect another PSD. Streamlined boundaries allow operational domains to be isolated logically, providing more control over router administration.

Cost Efficiency

With PSDs, forwarding resources are allocated to where they are most needed. This flexibility ensures that the most bandwidth-intensive services receive the resources needed to guarantee service license agreements. By consolidating network equipment and functions and streamlining management and administrative tasks, the utilization of resources is maximized. Shared interfaces enable you to assign expensive forwarding resources with more granularity to specific routing domains. RSDs and PSDs can run different versions of Junos OS; however, the supported Junos OS Release version must

be one release up, or one release down, from the current Junos OS Release version. For example, if RSD is running Junos OS Release 10.1, then PSD can run Junos Release 10.0 or 10.2; however, it cannot run Junos OS Release 9.6 or 10.3. To configure shared interfaces, each RSD and PSD must be running Junos OS Release 9.3 or later.

Faster Deployment of New Services

Service providers can use a separate partition for testing and activating new services without having to deploy a new system. Software upgrades can occur without affecting software versions used for existing services. Carriers can begin generating revenue more quickly and minimize the cost of introducing new services. RSDs and PSDs can run different versions of Junos OS; however, the supported Junos OS Release version must be one release up, or one release down, from the current Junos OS Release version. For example, if RSD is running Junos OS Release 10.1, then PSD can run Junos OS Release 10.0 or 10.2; however, it cannot run Junos OS Release 9.6 or 10.3. Each RSD and PSD must be running Junos Release 9.4 or later.

Related Documentation

- Example: Configuring a JCS1200 Platform and a Single T Series Router on page 117
- Example: Configuring a JCS1200 Platform and Multiple T Series Routers on page 123
- Example: Configuring Shared Interfaces (Ethernet) on page 142
- Example: Consolidating a Layer 2 VPN Network on page 172

CHAPTER 2

JCS1200 Platform Software Views

Software Views Overview

Configuring and managing the Juniper Networks JCS1200 control system and connected T Series routers requires three separate control points (*views*). Each view provides a different access to different parts of the system:

- Through the JCS management module command-line interface (CLI), a *JCS administration view* enables you to configure and manage JCS1200 platform components, including the JCS switch module and blade (or Routing Engine) parameters.
- Through the Junos OS running on the Routing Engine pair in the T Series router (called the Root System Domain), the *RSD administration view* enables you to create the Protected System Domains (PSDs) and to manage all the hardware in the T Series chassis.
- Through the Junos OS running on a Routing Engine (or Routing Engine pair) in the JCS chassis, the *PSD administration view* enables you to configure and manage the hardware that is assigned to the PSD.

Related Documentation

- JCS Administration View on page 17
- RSD Administration View on page 18
- PSD Administration View on page 19

JCS Administration View

The JCS administration view is controlled by JCS supervisors and operators who have access to configuration and settings associated with the hardware and software that reside on the JCS1200 platform. This includes JCS management modules, JCS switch modules, the JCS Routing Engines (blades), JCS media trays, power supplies, and so on.

JCS administration view considerations include:

- Types of JCS Users on page 18
- How Command Targets and User Permissions Impact Views on page 18

Types of JCS Users

Users are authenticated by the JCS management module before they can issue JCS commands. Login account configuration determines which commands are available. Two types of Juniper Networks-specific login accounts are available on the JCS:

- Supervisor—Login accounts configured with supervisor privileges enable you to view and enter JCS management module configuration commands such as **users** and **write**. You can also view and enter JCS management module monitoring commands.
- Operator—Login accounts configured with operator privileges enable you to view and enter JCS management module operational commands such as **info** and **health**. JCS management module configuration commands are not available for operator logins

How Command Targets and User Permissions Impact Views

Views available to JCS users are based on a combination of user login permissions and the target set for a command. For example:

- You can set the command target of the **info** command to selectively display information about a specific Routing Engine in the JCS chassis, all Routing Engines in the chassis, and so on.
- JCS operators can use the **ifconf** command to display network interface settings for the JCS Ethernet interfaces. In addition, JCS supervisors can use the **ifconf** command to change network interface settings.

Related Documentation

- RSD Administration View on page 18
- PSD Administration View on page 19
- JCS1200 Software Components on page 23
- Configuring User Accounts on page 45

RSD Administration View

The Root System Domain (RSD) view is controlled by the administrators and users of the Junos OS running on the Routing Engines on the T Series router. RSD administration view considerations include:

- Access Privileges on page 19
- System Information on page 19
- Management Tasks on page 19

Access Privileges

The RSD administrator creates the PSDs through the Junos OS running on the Routing Engines in the T Series chassis. With the correct user privileges and authentication, an RSD administrator can log in to a PSD from the RSD.

System Information

The RSD administrator can use the **show chassis psd** command to view which PSDs are configured within the RSD. Otherwise, when issuing **show** commands on the RSD, the administrator views all hardware on the T Series router.

By default, system log files are stored in the ***/var/log/message*** directory on the router. If a system log message on an RSD originates from an FPC that is assigned to a PSD, the system message is logged locally at the RSD and is also forwarded to that particular PSD. If a system log message originates from a hardware resource that is shared between and RSD and PSDs, the message is logged locally at the RSD and is also forwarded to all PSDs associated with the RSD.

Management Tasks

The RSD administrator manages all hardware on the T Series router, including the Routing Engines, FPCs, Switch Interface Boards (SIBs), the Switch Processor Mezzanine Board (SPMB), Power Entry Modules (PEMs), and fans. The RSD administrator can issue **show**, **request**, **clear**, and **test** commands for any hardware on the T Series router and for any FPCs that are part of a PSD.

NOTE: A switchover between Routing Engines on the T Series router (the RSD) does not affect PSDs. However, when an RSD reboots or goes offline, the FPCs assigned to PSDs will reboot or go offline.

Related Documentation

- JCS Administration View on page 17
- PSD Administration View on page 19
- Logging In to a PSD from the RSD on page 229
- Junos OS Verification Tasks on page 230

PSD Administration View

The Protected System Domain (PSD) view is controlled by the administrators and users of the Junos OS running on the Routing Engines in the JCS chassis that belong to a particular PSD. Topics in this section include:

- Access Privileges on page 20
- System Information on page 20
- Management Tasks on page 20

Access Privileges

Each PSD is independent of all other PSDs and requires login authentication. When you initially configure a PSD, you set its root authentication parameters. Authentication is enforced when a user attempts to log in to a PSD directly or from the RSD.

System Information

The PSD administrator can display information about the Routing Engines, FPCs, and PICs that are assigned to the PSD. The administrator can also display information about shared T Series hardware, such as SIBs, the SPMB, PEMs, and fans. When a **show** command is issued on a PSD, a field heading such as **psd1-re0:** precedes the set of information that pertains only to the PSD, whereas a field heading such as **rsd-re0:** precedes the set of information that pertains to the shared hardware.

System log messages originating from an FPC that is assigned to a PSD are logged locally at the RSD and forwarded to the PSD. If a system log message originates from a hardware resource that is shared between and RSD and PSDs, the message is logged locally at the RSD and is forwarded to all PSDs associated with the RSD. Again, you can determine the origin of a system message by labels such as **psd1-re0:** and **rsd-re0:**.

Management Tasks

The PSD administrator controls and manages Routing Engines and FPCs assigned to that PSD. For example, the PSD administrator can issue **request**, **clear**, and **test** commands for the FPCs and PICs that are part of the PSD. The PSD administrator has view-only access to shared T Series hardware, such as SIBs, the SPMB, PEMs, and fans.

NOTE: A switchover between Routing Engines on the JCS1200 platform that are assigned to a PSD does not affect the RSD or other PSDs. However, when the master Routing Engine in a PSD reboots or goes offline, the FPCs assigned to that particular PSD will reboot or go offline.

Related Documentation

- JCS Administration View on page 17
- RSD Administration View on page 18
- Logging In to a PSD from the RSD on page 229
- Junos OS Verification Tasks on page 230

CHAPTER 3

JCS1200 Platform Components

JCS1200 Platform Hardware Components

JCS1200 platform hardware components include:

Default Hardware Configuration

The default configuration for the JCS1200 platform includes:

- One JCS management module
- One JCS switch module
- Four power supplies
- One media tray

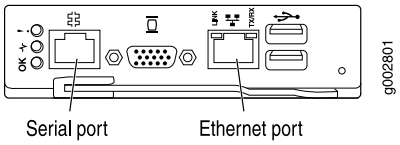
Routing Engines

The JCS chassis provides 12 slots (bays) for Routing Engines. A Routing Engine is a hot-swappable, independent server with its own processors, memory, storage, network controllers, operating system, and applications. The Routing Engine is installed in a slot in the JCS chassis and shares power, fans, switches, and ports with other Routing Engines. Routing Engines in the JCS1200 platform have the latest Junos OS preinstalled on them.

Management Module

The JCS management module is a hot-swappable module that you use to configure and manage JCS components. The JCS chassis comes with one hot-swappable management module in management module slot 1. To provide redundancy, you can add a second management module in management module slot 2. Only one management module is active. The other is a backup in case of failure. Each JCS management module has a separate internal link to each JCS switch module. See Figure 10 on page 22.

Figure 10: JCS Management Module



You can access the JCS management module CLI through a local connection to the serial port on the JCS management module. Or, you can access the CLI from a remote network management station on the network through the console (Ethernet) connector.

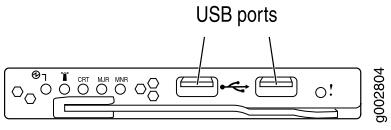
Switch Module

The JCS switch module connects Routing Engines on the JCS1200 platform to a T Series router and controls traffic between the two devices. The JCS chassis comes with one hot-swappable switch module in switch module slot 1. To provide redundancy, you can add a second switch module in switch module slot 2.

Media Tray

The media tray is a hot-swappable module that provides two USB connectors for use by the Routing Engines, error LEDs, an ambient air temperature sensor and a pressure sensor for use by the JCS management module, and two CompactFlash card slots. Junos OS is preloaded onto each Routing Engine. The media tray USB ports are used to copy new Junos OS packages onto Routing Engines. See Figure 11 on page 22. The JCS chassis comes with one hot-swappable media tray in media tray slot 1. To provide redundancy, you can add a second media tray in media tray slot 2.

Figure 11: JCS Media Tray



Power Supply Modules

The JCS chassis is configured with four hot-swappable power supply modules. The power supply modules in slots 1 and 2 supply power to Routing Engine slots 1 through 6, media trays 1 and 2, management module slots 1 and 2, and switch module slots 1 and 2. Power supply modules in slots 3 and 4 supply power to Routing Engine slots 7 through 12.

Each pair of power modules operates as a redundant pair. If either power module fails, the remaining power module continues to supply power, but there is no redundancy. Replace a failed power module as soon as possible.

Fan Modules

The JCS1200 platform comes with four hot-swappable fan modules for cooling redundancy. The fan module speeds vary depending on the ambient air temperature within the JCS1200 platform.

If the ambient temperature is 25ºC (77ºF) or below, the JCS1200 platform fan modules will run at their minimum rotational speed. If the ambient temperature is above 25ºC (77ºF), the fan modules will run faster, increasing their speed as required to control internal JCS1200 platform temperature.

Each fan module contains two fans operating as a pair in a series. If one fan fails, the remaining fan will run at full speed and continue to cool the JCS1200 platform. To maintain cooling redundancy, replace a failed fan module as soon as possible.

Related Documentation

- JCS1200 Software Components on page 23

JCS1200 Software Components

The JCS1200 software includes the following concepts and components:

JCS Management Module CLI Overview

The JCS management module command-line interface (CLI) is the software interface you use to access and configure the Juniper Networks Control System (JCS). You can access the JCS management module CLI through a local connection to the serial port on the JCS management module. Or, you can access the CLI from a remote network management station on the network through the console (Ethernet) connector.

The JCS management module CLI is a straightforward command interface. You type commands on a single line, and commands are executed when you press the Enter key. The CLI provides command help and command history.

Unlike the Junos OS CLI, in which configuration commands you enter are stored in a candidate configuration and the changes you add are not activated until you commit the configuration, configuration commands you enter with the JCS management module CLI are activated as soon as you enter the command.

General information about JCS CLI commands includes:

- All JCS CLI commands have the following basic structure:

  command -option parameter

  An *option* is a single-letter code or word that refines the behavior of a command in some predetermined way. A *parameter*, also known as a command-line argument, is a filename or other data that is provided to a command. Some commands do not require options, and some commands do not require parameters.

- All commands, command options, and predefined parameters are case-sensitive.
- Command options are indicated by a dash (-).
- Strings that contain spaces are enclosed in quotation marks. For example:

  snmp -cn "John Markham"

- Depending on which command options you enter, you can use the same JCS CLI command to display configuration information or to change a configuration. For example, compare the following:

  mt -T system

  Displays the Routing Engine (blade) that currently controls (owns) the media tray.

  mt -T system –b 6

  Configures the Routing Engine (blade) in slot 6 to control the media tray.

Logging In to the JCS Management Module CLI

To log in to the JCS management module for the first time, use the default username and password:

```
Username: USERID
Password: PASSW0RD
```

The 0 in **PASSW0RD** is a zero, not the letter O.

When you have created user accounts, you can log in as a specific user.

Getting Help on JCS Commands

The JCS management module CLI includes a **help** command you can use to get a list of available commands or to get help on individual commands.

- For a list of available commands, enter the **help** command. For example:

```
system> help
? - Display commands
accseccfg - View/edit account security config
advfailover - View/edit advanced failover mode
alarm - Manage Telco System Management alarm(s)
alertcfg - Displays/Configures the global remote alert systems
alertentries - View/edit remote alarm recipients
baydata - View/edit Blade Bay Data string
...
```

- For help on individual commands, enter ***command*** **-help**, where ***command*** is the name of the command for which you want help. For example:

```
system> clock -help
usage:
   clock [-options]
options:
   -d    - date (mm/dd/yyyy)
   -t    - time (hh:mm:ss)
   -g    - GMT offset
   -dst  - daylight savings time (on|off|special case)
For a GMT offset of +2:00, use one of the following values for dst:
   ee    - Eastern Europe
   gtb   - Great Britain
   egt   - Egypt
   fle   - Finland
   off
For a GMT offset of +10:00, use one of the following values for dst:
   ea    - Eastern Australia
   tas   - Tasmania
   vlad  - Vladivostok
   off
For a GMT offset in set {-9:00, -8:00, -7:00, -6:00, -5:00}, use one of the
following values for dst:
   uc    - USA and Canada
   other - Other locations
   off
For a GMT offset of -4:00, use one of the following values for dst:
   can   - Canada
   other - Other locations
   off
```

- You can also use the **?** or **-h** shortcuts to get help. For example:

```
system> clock -h
system> clock ?
```

Table 4 on page 25 shows syntax conventions used in **help** command output.

Table 4: Syntax Conventions for JCS Management Module CLI Help

Item	Description
[ ]	Used for indexing (by slot (bay) number)
< >	Denotes a variable
{ }	Denotes an optional argument
|	Denotes a choice

Setting the JCS Management Module Command Target

You can use the JCS management module CLI to direct commands to the management module or other devices installed in the JCS chassis. The device where the command takes effect is called the command *target*. By default, the command target is **system** (the JCS chassis).

- Use the **env** command to change the command target. For example:

- The following command changes the command target from **system** to JCS management module 1 (**mm[1]**):

  ```
  system> env -T mm[1]
  OK
  system:mm[1]>
  ```

  The command prompt changes to **system:mm[1]** to indicate the command target. Unless otherwise directed, all commands you enter apply to the target shown by the prompt.

- To return the command target to the top level of the hierarchy, type the following:

  ```
  system:mm[1]: env -T system
  OK
  system>
  ```

- Use the **-T** option to temporarily override the active command target for individual commands. For example, to include the following command option to redirect a command to the JCS management module in slot (bay 1), type:

  -T system:mm[1]

Table 5 on page 26 lists command targets you typically use to configure and monitor the JCS1200 platform.

Table 5: Target Paths for JCS Modules

Item	Target Path	Description
JCS1200 platform	**system**	–
JCS management module	**system:mm[*x*]**	*x* is the management module number (**1** or **2**)
Routing Engine (blade server)	**system:blade[*x*]**	*x* is the blade slot number (**1** through **12**)
JCS switch module	**system:switch[*x*]**	*x* is the switch number (**1** or **2**)

NOTE: Additional target paths are available in the JCS management module CLI.

JCS Switch Module Script

The JCS switch module includes a menu-based interface that runs on the JCS1200 platform. However, instead of using menus to configure the switch, Juniper Networks provides a script you can use for configuring the switch.

Related Documentation

- JCS1200 Platform Hardware Components on page 21

JCS1200 Platform Graceful Routing Engine (GRES) Switchover

Graceful Routing Engine Switchover Overview

The Graceful Routing Engine switchover (GRES) feature in the Junos OS enables a routing platform with redundant Routing Engines to continue forwarding packets even if one Routing Engine fails. GRES preserves interface and kernel information. Traffic is not interrupted. For more information, on GRES, see the *Junos High Availability Configuration Guide.*

- To configure GRES on the JCS1200 platform, include the **graceful-switchover** statement at the **[edit chassis redundancy routing-engine]** hierarchy level on the PSD.
- Configure the **graceful-switchover** statement for all PSDs on the JCS1200 platform that include redundant Routing Engines.

Graceful Routing Engine Switchover PIC Support

Junos OS Release 10.0 or higher supports GRES for PICs running on the JCS1200 platform, including IQ2 PICs. IQ2 PICs supported on the JCS1200 platform include 1-, 4-, and 8-port Gigabit Ethernet IQ2 PICs and 1-port 10-Gigabit Ethernet IQ2 PICs.

Related Documentation

- *Junos High Availability Configuration Guide*
- Configuring a PSD with Redundant Routing Engines on page 85

CHAPTER 4

Supported Hardware

CHAPTER 5

Glossary

Glossary

B

blade bay data (BBD) 60-byte text string stored in the JCS management module NVRAM that conveys configuration information to the Routing Engines (blades) in the JCS chassis.

F

Flexible PIC Concentrator (FPC) Interface concentrator on which PICs are mounted. An FPC is inserted into a slot in a Juniper Networks router. *See also* PIC.

I

inter-PSD forwarding A configuration that enables PSDs on the JCS1200 platform to communicate on a peer-to-peer basis without requiring external links. Inter-PSD forwarding is achieved by using tunnel PICs that reside on each PSD. The PSDs communicate over logical interfaces configured on the tunnel PICs.

J

JCS management module (MM) Chassis management hardware and software included used to access and configure the Juniper Control System (JCS) platform.

JCS switch module Hardware device that connects Routing Engines in the Juniper Control System (JCS) chassis to a Juniper Networks router and controls traffic between the two devices. For redundancy, the JCS chassis can include two JCS switch modules.

Juniper Control System (JCS) OEM blade server customized to work with Juniper Networks routers. The JCS chassis holds up to 12 single Routing Engines (or 6 redundant Routing Engine pairs). The JCS1200 chassis connects to up to three T Series routers, enabling the control plane and forwarding plane of a single interconnected platform to be scaled independently.

P

PIC Physical Interface Card. A network interface-specific card that can be installed on an FPC in the router.

Protected System Domain (PSD) One or more Flexible PIC Concentrators (FPCs) on a Juniper Networks router matched with a Routing Engine (or redundant pair) on the JCS1200 platform to form a secure, virtual hardware router.

R

Root System Domain (RSD) A pair of redundant Routing Engines on a Juniper Networks router connected to the switch fabric on the Juniper Control System (JCS) platform. The configuration on the Routing Engines on a single Juniper Networks router provides the RSD identification and the configuration of up to eight Protected System Domains (PSDs).

S

shared interface A physical interface that is owned by the Root System Domain (RSD) on which logical interfaces can be shared by multiple Protected System Domains (PSDs). Each individual logical interface is assigned to a different PSD. On the PSD, each assigned logical interface is configured and peered with an uplink tunnel interface (**ut-*fpc/pic/slot***), which transports packets between the PSD and the shared interface on the RSD.

PART 2

Configuration

CHAPTER 6

Configuration Overview

Verifying the FPC BootROM Version

Before connecting the JCS1200 platform to any T Series router, ensure that the bootROM version for all FPCs on the T Series chassis is ROM Monitor Version 6.4 or later. If an FPC bootROM version is earlier than Version 6.4, the FPC will not come online. To upgrade the firmware, you must contact your Juniper Networks customer support representative. To determine if you need to upgrade the FPC firmware, display the version of the firmware on all FPCs by issuing the **show chassis firmware** command:

```
user@host> show chassis firmware

Part                    Type       Version
FPC 0                   ROM        Juniper ROM Monitor Version 7.5b4
                        O/S        Version 9.1-20080222.0 by builder on 2008-0
FPC 1                   ROM        Juniper ROM Monitor Version 6.4b18
                        O/S        Version 9.1-20080222.0 by builder on 2008-0
FPC 2                   ROM        Juniper ROM Monitor Version 7.5b4
                        O/S        Version 9.1-20080222.0 by builder on 2008-0
FPC 4                   ROM        Juniper ROM Monitor Version 6.4b18
                        O/S        Version 9.1-20080222.0 by builder on 2008-0
FPC 5                   ROM        Juniper ROM Monitor Version 6.4b20
                        O/S        Version 9.1-20080222.0 by builder on 2008-0
FPC 6                   ROM        Juniper ROM Monitor Version 7.5b4
                        O/S        Version 9.1-20080222.0 by builder on 2008-0
FPC 7                   ROM        Juniper ROM Monitor Version 6.4b20
                        O/S        Version 9.1-20080222.0 by builder on 2008-0
SPMB 0                  ROM        Juniper ROM Monitor Version 6.4b18
                        O/S        Version 9.1-20080222.0 by builder on 2008-0
SPMB 1                  ROM        Juniper ROM Monitor Version 6.4b18
                        O/S        Version 9.1-20080222.0 by builder on 2008-0
```

Related Documentation

- Keeping the JCS Management Module Default SNMP Setting on page 36
- Configuration Roadmap on page 36

Keeping the JCS Management Module Default SNMP Setting

CAUTION: By default, SNMP is enabled on the JCS management module. Do not disable SNMP. If you disable SNMP, your system might not function correctly. Also, do not erase or change the SNMP default c1 community.

Related Documentation

- Verifying the FPC BootROM Version on page 35
- Configuring SNMP Traps on page 47
- Configuration Roadmap on page 36

Configuration Roadmap

Complete the following tasks to configure the JCS1200 platform and T Series routers:

- Step One: Configure the JCS1200 Platform on page 36
- Step Two: Configure the T Series Router on page 37
- Step Three: Configure Basic System Properties on a New PSD on page 37
- Step Four: Configure Shared Interfaces (Optional) on page 38

Step One: Configure the JCS1200 Platform

To configure the JCS1200 platform, log in to the JCS management module command-line interface (CLI) and:

1. Configure basic system parameters:
   - Restore the default configuration on the JCS management module.
   - Configure the JCS management module Ethernet management interface.
   - Configure the JCS switch module Ethernet management interface.
   - Create user accounts.
   - Configure the NTP server.
   - Configure the time zone.
   - Configure the system name and contact information.
   - Configure Secure Shell (SSH) access.
   - Configure Simple Network Management Protocol (SNMP) traps.
   - Configure the JCS switch module.
2. Configure the Routing Engines (blades) on the JCS1200 platform:

- Configure Routing Engine (blade) bay data to assign a single Routing Engine (or redundant pair) to a Root System Domain (RSD) and to a unique Protected System Domain (PSD).
- Configure Routing Engine (blade) names.

Step Two: Configure the T Series Router

Log in to the master Routing Engine on the T Series router to configure it as a Root System Domain (RSD) and to create Protected System Domains (PSDs) under the RSD. Through the Junos OS CLI or through the J-Web user interface:

1. Assign an ID number to the RSD.

   This ID number must match the ID number set through the JCS management module **baydata** command.

2. Configure a PSD and assign it an ID number.
3. Provide a description of the PSD.
4. Assign one or more FPCs to the PSD.

   NOTE: Any FPC that is not assigned to a PSD belongs to the RSD. For information about how to configure shared interfaces on a SONET PIC in an unassigned FPC, see "Step Four: Configure Shared Interfaces (Optional)" on page 38.

5. Assign an ID number to the JCS1200 platform.

   The ID number must match the ID number set through the JCS management module **baydata** command.

6. Assign a Routing Engine (or redundant pair) on the JCS1200 platform to the PSD.

   Routing Engine assignments must match the assignments configured through the JCS management module **baydata** command.

7. Repeat Step 2 through Step 6 for each PSD to be configured under the RSD.
8. Repeat this entire procedure for each RSD.

Step Three: Configure Basic System Properties on a New PSD

To configure a PSD, connect to the console port on the Routing Engine on the JCS1200 platform for the PSD you want to configure and, using the Junos OS CLI, include the following information:

- Hostname
- Domain name
- Ethernet management IP addresses
- IP address of a backup router

- IP address of one or more DNS name servers on your network
- Password for the root account

Step Four: Configure Shared Interfaces (Optional)

Optionally, configure shared interfaces. Shared interfaces are configured on both the Root System Domain (RSD) and the Protected System Domain (PSD).

On the Root System Domain (RSD):

1. Configure the physical interface.
2. For SONET interfaces, configure Frame Relay encapsulation. For Ethernet interfaces, configure virtual LAN (VLAN) tagging.
3. Configure logical interfaces under the physical interface.
4. For each logical interface:
   a. Provide an identifier. For a SONET logical interface, configure a data-link connection identifier (DLCI). For an Ethernet logical interface, configure a virtual LAN (VLAN) identifier.
   b. Specify the Protected System Domain (PSD) that owns the shared interface.

On the Protected System Domain (PSD):

1. Configure the physical interface (as specified in the RSD configuration).
2. For a SONET interface, configure Frame Relay encapsulation on the physical interface to match the RSD configuration. For an Ethernet interface, configure VLAN tagging to match the RSD configuration.
3. For a SONET physical interface, configure the maximum transmission unit (MTU) size to match the RSD configuration. (If the RSD has no MTU size specified, do not include an MTU size on the PSD.)
4. Identify the physical interface as a shared interface.
5. Configure the logical interfaces that belong to the PSD (as specified in the RSD configuration).
6. On each logical interface:
   a. Configure the same DLCI (for SONET) or VLAN ID (for Ethernet) that has been specified in the RSD configuration
   b. Specify the logical tunnel interface that is peered with the logical SONET or Ethernet interface.

      The logical unit number of the tunnel interface must be the same as the one that is configured on the SONET or Ethernet interface.

   c. Configure the protocol family and IP address of the logical SONET or Ethernet interface.
7. Configure the physical tunnel interface.

8. Configure the logical tunnel interfaces under the physical interface.
9. For each logical tunnel interface, specify its peer logical SONET or Ethernet interface.

   The logical unit number must be the same as the one that is configured on the logical tunnel interface.

Related Documentation

- Configuring JCS Management Module Settings on page 43
- Configuring the JCS Switch Module on page 50
- Configuring the Routing Engine Parameters (Blade Bay Data) on page 50
- Configuring the Routing Engine (Blade) Name on page 52
- Configuring an RSD and Creating PSDs on page 82
- Configuring a PSD with a Single Routing Engine on page 83
- Configuring a PSD with Redundant Routing Engines on page 85
- Configuring Shared Interfaces on the RSD on page 91
- Configuring Shared Interfaces on a PSD on page 93

CHAPTER 7

Configuration Tasks for the JCS1200 Platform

Upgrading a JCS1200 Route Reflector to 64-Bit Junos OS

On a JCS1200 route reflector, you can install 64-bit Junos OS to improve memory and performance. However, you cannot mix a 32-bit image and a 64-bit image in the same JCS chassis. This upgrade is available only for route reflector applications. Protected System Domain is not supported.

NOTE: **You can also order a routing engine with 64-bit Junos OS image preinstalled.**

Following are the memory and Junos OS requirements:

- Memory requirements—There are no special memory requirements to use a 64-bit Junos OS on a JCS1200 route reflector. Your existing hardware configuration is sufficient for using 64-bit Junos OS.
- Junos OS release requirements—64-bit Junos OS is supported from Junos OS Release 10.3.

This topic includes the following tasks:

Downloading 64-Bit Junos OS

To download 64-bit Junos OS:

- Download the 64-bit software package from the Juniper Networks Support website at **http://www.juniper.net/support/**. Under Download Software, select either Junos (US & Canada) or Junos (Worldwide).

  To download the software package, you must have a service contract and an access account. If you need help obtaining an account, complete the registration form at the Juniper Networks website: **https://www.juniper.net/registration/Register.jsp**.

Installing 64-Bit Junos OS

To install 64-bit Junos OS:

1. Back up the currently running file system so that you can recover to a known, stable environment in case something goes wrong with the upgrade:

   user@host>**request system snapshot**

   The root file system is backed up to **/altroot**, and **/config** is backed up to **/altconfig**. The root and **/config** file systems are on the router's CompactFlash card, and the **/altroot** and **/altconfig** file systems are on the router's hard disk.

   NOTE: After you issue the **request system snapshot** command, you cannot return to the previous version of the software, because the running copy and the backup copy of the software are identical.

2. Copy the downloaded software package to the **/var/tmp** directory on the hard disk:

   user@host> **file copy ftp://***username***:prompt@ftp.***hostname***.net/***filename* **/var/tmp**

3. Add the new software package:

   user@host> **request system software add/var/tmp/** ***installation-package*** **validate**

   installation-package is the full name of the file copied in the previous step. For 64-bit Junos OS, the full name would be **jinstall64.tgz**.

   The system might display the following message:

   ```
   pkg_delete: couldn't entirely delete package
   ```

   This message indicates that someone manually deleted or changed an item that was in a package. You do not need to take any action; the package is still properly deleted.

4. Reboot the router to start the new software:

   user@host> **request system reboot**

5. After you have upgraded the software and are satisfied that the new software is properly running, issue the **request system snapshot** command to back up the new software:

   user@host> **request system snapshot**

The root file system is backed up to **/altroot**, and **/config** is backed up to **/altconfig**. The root and **/config** file systems are on the router's CompactFlash card, and the **/altroot** and **/altconfig** file systems are on the router's hard disk.

NOTE: After you issue the **request system snapshot** command, you cannot return to the previous version of the software, because the running copy and backup copy of the software are identical.

Configuring JCS Management Module Settings

You use the JCS management module CLI to configure basic system parameters on the JCS1200 platform:

Restoring the Default JCS Management Module Configuration

Before you configure the JCS management module, we recommend clearing any existing configurations on the JCS management module and restoring the defaults.

Clearing a configuration results in the following changes:

- Sets the JCS management module to its default state.

  This is equivalent to pressing the recessed button on the front panel of the JCS management module for more than 5 seconds.

- Initializes the serial port to 9600 baud.
- Initializes the internal SNMP community string.

  An SNMP community string is a text string that acts as a password. It is used to authenticate messages that are sent between the management station (the SNMP manager) and the device (the SNMP agent). The community string is included in every packet that is transmitted between the SNMP manager and the SNMP agent.

- Disables web access.

To clear an existing JCS management module configuration:

1. Log in to the JCS management module.

   If you are logging in for the first time, use the default username and password:

   ```
   Username: USERID
   ```

```
Password: PASSW0RD
```

The 0 in **PASSW0RD** is a zero, not the letter O.

2. Use the **env** command to set JCS management module 1 (**mm[1]**) as the configuration target. For example:

```
system> env —T mm[1]
```

3. Use the **clear** command to clear the configuration. For example:

```
system:mm[1]> clear —cnfg
```

This example clears the configuration on **mm[1]** and returns the JCS management module to the factory default settings.

Configuring the JCS Management Module Ethernet Interface

To configure the network interface on the JCS management module:

1. Log in to the JCS management module.
2. Use the **env** command to set JCS management module 1 (**mm[1]**) as the configuration target. For example:

```
system:mm[1]> env —T mm[1]
```

3. Use the **ifconfig** command to configure the interface. For example:

```
system:mm[1]> ifconfig —eth0 —i 192.168.171.96 —g 192.168.171.254 —s 255.255.252.0 —c static
```

In this example, Ethernet channel 0 is configured for a static IP address of **192.168.171.96** and a gateway address of **192.168.171.254**. The subnet mask is **255.255.252.0**.

NOTE: **You only need to configure the Ethernet interface on the primary management module. The backup management module will use the IP address from the primary if it becomes the primary management module.**

Configuring the Switch Module Ethernet Interface

You must configure the Ethernet interface for both JCS switch modules (**switch[1]** and **switch[2]**) on the JCS management module.

NOTE: **The IP address for the JCS switch modules must be on the same subnet as the IP address for the JCS management module.**

To configure the JCS switch module Ethernet interface on the JCS management module:

1. Log in to the JCS management module.
2. Use the **env** command to set JCS switch module 1 (**switch[1]**) as the configuration target. For example:

```
system> env —T switch[1]
```

3. Use the **ifconfig** command to configure the interface. For example:

```
system:switch[1]> ifconfig —i 192.168.171.98 —g 192.168.171.254 —s 255.255.252.0 —em
enabled —ep enabled
```

In this example, the Ethernet interface for JCS switch module 1 is configured for an IP address of **192.168.171.98** and a gateway address of **192.168.171.254**. The subnet mask is **255.255.252.0**. The external ports (**ep**) of the switch module are enabled.

4. Repeat this procedure for JCS switch module 2. Use the **env** command to set switch module 2 (**switch[2]**) as the configuration target. For example:

```
system> env —T switch[2]
```

5. Use the **ifconfig** command to configure the interface. For example:

```
system:switch[2]> ifconfig —i 192.168.171.99 —g 192.168.171.254 —s 255.255.252.0 —em
enabled —ep enabled
```

In this example, the Ethernet interface for JCS switch module 2 is configured for an IP address of **192.168.171.99** and a gateway address of **192.168.171.254**. The subnet mask is **255.255.252.0**. The external ports (**ep**) of the switch module are enabled.

Configuring User Accounts

You configure user accounts on the JCS management module to control access to the module. The JCS1200 platform supports the following types of security roles for user accounts:

- Supervisor—This role has full read and write access to the JCS1200 platform. Users can configure the JCS management module, the JCS switch module, and Routing Engines (blades) on the JCS1200 platform. You must configure at least one user to have a Supervisor role.
- Operator—This role has read-only access to the JCS platform. Users can view the configuration of the JCS management module, the JCS switch module, and the JCS Routing Engines. They can monitor JCS operations, but they cannot change the JCS configuration

You can add up to 12 users to the JCS management module. Each user you add must be assigned a unique number (**1** through **12**).

To configure user accounts:

1. Log in to the JCS management module.
2. Use the **env** command to set JCS management module 1 (**mm[1]**) as the configuration target. For example:

```
system> env —T mm[1]
```

3. Use the **users** command to configure user accounts. For example:

```
system:mm[1]> users -2 —n chang —p SPASS1 —a super
system:mm[1]> users —3 —n markham —p OPASS1 —a operator
```

In these examples, User 2 is configured with a username (**chang**) and a password (**SPASS1**). User 2 has **Supervisor** access (full read/write). User 3 is configured with a username (**markham**) and a password (**OPASS1**). User 2 has **Operator** access (read-only).

Configuring the NTP Server

To synchronize the JCS1200 platform with other servers on the network, you must configure a Network Time Protocol (NTP) server.

To configure an NTP server:

1. Log in to the JCS management module.
2. Use the **env** command to set JCS management module 1 (**mm[1]**) as the configuration target. For example:

   ```
   system> env —T mm[1]
   ```
3. Use the **ntp** command to configure an NTP server. For example:

   ```
   system:mm[1]> ntp —i 172.17.28.5 —f 60 —en enabled
   ```
   In this example, the IP address of the NTP server is **172.17.28.5**, the JCS management module clock is updated by the NTP server every **60** minutes, and NTP is enabled.

Configuring the Time Zone

To configure the time zone on the JCS management module:

1. Log in to the JCS management module.
2. Use the **env** command to set JCS management module 1 (**mm[1]**) as the configuration target. For example:

   ```
   system> env —T mm[1]
   ```
3. Use the **clock** command to configure the time zone. For example:

   ```
   system:mm[1]> clock —g —8 —dst uc
   ```
   In this example, the clock is configured for 8 hours earlier than UTC (GMT) (**-g -8**), and daylight saving time for the USA and Canada (**-dst uc**) is set.

Configuring the System Name and Contact Information

JCS management module configuration should include the system name of the JCS 1200 platform (to identify the JCS1200 platform on the network), the physical location of the JCS1200 platform, and a contact person for the JCS1200 platform. Typically, the contact is someone who has Supervisor access to the JCS1200 platform.

To configure the system name, location, and contact information for the JCS management module:

1. Log in to the JCS management module.
2. Use the **env** command to set JCS management module 1 (**mm[1]**) as the configuration target. For example:

   ```
   system> env —T mm[1]
   ```
3. Use the **config** command to configure the system name, location, and contact information for the JCS. For example:

   ```
   system:mm[1]> config -name system5 -contact “George Chang email=chang@corp.net
   phone=x2368” —loc “Software Lab, Main Campus, Building 12”
   ```

In this example, the system name is **system5**. This name identifies the JCS on the network, appears in monitoring command output, and so on. The contact information is for **George Chang** and the location is **Software Lab**.

Configuring SNMP Traps

The Simple Network Management Protocol (SNMP) enables the monitoring of network devices from a central location. This section describes how to configure SNMP traps on the JCS management module.

Tasks to configure SNMP traps and alerts on the JCS management module are:

- Configuring the SNMP Community on page 47
- Configuring Alert Entries for SNMP Traps on page 47
- Configuring Monitored Alerts for SNMP Traps on page 48

Configuring the SNMP Community

The SNMP community defines the relationship between an SNMP server system and client systems. To configure the SNMP community, set the community name and type. Also set the IP address for the community.

To configure the SNMP community:

1. Log in to the JCS management module.
2. Use the **env** command to specify **mm[1]** as the configuration target. For example:

   ```
   system> env -T mm[1]
   ```
3. Use the **snmp** command to configure the SNMP community. For example:

   ```
   system:mm[1]> snmp -c3 trap
   system:mm[1]> snmp -c3i1 192.168.171.100 -ca3 trap
   ```

   In this example, the community 3 name is **trap**, the IP address of the trap destination is **192.168.171.100**, and the community 3 type is **trap**.

CAUTION: **By default, SNMP is enabled on the JCS management module. Do not disable SNMP. If you disable SNMP, your system might not function correctly. Also, do not erase or change the SNMP default c1 community.**

Configuring Alert Entries for SNMP Traps

To use SNMP notifications on the JCS management module, you must specify the alert recipient. These recipients indicate where network registrar notifications are directed. Alert recipients are numbered from 1 through 12.

To configure the alert recipient:

1. Log in to the JCS management module.
2. Use the **env** command to specify **mm[1]** as the configuration target. For example:

```
system> env -T mm[1]
```

3. Use the **alertentries** command to configure the alert recipient. For example:

```
system:mm[1]> alertentries -1 -n trap -status on -f none -t snmp
```

In this example, the alert recipient number is **1**, the recipient is named **trap**, the alert status is **on**, alert filtering is **none** (all alerts are received, not just critical alerts), and the alert type is **SNMP**.

Configuring Monitored Alerts for SNMP Traps

In addition to specifying alert recipients for SNMP notifications, you can configure particular enhanced alert categories (monitored alerts), which enable you to selectively choose alerts.

To configure monitored alerts:

1. Log in to the JCS management module.
2. Use the **env** command to specify **mm[1]** as the configuration target. For example:

```
system> env —T mm[1]
```

3. Use the **monalerts** command to configure the monitored alerts. For example:

```
system:mm[1]> monalerts —ec enabled
system:mm[1]> monalerts —ca enabled, —wa enabled —ia enabled
```

In this example, the enhanced alert categories are enabled. All critical (**ca**), warning (**wa**), and informational (**ia**) alerts are enabled.

Related Documentation

- alertentries on page 54
- env on page 63
- monalerts on page 70
- snmp on page 75

Configuring SSH Access

Secure Shell, or SSH, is a network protocol that allows data to be exchanged over a secure channel between two systems. This section describes how to use JCS commands to configure SSH access to the JCS1200 platform.

Tasks to configure SSH include:

- Generating the Host Key on page 49
- Adding the User Public Key on page 49

Generating the Host Key

SSH access requires a host key and a user public key.

To generate the host key:

1. Use an existing username and password to connect to the JCS management module serial port. For example:

   ```
   tcsh-1:telnet bcgmm1-con
   ```

   In this example, the serial port is connected to a telnet server port identified as **bcgmm1-con**.

2. Use the **env** command to specify **mm[1]** as the configuration target. For example:

   ```
   system> env —T mm[1]
   ```

3. Use the **sshcfg** command to generate a host key. For example:

   ```
   system:mm[1]> sshcfg —hk gen
   ```

   It takes about 1 minute to generate a host key.

4. You can use the **displaylog** command to monitor host key generation. For example:

   ```
   system:mm[1]> displaylog —f
   ```

5. Once the host key is generated, use the **sshcfg** command to enable SSH for the JCS CLI. For example:

   ```
   system:mm[1]> sshcfg —cstatus enabled
   ```

Adding the User Public Key

To generate a user public key:

1. See the “Generating the Host Key” section to generate a host key.
2. Locate the **/.ssh/authorized_keys** file and copy your public key from this file.
3. Use the **users** command to add your public key.

   You copy the public key from the **authorized_keys** file and paste it on the command line. For example:

   ```
   system:mm[1]> users —2 —pk —1 —add paste-key-here
   ```

4. Issue the **users** command to verify that the public key has been installed. For example:

   ```
   system:mm[1]> users —2

   - n chang
   - a Role:supervisor
    ...
   Number of SSH public keys installed for this user: 1
   Last login: 1/28/08 09:26:59
   ```

5. Log out, and then use SSH to log back in. For example:

   ```
   system:mm[1]> exit
   tcsh-1 ssh bcgmm1
   ```

   In this example, the JCS management module Ethernet port is identified as **bcgmm1**.

Related Documentation

- displaylog on page 206
- env on page 63
- sshcfg on page 77
- users on page 79

Configuring the JCS Switch Module

The JCS switch module in the JCS chassis connects JCS Routing Engines to a T Series router. For redundancy, the JCS chassis includes two JCS switch modules. The JCS switch module is preconfigured with defaults, and the configuration should not be changed. A script is available to complete switch configuration. This script enables you to configure the following items on the switch module:

- Network Time Protocol (NTP)—The JCS switch module does not have a real-time clock. You must configure NTP so that the system clock on the JCS switch module has the correct time. The script sets the IP address for the NTP server, enables the NTP server, and sets the time zone for the switch module.
- SNMP traps—The script also configures SNMP trap information for the switch module. This includes setting the SNMP community name and type and specifying alert recipients.

For more information on the JCS switch configuration script, see the *Junos OS Release Notes*.

NOTE: **JCS switch module configuration is not replicated across switch modules. You must run the configuration script on both JCS switch modules.**

Related Documentation

- Configuring JCS Management Module Settings on page 43
- Configuring the Routing Engine Parameters (Blade Bay Data) on page 50
- Configuring the Routing Engine (Blade) Name on page 52

Configuring the Routing Engine Parameters (Blade Bay Data)

To pass system configuration information to the Routing Engines on the JCS, you must configure the blade bay data. Blade bay data is stored as a 60-byte text string that contains information about how the Routing Engines on the JCS1200 platform are mapped to PSDs and to the RSD. The blade bay mapping information is passed from the JCS management module to the appropriate Routing Engine, so that it is available when the Junos OS boots.

You enter a blade bay data string for each primary and standby Routing Engine on the JCS chassis.

Blade bay data is entered as a text string with the following format. See Table 6 on page 51 for details.

V*n*-JCS*n*-SD*n*-PSD*n*-REP*n*-REB*n*-PRD*platform-type*

n is a number. ***platform-type*** is the routing platform type (**T1600**, **T640**, or **T320**).

Table 6: Format Requirements for Blade Bay Data

Item	Description
V	Version number of the blade bay data. The accepted value is **01**.
JCS	JCS identifier. The range of values is **01** through **04**. The value for this parameter must match the value set by the control-system-id statement configured through the Junos OS CLI.
SD	RSD identifier. The range of values is **01** through **03**. The value for this parameter must match the value set by the root-domain-id statement configured in the Junos OS CLI.
PSD	PSD identifier. Each identifier must be unique. The value range is **01**-**31**. The value for this parameter must match the value set by the protected-system-domains statement configured through the Junos OS CLI.
REP	Slot identifier of the primary Routing Engine. The value range is **01** through **12**. In the absence of any Junos OS CLI configuration that affects mastership, the Routing Engine in the slot indicated by REP will boot as the master, and the Routing Engine in slot REB will boot as the backup. The value for this parameter must match the value set by the control-slot-numbers statement configured through the Junos OS CLI.
REB	Slot identifier of the backup Routing Engine. Typically, the value range is **01** through **12**. Use **00** if no backup Routing Engine is installed. In the absence of any Junos OS CLI configuration that affects mastership, the Routing Engine in the slot indicated REB will boot as the backup.
PRD	Routing platform type. The accepted values are **T1600**, **T640**, **T320**, or **SCE** (standalone control element).

To enter the blade bay data:

1. Log in to the JCS management module.
2. Use the **baydata** command to configure the blade bay data. For example:

   baydata -b 1 -data "V01–JCS01–SD01–PSD01–REP01–REB02–PRDT640"
   baydata -b 2 -data "V01–JCS01–SD01–PSD01–REP01–REB02–PRDT640"

   The bay data slots are Routing Engine slots 1 through 12 on the JCS chassis. In this example, the blade bay data is configured for the Routing Engine in slot 1 and the Routing Engine in slot 2. Blade 1 is the primary Routing Engine of PSD 1. Blade 2 is the backup Routing Engine of PSD 1. PSD 1 is connected to RSD 1, and RSD 1 is a T640 router.
3. Repeat this procedure for each Routing Engine on the JCS1200 platform.

Related Documentation

- Configuring an RSD and Creating PSDs on page 82
- baydata on page 56

Configuring the Routing Engine (Blade) Name

JCS configuration should include a name for each Routing Engine (blade) included with the JCS1200 platform. This name is used to identify each Routing Engine in CLI command output and so on.

To configure the blade name information:

1. Log in to the JCS management module.
2. Use the **env** command to specify the blade you want to configure. For example:

   ```
   system> env -T blade[1]
   ```
3. Use the **config** command to configure the blade name. For example:

   ```
   system:blade[1]> config -name BLADE01
   ```

   In this example, the blade name is **BLADE01**. This name identifies the JCS Routing Engine on the network, and it appears in monitoring command output.

Related Documentation

- env on page 63
- config on page 61

CHAPTER 8

JCS Management Module Configuration Commands

alertentries

Syntax **alertentries -T system:mm[*x*] -*recipient-number* <-f *filter-type*> <-n *recipient-name*> <-status (on | off)> <-t snmp>**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Display or configure the recipients of SNMP alerts generated by the JCS management module.

Options **-T system:mm[*x*]**—Specify a JCS management module as the command target. Replace *x* with the primary management module number (**1** or **2**).

-*recipient-number*—Create or specify an alert recipient. Each alert recipient you create must have a unique number (**1** through **12**).

-f *filter-type*—(Optional) Filter the type of alerts received by the alert recipient. Replace ***filter-type*** with a value of **critical** (receive critical alerts only) or **none** (no filtering, receive all alerts).

-n *recipient-name*—(Optional) Specify the name of the alert recipient. Recipient names can be up to 31 characters in length. The name can include any character (including spaces), except for less than (**<**) and greater than (**>**) symbols.

-status (on | off)—(Optional) Set alert status for the specified alert recipient. When the status is **on**, the recipient receives alarm notifications. When the status is **off**, the recipient does not receive alarm notifications.

-t snmp—(Optional) Sets SNMP as the alert notification method for the specified alert recipient.

Required Privilege Level operator (display)
supervisor (display or configure)

Related Documentation

- Configuring SNMP Traps on page 47
- monalerts on page 70
- snmp on page 75

List of Sample Output

alertentries (Display) on page 55
alertentries (Configure) on page 55

Output Fields Table 7 on page 54 lists the output fields for the **alertentries** command. Output fields are listed in the approximate order in which they appear.

Table 7: alertentries Output Fields

Field Name	Field Description
-status	Alert status for the specified recipient. Alert status is **on** or **off**.

Table 7: alertentries Output Fields *(continued)*

Field Name	Field Description
-n	Name of the specified alert recipient.
-f	Type of alerts received by the specified alert recipient.
-t	Alert notification method.

Sample Output

alertentries (Display)

```
system> alertentries -T system:mm[1] -2
–status on
-n test1
-f critical
-t snmp
```

alertentries (Configure)

```
system> alertentries -T system:mm[1] -3 -f none -n trap -status on -t snmp
OK
```

baydata

Syntax **baydata <–b *n*> (-clear | -data “*data-definition*”)**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Display, configure, or remove informational data (blade bay data) associated with Routing Engine blades.

NOTE: When a blade restarts, the status should change from “BSMP” to “Supported”. The "Supported" status indicates that the blade has been restarted since the last baydata change for that blade, and it should have the proper baydata configuration information. However, if the management module (MM) is reset, all blades will show a "BSMP" status, because the MM does not know if the blades have current baydata information after a restart. As individual blades are restarted, their status should change to "Supported".

Options **-b *n***—(Optional) Specify a specific Routing Engine. Replace ***n*** with the Routing Engine slot number (**1** through **12**). If a Routing Engine is not specified, the command applies to all Routing Engines in the JCS chassis.

–clear—Remove the blade bay data definition.

-data “*data-definition*”—Set the blade bay data. Blade bay data is an ASCII text string with the following format: **V*n*-JCS*n*-SD*n*-PSD*n*-REP*n*-REB*n*-PRD*platform-type***. Enclose the text string in double quotation marks (” “).

- **V*n***—Version number of the blade bay data. Replace ***n*** with a version number. The accepted value is **01**.
- **JCS*n***—JCS identifier. Replace ***n*** with the ID number of the JCS. The range of values is **01** through **04.**
- **SD*n***—RSD identifier. Replace ***n*** with the ID number of the RSD. The range of values is **01** through **03**.
- **PSD*n***—PSD identifier. Replace ***n*** with the ID number of the PSD. The range is **01** through **31**.
- **REP*n***—Slot number of the primary Routing Engine in a primary, backup Routing Engine pair. Replace ***n*** with the slot number of the Routing Engine. The range is **01** through **12**.
- **REB*n***—Slot number of the backup Routing Engine in a primary, backup Routing Engine pair. Replace ***n*** with the slot number of the Routing Engine. The range is **01** through **12**.
- **PRD*platform-type***—Routing platform type. Replace ***platform-type*** with one of the following values: **T1600**, **T640**, **T320,** or **SCE** (standalone control element).

Required Privilege Level supervisor

Related Documentation
- Configuring the Routing Engine Parameters (Blade Bay Data) on page 50
- control-slot-numbers on page 110
- control-system-id on page 111
- root-domain-id on page 115

List of Sample Output

Output Fields Table 8 on page 57 lists the output fields for the **baydata** command. Output fields are listed in the approximate order in which they appear.

Table 8: baydata Output Fields

Field Name	Field Description
Bay	Slot number of the Routing Engine (blade).
Status	Status of the Routing Engine.
Definition	Blade bay data (if any) assigned to the Routing Engine.

Sample Output

baydata (Display)

```
system> baydata
Bay    Status           Definition
1      Unsupported
2      No blade present
3      Supported         V01-JCS01-SD01-PSD01-REP03-REB04-PRDT640
4      Supported         V01-JCS01-SD01-PSD01-REP03-REB04-PRDT640
5      Supported         V01-JCS01-SD01-PSD01-REP05-REB06-PRDT640
6      Supported         V01-JCS01-SD01-PSD01-REP05-REB06-PRDT640
7      No blade present
8      No blade present
9      No blade present
10     No blade present
11     No blade present
12     No blade present
```

baydata (Configure a Routing Engine)

```
system> baydata —b 05 —data “V01-JCS01-SD01-PSD01-REP05-REB06-PRDT1600”
OK
```

baydata (Clear a Routing Engine)

```
system> baydata –b 06 —clear
OK
```

baydata (Clear All Routing Engines)

```
system> baydata —clear
```

OK

clear

Syntax **clear -config -T system:mm[*x*]**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Restore the JCS management module configuration to the default settings.

NOTE: **Use this command to clear the JCS management module configuration only. Do not clear the JCS switch module configuration.**

Options **-config**—Specify the configuration is to be cleared.

-T system:mm[*x*]—Specify the management module as the target of the command (the configuration to be cleared). Replace *x* with a value of **1** or **2**.

Required Privilege Level supervisor

Related Documentation
- Restoring the Default JCS Management Module Configuration on page 43
- power on page 218

List of Sample Output clear on page 59

Output Fields No results are returned from this command. After the JCS management module resets, you must start a new CLI session.

Sample Output

clear

```
system> clear —config –T system:mm[1]
```

clock

Syntax **clock <-d *date*> <-dst *dst-mode*> <-g *offset*> <-t *time*> -T system:mm[*x*]**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Display or configure the JCS management module clock settings.

Options **-d *date***—(Optional) Current calendar date in ***mm/dd/yyyy*** format.

-dst *dst-mode*—(Optional) Daylight saving mode for the clock. Choices include:

- off—Daylight saving time is off (Standard time)
- uc—United States and Canada
- others—Nonstandard daylight saving time (outside the United States and Canada)

-g *offset*—(Optional) UTC (GMT) offset, in hours. Replace ***offset*** with a value from **-12** to **+12**.

-t *time*—(Optional) Current time in 24–hour ***hh:mm:ss*** format.

-T system:mm[*x*]—Specify the JCS management module as the target of the command. Replace ***x*** with a value of **1** or **2**.

Required Privilege Level operator (display)
supervisor (display or configure)

Related Documentation
- Configuring the Time Zone on page 46

List of Sample Output
clock (Display) on page 60
clock (Configure) on page 60

Output Fields When you enter this command, you are provide with feedback on the status of your request.

Sample Output

clock (Display)

```
system> clock –T system:mm[1]
03/31/2008 16:27:11 GMT+5:00 dst uc
```

clock (Configure)

```
system> clock -d 04/01/2008 -t 22:12:04 dst uc –T system:mm[1]
OK
```

config

Syntax **config -T *target* <-contact "*contact-name*"> <-name *name*> <-loc "*location*">**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Display configuration information or configure a device on the JCS1200 platform.

Options **-T *target***—Specify the target of the command. Command targets include:

- **system:mm[*x*]**—JCS management module. Replace ***x*** with a value of **1** or **2**.
- **system:blade[*x*]**—JCS Routing Engine (blade). Replace ***x*** with a value of **1** through **12**.

-contact "*contact-hame*"—(Optional) JCS management module only. Specify a contact name for the primary JCS management module. Contact names must be enclosed in double quotation marks (" ") and can be up to 47 characters. Contact names can contain any character except for less than (<) and greater than (>) symbols.

-name *name*—(Optional) Specify a device name. The device name can be up to 15 characters.

Routing Engine names can contain any character except for less than (<) and greater than (>) symbols.

JCS management module names can contain only alphanumeric characters, hyphens (–), pound signs (#), underscores (_), and periods (.).

NOTE: **Unlike the contact name and location, the device name is not enclosed in quotation marks.**

-loc "*location*"—(Optional) JCS management module only. Specify the location of the primary JCS management module. The location must be enclosed in double quotation marks (" ") and can be up to 47 characters. A location can contain any character except for less than (<) and greater than (>) symbols.

Required Privilege Level operator (display)
supervisor (display or configure)

Related Documentation
- Configuring the System Name and Contact Information on page 46
- Configuring the Routing Engine (Blade) Name on page 52

List of Sample Output
config (Display) on page 62
config (Configure a JCS Management Module) on page 62
config (Configure a Routing Engine) on page 62

Output Fields Table 9 on page 62 lists the output fields for the **config** command. Output fields are listed in the approximate order in which they appear.

Table 9: config Output Fields

Field Name	Field Description
Name	Device name
Contact	Contact name for the primary JCS management module
Loc	Location of the primary JCS management module

Sample Output

config (Display)

```
system> config –T system:mm[1]
–name QA-Prototype
-contact John Markham
-loc QA Lab
```

config (Configure a JCS Management Module)

```
system> config –T system:mm[1] -contact “George Chu x2556” -name SW-MM1 -loc “SW Lab”
OK
```

config (Configure a Routing Engine)

```
system> config –T system:blade[2] -name QA-Blade2
OK
```

env

Syntax **env -T *target***

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Set the persistent environment for commands you enter in the JCS management module. Commands entered during the remainder of the login session apply to this target, unless you specify a new command target.

Options **-T *target***—Specify the target of the command. Command targets include:

- **system**—JCS1200 platform. This is the default command target.
- **system:mm[*x*]**—JCS management module. Replace ***x*** with a value of **1** or **2**.
- **system:switch[*x*]**—JCS switch module. Replace ***x*** with a value of **1** or **2**.
- **system:blade[*x*]**—JCS Routing Engine (blade). Replace ***x*** with a value of **1** through **12**.
- **system:power[*x*]**—JCS power supply. Replace ***x*** with a value of **1** through **4**.
- **system:blower[*x*]**—JCS fan (blower). Replace ***x*** with a value of **1** through **4**.
- **system:mt[*x*]**—JCS media tray. Replace ***x*** with a value of **1** or **2**.

Required Privilege Level operator

Related Documentation
- JCS1200 Software Components on page 23

List of Sample Output env (JCS Management Module) on page 63

Output Fields When you enter this command, you are provided feedback on the status of your request. The command prompt changes to reflect the new command target.

Sample Output

env (JCS Management Module)

```
system> env –T system:mm[1]
OK
system:mm[1]>
```

exit

Syntax **exit -T system:mm[*x*]**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Terminate the current CLI session.

Options **-T system:mm[*x*]**—Specify a JCS management module as the target of the command. Replace ***x*** with a value of **1** or **2**.

Required Privilege Level operator

Related Documentation
- JCS1200 Software Components on page 23

List of Sample Output exit on page 64

Output Fields When you enter this command, no feedback is provided. Instead, the user login prompt appears.

Sample Output

exit

```
system> exit –T system:mm[1]
username:
```

help

Syntax **[help | ?]**

<*command* [–help | -h | ?]>

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Display a list of available commands with a brief description of each command. You can also add a **–help**, **-h**, or **?** option to a command to display help for the command.

Options ***command* [-help | -h | ?]**—(Optional) Specify help for a specific command.

Required Privilege Level operator

Related Documentation
- JCS1200 Software Components on page 23

List of Sample Output help on page 65

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

help

```
system> help
? – Display commands
accseccfg – View/edit account security config
advfailover – View/edit advanced failover mode
alarm – Manage Telco System Management alarm(s)
alertcfg – Displays/Configures the global remote alert systems
alertentries – View/edit remote alarm recipients
baydata – View/edit Blade Bay Data string
...
```

ifconfig (JCS Management Module)

Syntax **ifconfig -T system:mm[*x*] (-eth0 | -eth1) <enabled | disabled> <-c static> <-g *gateway-address*> <-i *static-ip-address*> <-s *subnet-mask*>**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Configure or display the JCS management module Ethernet interface.

Options **-T system:mm[*x*]**—Specify a JCS management module as the command target. Replace *x* with the primary management module number (**1** or **2**). The JCS management module is the only valid target available for this command.

-eth0 | -eth1—Specify Ethernet channel 0 or Ethernet channel 1.

enabled | disabled—(Optional) Enable or disable the Ethernet interface on the JCS management module.

-c static—(Optional) Specify static IP configuration.

-g *gateway-address*—(Optional) Gateway IP address of the Ethernet interface on the JCS management module.

-i *static-ip-address*—(Optional) Static IP address of the Ethernet interface on the JCS management module.

-s *subnet-mask*—(Optional) Subnet mask of the Ethernet interface on the JCS management module.

Required Privilege Level operator (display)
supervisor (display or configure)

Related Documentation
- Configuring the JCS Management Module Ethernet Interface on page 44

List of Sample Output ifconfig (Display) on page 67
ifconfig (Configure) on page 67

Output Fields Table 10 on page 66 lists the output fields for the **ifconfig** command. Output fields are listed in the approximate order in which they appear.

Table 10: ifconfig Output Fields

Field Name	Field Description
-i	IP address of the Ethernet interface on the JCS management module.
-g	Gateway IP address of the Ethernet interface on the JCS management module.

Table 10: ifconfig Output Fields *(continued)*

Field Name	Field Description
-s	Subnet mask of the Ethernet interface on the JCS management module.
-c	Configuration method (**static**) for the Ethernet interface on the JCS management module.

Sample Output

ifconfig (Display)

```
system> ifconfig -T system:mm[1] -eth0
Enabled
-i 192.168.171.96
-g 192.168.171.254
–s 255.255.252.0
-c static
```

ifconfig (Configure)

```
system> ifconfig -T system:mm[1] —eth0 -c static —i 157.210.171.96 -g 157.210.171.254 —s
255.255.252.0
OK
```

ifconfig (JCS Switch Module)

Syntax **ifconfig -T system:switch[*x*] <-c static> <-em (enabled | disabled)> <-ep (enabled | disabled)> <-g *gateway-address*> <-i *static-ip-address*> <-s *subnet-mask*>**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Configure or display the JCS switch module Ethernet interface.

Options **-T system:switch[*x*]**—Specify a JCS switch module as the command target. Replace ***x*** with the primary management module number (**1** or **2**). The JCS switch module is the only valid target available for this command.

NOTE: **For redundancy, you must configure the Ethernet interface for both JCS switch modules.**

-c static—(Optional) Specify static IP configuration.

-em (enabled | disabled)—(Optional) Enable or disable external management of all ports on the JCS switch module.

-ep (enabled | disabled)—(Optional) Enable or disable external ports on the JCS switch module.

-g *gateway-address*—(Optional) Gateway IP address of the Ethernet interface on the JCS switch module.

-i *static- ip-address*—(Optional) Static IP address of the Ethernet interface on the JCS switch module.

-s *subnet-mask*—(Optional) Subnet mask of the Ethernet interface on the JCS switch module.

Required Privilege Level operator (display)
supervisor (display or configure)

Related Documentation
- Configuring the Switch Module Ethernet Interface on page 44

List of Sample Output
ifconfig (Display) on page 69
ifconfig (Configure) on page 69

Output Fields Table 11 on page 69 lists the output fields for the **ifconfig** command. Output fields are listed in the approximate order in which they appear.

Table 11: ifconfig Output Fields

Field Name	Field Description
-i	IP address of the Ethernet interface on the JCS switch module.
-g	Gateway IP address of the Ethernet interface on the JCS switch module.
-s	Subnet mask of the Ethernet interface on the JCS switch module.
-c	Configuration method (**static**) for the Ethernet interface on the JCS switch module.

Sample Output

ifconfig (Display)

```
system> ifconfig -T system:switch[1]
-i 192.168.171.96
-g 192.168.171.254
–s 255.255.252.0
-c static
```

ifconfig (Configure)

```
system> ifconfig -T system:switch[1] -c static –em enabled —ep enabled —i 157.210.171.98 -g
157.210.171.254 —s 255.255.252.0
OK
```

monalerts

Syntax **monalerts -T system:mm[*x*] <-ca (enabled | disabled)> <-ec (enabled | disabled)> <-ia (enabled | disabled)> <-wa (enabled | disabled)>**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Display or configure alerts monitored by the JCS management module.

Options **-T system:mm[*x*]**—Specify a JCS management module as the command target. Replace *x* with the primary management module number (**1** or **2**).

-ca (enabled | disabled)—(Optional) Enable or disable monitoring of all critical alerts.

-ec (enabled | disabled)—(Optional) Enable or disable enhanced legacy alert categories. When enhanced legacy alert categories are enabled, alerts can be configured using the **monalerts** command.

NOTE: **Make sure enhanced legacy alerts are enabled for the JCS1200 platform.**

-ia (enabled | disabled)—(Optional) Enable or disable monitoring of all informational alerts.

-wa (enabled | disabled)—(Optional) Enable or disable monitoring of all warning alerts.

Required Privilege Level operator (display)
supervisor (display or configure)

Related Documentation
- Configuring SNMP Traps on page 47
- alertentries on page 54
- snmp on page 75

List of Sample Output monalerts (Display) on page 71
monalerts (Configure) on page 71

Output Fields Table 12 on page 70 lists the output fields for the **monalerts** command. Output fields are listed in the approximate order in which they appear.

Table 12: monalerts Output Fields

Field Name	Field Description
-ca	Status (**enabled** or **disabled**) of critical alert monitoring.

Table 12: monalerts Output Fields *(continued)*

Field Name	Field Description
-ec	Status (**enabled** or **disabled**) of enhanced legacy alert categories. When enabled, legacy alert categories can be configured with the **monalerts** command.
-ia	Status (**enabled** or **disabled**) of informational alert monitoring.
-wa	Status (**enabled** or **disabled**) of warning alert monitoring.

Sample Output

monalerts (Display)

```
system> monalerts -T system:mm[1]
-ca enabled
-ec enabled
-ia disabled
-wa disabled
```

monalerts (Configure)

```
system> monalerts -T system:mm[1] -ia enable -wa enable
OK
```

mt

Syntax **mt -T system <-b *n*>**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Configure or display the Routing Engine (blade) that is in control of the JCS media tray (mt). You can use the media tray to copy Junos OS from a USB device to a Routing Engine installed in the JCS chassis.

Options **-T system**—Display the media tray owner.

-b *n*—(Optional) Configure which Routing Engine controls (owns) the media tray. Replace ***n*** with a value of **1** through **12** to indicate the slot number of the Routing Engine to which you want to assign control of the media tray.

Required Privilege Level operator (display)
supervisor (display or configure)

Related Documentation
- Troubleshooting a Routing Engine on the JCS1200 Platform on page 245

List of Sample Output
mt (Configure) on page 72
mt (Display) on page 72

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

mt (Configure)

```
system:mm[1]> mt -T system —b 12

OK
```

mt (Display)

```
system:mm[1]> mt -T system

-b 12
```

ntp

Syntax **ntp -T system:mm[*x*] <-en (enabled | disabled)> <-i *ip-address* | *hostname*> <-f *update-frequency*> <-synch>**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Configure or display the JCS management module network time protocol (NTP) settings.

Options **-T system:mm[*x*]**—Specify a JCS management module as the command target. Replace *x* with the primary management module number (**1** or **2**). The JCS management module is the only valid target available for this command.

-en (enabled | disabled)—(Optional) Enable or disable NTP for the JCS management module.

-i *ip-address*|*hostname*—(Optional) IP address or hostname of the NTP server.

-f *update-frequency*—(Optional) Update frequency (in minutes). The JCS management module clock is automatically updated at the frequency specified. Replace ***update-frequency*** with a value from **1** through **45000**.

-synch—(Optional) Synchronize the JCS management module clock with the NTP server.

Required Privilege Level operator (display)
supervisor (display or configure)

Related Documentation
- Configuring the NTP Server on page 46

List of Sample Output
ntp (Display) on page 74
ntp (Configure) on page 74

Output Fields Table 13 on page 73 lists the output fields for the **ntp** command. Output fields are listed in the approximate order in which they appear.

Table 13: ntp Output Fields

Field Name	Field Description
-en	NTP status (**enabled** or **disabled**).
-i	IP address or hostname of the NTP server.
-f	How often (in minutes) the JCS management module is updated by the NTP server.
-v3en	V3 authentication status (**enabled** or **disabled**) between the JCS management module and the NTP server.

Sample Output

ntp (Display)

```
system> ntp -T system:mm[1]
-en enabled
-i timeserver
-f 5
-v3en disabled
```

ntp (Configure)

```
system> ntp -T system:mm[1] -en enable -I timeserver2 -f 15
OK
```

snmp

Syntax snmp -T system:mm[*x*] <-ca*x community-type*> <-c*x community-name*> <-cx*in* (*ip-address* | *hostname*)> <-cn *contact-name*> <-l *location*>

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS1200 platform only) Display or configure SNMP settings on the JCS management module.

Options

-T system:mm[*x*]—Specify the JCS management module as the target of the command. Replace *x* with a value of **1** or **2**.

-ca*x community-type*—(Optional) Specify an SNMPv3 view type for the community. View types can be **get**, **set**, or **trap**. Replace *x* with a value of **1** through **3** to represent the community number.

-c*x community-name*—(Optional) Specify a descriptive name for the community. Replace *x* with a value of **1** through **3** to represent the community number.

-cx*in* (i*p-address* | *hostname*)—(Optional) Specify an IP address or hostname for the community. Replace *x* with a value of **1** through **3** to represent the community number. Replace *n* with a value of **1** through **3** to represent the host ranking (first, second, or third). You can specify up to three hosts for each community.

-cn *contact-name*—(Optional) Specify a contact name for the SNMP community host server.

-l *location*—(Optional) Specify a location for the SNMP community host server.

Required Privilege Level operator (display)
supervisor (display or configure)

Related Documentation

- Configuring SNMP Traps on page 47
- alertentries on page 54
- monalerts on page 70

List of Sample Output

snmp (Display) on page 76
snmp (Configure) on page 76

Output Fields Table 14 on page 75 lists the output fields for the **snmp** command. Output fields are listed in the approximate order in which they appear.

Table 14: snmp Output Fields

Field Name	Field Description
a	Status of the SNMP agent (enabled or disabled)

Table 14: snmp Output Fields *(continued)*

Field Name	Field Description
t	Status of the SNMP traps (enabled or disabled)
cx	Descriptive name for the community
cxin	IP address and ranking of the community host
cn	Contact name for the SNMP community host server
-l	Location of the SNMP community host server

Sample Output

snmp (Display)

```
system> snmp -T system:mm[1]
To be provided.
```

snmp (Configure)

```
system> snmp -T system:mm[1] -ca1 trap -c1 Traps -c3i1 192.168.171.100
OK
```

sshcfg

Syntax **sshcfg -T system:mm[*x*] <-cstatus (enabled | disabled)> <-hk (rsd | dsa | gen)> <-v1 (on | off)>**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS1200 platform only) Display or configure SSH access on the JCS management module.

Options **-T system:mm[*x*]**—Specify the JCS management module as the target of the command. Replace *x* with a value of **1** or **2**.

-cstatus (enabled | disabled)—(Optional) Enable or disable the SSH server on the JCS management module.

-hk gen—(Optional) Generate a host key for the JCS management module.

-hk (rsa | dsa)—(Optional) Display RSA or DSA host key information for the JCS management module.

-v1 (on | off)—(Optional) Enable or disable SSH v1 on the JCS management module. (SSH v2 is always enabled.)

Required Privilege Level operator (display)
supervisor (display or configure)

Related Documentation
- Configuring SSH Access on page 48

List of Sample Output
sshcfg (Display) on page 78
sshcfg (Configure) on page 78

Output Fields Table 15 on page 77 lists the output fields for the **sshcfg** command. Output fields are listed in the approximate order in which they appear.

Table 15: sshcfg Output Fields

Field Name	Field Description
v1	SSH v1 status (**On** or **Off**). SSH v2 is always enabled (**On**).
cstatus	Status of the CLI SSH server (enabled or disabled).
CLI SSH port	Port number assigned to the CLI SSH server.
sstatus	Status of the SMASH (secure mashup) SSH server (enabled or disabled).
SMASH SSH port	Port number assigned to the SMASH SSH server.

Table 15: sshcfg Output Fields *(continued)*

Field Name	Field Description
ssh-dss	DSS fingerprint for the SSH server. This fingerprint is used to verify the authenticity of the server.
ssh-rsa	RSA fingerprint for the SSH server. This fingerprint is used to verify the authenticity of the server.
***x* SSH public keys**	Number of SSH public keys installed.
***x* Locations**	Number of locations available to store SSH public keys.

Sample Output

sshcfg (Display)

```
system> sshcfg -T system:mm[1]
-v1 off
-cstatus enabled
CLI SSH port 22
-sstatus disabled
SMASH SSH port 50024
ssh-dss 2048 bit fingerprint: 27:ee:bd:a9:27:28:d8:a5:93:03:3d:8e:77:d0:38:2c
ssh-rsa 2048 bit fingerprint: 66:c9:73:4f:18:11:02:10:f3:05:6e:d7:27:05:a5:01
2 SSH public keys installed
10 locations available to store SSH public keys
```

sshcfg (Configure)

```
system> sshcfg -T system:mm[1] -hk gen -cstatus enabled
OK
```

users

Syntax **users <*-user-number*> (-n *user-name* -p *user-password* -a *user-authority* | –clear)**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS1200 platform only) Display, configure, or clear user accounts on the JCS management module.

Options **-*user-number***—(Optional) Unique number assigned to the user. Replace ***user-number*** with a value from **1** through **12**. If a user number is not specified, the command applies to all users.

-n *user-name*—Login name of the user: An alphabetic string up to 15 characters long that can include periods (.) and underscores (_). User names must be unique.

-p *user-password*—User password: An alphabetic string up to 15 characters long that can include periods (.) and underscores (_). A password must include at least one alphabetic character and one non-alphabetic character.

-a *user-authority*—Command authority assigned to the user. Valid values are **super** (supervisor) or **operator**. A supervisor has full read and write access. An operator has read access only.

-clear—Remove a user account.

Required Privilege Level supervisor

Related Documentation
- Configuring User Accounts on page 45

List of Sample Output
users (Display All Users) on page 80
users (Configure a User Account) on page 80
users (Clear a User Account) on page 80
users (Clear All User Accounts) on page 80

Output Fields Table 16 on page 79 lists the output fields for the **users** command. Output fields are listed in the approximate order in which they appear.

Table 16: users Output Fields

Field Name	Field Description
User ID	User number and name.
Role	Authority level assigned to the user. Users can have either **supervisor** or **operator** authority.
Blades	Routing Engines (blades) to which the user has access. By default, users have access to all Routing Engines.

Table 16: users Output Fields *(continued)*

Field Name	Field Description
Chassis	JCS management module to which the user has access.
Switches	JCS switch modules to which the user has access. By default, users have access to all switch modules.

Sample Output

users (Display All Users)

```
system:mm[1]> users

1. USERID
 Role: supervisor
 Blades:1|2|3|4|5|6|7|8|9|10|11|12
 Chassis:1
 Switches:1|2
2. <not used>
3. chang
 Role: supervisor
 Blades:1|2|3|4|5|6|7|8|9|10|11|12
 Chassis:1
 Switches:1|2
4. markham
 Role: operator
 Blades:1|2|3|4|5|6|7|8|9|10|11|12
 Chassis:1
 Switches:1|2
5. <not used>
6. <not used>
7. <not used>
8. <not used>
9. <not used>
10. <not used>
11. <not used>
12. <not used>
```

users (Configure a User Account)

```
system:mm[1]> users –5 akbar –p PWD.2 –a super
OK
```

users (Clear a User Account)

```
system:mm[1]> users –3 -clear
OK
```

users (Clear All User Accounts)

```
system:mm[1]> users -clear
OK
```

CHAPTER 9

Configuration Tasks for the Junos OS

System Domains Configuration Hierarchy

Using the Junos OS command-line interface (CLI), you configure Root System Domain (RSD) and Protected System Domain (PSD) parameters at the **[edit chassis system-domains]** hierarchy level:

```
[edit chassis]
system-domains {
  protected-system-domains psdn {
    control-plane-bandwidth-percent percent;
    control-slot-numbers [ slot-numbers ];
    control-system-id control-system-id;
    description description;
    fpcs [ slot-numbers ];
    lcc number fpcs [ slot-numbers ];
  }
  root-domain-id root-domain-id;
}
```

Related Documentation

- Protected System Domains on page 4
- Configuring an RSD and Creating PSDs on page 82

Configuring an RSD and Creating PSDs

To configure a Root System Domain (RSD), create Protected System Domains (PSDs) under it, and assign FPCs from the T Series router and Routing Engines from the JCS1200 routing platform to each PSD, perform the following steps.

NOTE: Several of the values set through the following Junos configuration statements must match the values set by the **baydata** command through the JCS management module CLI. For the **baydata** command format, see baydata.

1. Log in to the master Routing Engine on the T Series router.
2. At the **[edit chassis system-domains]** hierarchy level, include the root-domain-id ***root-domain-id*** configuration statement. The range of values for ***root-domain-id*** is **1** through **3**.

   This value for this statement must match the **SD** value set through the **baydata** command.
3. At the **[edit chassis system-domains]** hierarchy level, include the protected-system-domains **psd*n*** configuration statement. The range of values ***n*** is **1** to **31**.

   NOTE: The PSD identifier must be unique for each RSD. For example, if PSD1 is assigned to RSD1, neither RSD2 nor RSD3 can contain PSD1.

   The value for this statement must match the **PSD** value set through the **baydata** command.
4. At the **[edit chassis system-domains protected-system-domains psd*n*]** hierarchy level, include the following statements:
   - control-plane-bandwidth-percent ***percent***—Assign the percentage of bandwidth that exists on the JCS switch modules and the T Series Control Boards (T-CBs) to the PSD. The range of values is **1** to **100**. Allocating bandwidth prevents potential overutilization by one PSD over another.
   - description ***description***—Provide a description for the PSD.
   - fpcs **[** ***slot-numbers*** **]**—Assign FPCs to the PSD.

     For Junos OS Release 9.4, supported values for ***slot-numbers*** are **0** through **7**.
   - lcc ***number*** **fpcs [** ***slot-numbers*** **]**—Assign FPCs to a PSD. This statement is used for the TX Matrix Plus platform.
   - control-system-id ***control-system-id***—Assign an ID to the JCS1200 platform. The value for ***control-system-id*** can be **1** through **4**.

The value for this statement must match the **JCS** value set through the **baydata** command.

- control-slot-numbers **[** ***control-slot-numbers*** **]**—Assign a Routing Engine or pair of redundant Routing Engines on the JCS1200 platform to the PSD.

  The value for ***control-slot-numbers*** for the primary Routing Engine assigned to the PSD must match the **REP** value set through the JCS management module **baydata** command. Similarly, the value for ***control-slot-numbers*** for the backup Routing Engine must match the **REB** value set through the **baydata** command. In the absence of any Junos OS CLI configuration that affects mastership, the Routing Engine in the slot indicated by REP will boot as the master, and the Routing Engine in slot REB will boot as the backup. See **baydata**.

Related Documentation

- Protected System Domains on page 4
- System Domains Configuration Hierarchy on page 81
- Example: Configuring a JCS1200 Platform and a Single T Series Router on page 117
- Example: Configuring a JCS1200 Platform and Multiple T Series Routers on page 123

Configuring a PSD with a Single Routing Engine

To initially configure a PSD with a single Routing Engine:

1. Connect to the console port on the Routing Engine that is assigned to the PSD you want to configure.
2. At the **login** prompt on the console, log in with the username **root**.

   Initially, the **root** user account requires no password. You can see that you are the **root** user, because the prompt on the routing platform shows the username **root@%**.
3. Start the Junos OS command-line interface (CLI):

   ```
   root@% cli
   root@>
   ```
4. Enter Junos OS configuration mode:

   ```
   cli> configure
   [edit]
   root#
   ```
5. Configure the name of the routing platform (the routing platform hostname). We do not recommend spaces in the routing platform name. However, if the name does include spaces, enclose the entire name in quotation marks (" ").

   ```
   [edit]
   root# set system host-name host-name
   ```
6. Configure the routing platform's domain name:

   ```
   [edit]
   root# set system domain-name domain-name
   ```

7. Configure the IP addresses and prefix lengths for one or both of the router management Ethernet interfaces (**fxp0** and **fxp1**) on each Routing Engine.

   ```
   [edit]
   root# set interfaces fxp0 unit 0 family inet address address/prefix-length
   ```

   If both interfaces are configured (for JCS switch module redundancy), we recommend that the IP address for each interface be on a separate subnet. The **fxp0** interface connects to port 6 on the JCS switch module in bay 1, whereas the **fxp1** interface connects to port 6 on the JCS switch module in bay 2.

8. Configure the IP address of a backup or default routing platform.

   ```
   [edit]
   root# set system backup-router address
   ```

   Choose a router that is directly connected to the local routing platform by way of the management interface.

9. Configure the IP address of a DNS server. The routing platform uses the DNS name server to translate hostnames into IP addresses.

   ```
   [edit]
   root# set system name-server address
   ```

10. Set the root password, entering a clear-text password that the system will encrypt, a password that is already encrypted, or an SSH public key string.

    Choose one of the following:

    - To enter a clear-text password, use the following command:

      ```
      [edit]
      root# set system root-authentication plain-text-password
      New password: type password
      Retype new password: retype password
      ```

    - To enter a password that is already encrypted, use the following command:

      ```
      [edit]
      root# set system root-authentication encrypted-password encrypted-password
      ```

    - To enter an SSH public key, use the following command:

      ```
      [edit]
      root# set system root-authentication ssh-rsa key
      ```

11. Commit the configuration, which activates the configuration on the routing platform:

    ```
    [edit]
    root# commit
    ```

    After committing the configuration, you see the newly configured hostname appear after the username in the prompt; for example, **user@host#**.

    Junos OS defaults are now set on the routing platform.

    If you want to configure additional Junos OS properties at this time, remain in the CLI configuration mode and add the necessary configuration statements. For more information about how to configure additional properties, see the *Junos System Basics*

Configuration Guide. You will need to commit your configuration changes to activate them on the routing platform.

12. Exit from the Junos OS configuration mode.

    ```
    [edit]
    root@host-name# exit
    root@host-name>
    ```

13. Issue the **request system snapshot** command to back up the configuration to the **/altconfig** file system on the hard drive.

    If you do not issue the **request system snapshot** command, the configuration on the alternate boot device will be out of sync with the configuration on the primary boot device. The **request system snapshot** command causes the root file system to be backed up to **/altroot**, and **/config** to be backed up to **/altconfig**. The root and **/config** file systems are on the routing platform's flash disk, and the **/altroot** and **/altconfig** file systems are on the routing platform's hard disk.

NOTE: After you issue the **request system snapshot** command, you cannot return to the previous version of the software, because the running copy and the backup copy of the software are identical.

NOTE: The **logout-on-disconnect** statement at the **[edit system ports console]** hierarchy level is not supported for Routing Engines on the JCS1200 platform. When the cable is unplugged from the Routing Engine, the user is not logged out of the console session.

Related Documentation

- Configuring an RSD and Creating PSDs on page 82
- Configuring a PSD with Redundant Routing Engines on page 85

Configuring a PSD with Redundant Routing Engines

To initially configure a PSD with redundant Routing Engines:

1. Connect to the console port on the Routing Engine that is assigned to the PSD you want to configure.
2. At the **login** prompt on the console, log in with the username **root**.

   Initially, the **root** user account requires no password. You can see that you are the **root** user, because the prompt on the routing platform shows the username **root@%**.

3. Start the Junos OS command-line interface (CLI):

   ```
   root@% cli
   root@>
   ```

4. Enter Junos OS configuration mode:

```
cli> configure
[edit]
root#
```

5. Configure a hostname and the IP addresses and prefix lengths for one or both of the router management Ethernet interfaces (**fxp0** and **fxp1**) on each Routing Engine.

   If both interfaces are configured (for JCS switch module redundancy), we recommend that the IP address for each interface be on a separate subnet. The **fxp0** interface connects to port 6 on the JCS switch module in bay 1, whereas the **fxp1** interface connects to port 6 on the JCS switch module in bay 2.

   ```
   [edit]
   root# edit groups
   [edit groups]
   root# set re0 system host-name router1
   root# set re0 interfaces fxp0 unit 0 family inet address 10.10.10.1/24
   root# set re1 system host-name router2
   root# set re1 interfaces fxp0 unit 0 family inet address 10.10.10.2/24
   root# set re0 system host-name router1
   root# set re0 interfaces fxp1 unit 0 family inet address 10.20.20.1/24
   root# set re1 system host-name router2
   root# set re1 interfaces fxp1 unit 0 family inet address 10.20.20.2/24
   ```

6. Configure the routing platform's domain name:

   ```
   [edit]
   root# set system domain-name domain-name
   ```

7. Set the loopback interface address for each Routing Engine.

   ```
   [edit groups]
   root# set re0 interfaces lo0 unit 0 family inet address 2.2.2.1/32
   root# set re1 interfaces lo0 unit 0 family inet address 2.2.2.2/32
   ```

8. Issue the **apply-groups** statement to reproduce the configuration group information to the main part of the configuration.

   ```
   [edit groups]
   root# top
   [edit]
   root# set apply-groups [re0 re1]
   ```

9. Configure Routing Engine redundancy:

   ```
   [edit]
   root# set chassis redundancy routing-engine 0 master
   root# set chassis redundancy routing-engine 1 backup
   root# set chassis redundancy routing-engine graceful-switchover
   ```

10. Save the configuration change on both Routing Engines:

    ```
    [edit]
    root# commit synchronize
    ```

11. Configure the IP address of a backup or default routing platform.

    ```
    [edit]
    root# set system backup-router address
    ```

Choose a router that is directly connected to the local routing platform by way of the management interface.

12. Configure the IP address of a DNS server. The routing platform uses the DNS name server to translate hostnames into IP addresses.

    ```
    [edit]
    root# set system name-server address
    ```

13. Set the root password, entering a clear-text password that the system will encrypt, a password that is already encrypted, or an SSH public key string.

    Choose one of the following:

    - To enter a clear-text password, use the following command:

      ```
      [edit]
      root# set system root-authentication plain-text-password
      New password: type password
      Retype new password: retype password
      ```

    - To enter a password that is already encrypted, use the following command:

      ```
      [edit]
      root# set system root-authentication encrypted-password encrypted-password
      ```

    - To enter an SSH public key, use the following command:

      ```
      [edit]
      root# set system root-authentication ssh-rsa key
      ```

14. After you have installed the new software and are satisfied that it is successfully running, issue the **request system snapshot** command to back up the new software on both master and backup Routing Engines.

    ```
    {master}
    user@host> request system snapshot
    ```

    The root file system is backed up to **/altroot**, and **/config** is backed up to **/altconfig**. The root and **/config** file systems are on the routing platform's flash disk, and the **/altroot** and **/altconfig** file systems are on the routing platform's hard disk.

NOTE: After you issue the **request system snapshot** command, you cannot return to the previous version of the software, because the running copy and backup copy of the software are identical.

NOTE: The **logout-on-disconnect** statement at the **[edit system ports console]** hierarchy level is not supported for Routing Engines on the JCS1200 platform. When the cable is unplugged from the Routing Engine, the user is not logged out of the console session.

Related Documentation

- Configuring an RSD and Creating PSDs on page 82
- Configuring a PSD with a Single Routing Engine on page 83

CHAPTER 10

Configuration Tasks for Shared Interfaces

Interfaces Hierarchy

To configure shared interfaces, you must be familiar with the **[edit interfaces]** hierarchy in the Junos configuration command-line interface (CLI).

Configuration statements that are unique to shared interfaces are:

- **shared-interface** at the **[edit interfaces so-*fpc/pic/slot*]**, **[edit interfaces ge-*fpc/pic/slot*]**, and **[edit interfaces xe-*fpc/pic/slot*]** hierarchy levels
- **interface-shared-with** at the **[edit interfaces so-*fpc/pic/slot* unit *logical unit-number*]**, **[edit interfaces ge-*fpc/pic/slot* unit *logical unit-number*]**, and **[edit interfaces xe-*fpc/pic/slot* unit *logical unit-number*]** hierarchy levels

For detailed information about all other configuration statements under the **[edit interfaces]** hierarchy, see the Junos® OS Network Interfaces.

```
interfaces {
   ge-fpc/pic/slot {
      vlan-tagging;
      shared-interface;
      unit logical-unit-number {
         vlan-id number;
         peer-interface interface-name;
         interface-shared-with psdn;
         family family {
            address ip-address;
         }
      }
   }
   so-fpc/pic/slot {
```

```
        encapsulation frame-relay;
        shared-interface;
        unit logical-unit-number {
          dlci dlci-identifier;
          peer-interface interface-name;
          interface-shared-with psdn;
          family family {
            address ip-address;
          }
        }
      }
      xe-fpc/pic/slot {
        shared-interface;
        unit logical-unit-number {
          peer-interface interface-name;
          vlan-id number;
          interface-shared-with psdn;
          family family {
            address ip-address;
          }
        }
      }
      ut-fpc/pic/slot {
        unit logical-unit-number {
          peer-interface interface-name;
        }
      }
    }
```

Related Documentation

- Shared Interfaces on page 6
- Configuring Shared Interfaces on the RSD on page 91
- Configuring Shared Interfaces on a PSD on page 93

Before You Configure Shared Interfaces

Before you configure shared interfaces, remember that on the Root System Domain (RSD), you configure the physical interface and then configure and assign each logical shared interface under it to a specific Protected System Domain (PSD).

On the PSD, you configure the physical interface as well and identify it as a shared interface. Then configure the assigned logical interfaces under it and bind each one to a peer interface on the Tunnel PIC owned by the PSD.

When you configure shared interfaces, the values for several parameters configured on the RSD and the PSD must match:

- On the physical SONET interface, Frame Relay encapsulation must be configured in both the RSD and the PSD. (Point-to-multipoint Frame Relay is not supported.) Frame Relay encapsulation enables a change in state to be communicated between the RSD and the PSD. Status is communicated through Local Management Interface (LMI) packets exchanged on data-link connection identifier (DLCI) 0. LMI packet exchanges are managed by the RSD.

  On the physical Gigabit Ethernet interface, VLAN tagging must be configured in both the RSD and the PSD.

- On the physical SONET interface, the same maximum transmission unit (MTU) size must be used in both the RSD and PSD. For example, in both the RSD and PSD, do not include any MTU configuration to allow the default MTU size to be applied to the physical interface. Or, in both the RSD and PSD, configure the same MTU size. For example, in both the RSD and PSD configuration, include the **mtu 5000** statement under the **[edit so-0/0/1]** hierarchy level.

- The same logical unit number must be specified on the physical shared interface (**so-*fpc/pic/slot.logical unit-number***, **ge-*fpc/pic/slot.logical unit-number***, or **xe-*fpc/pic/slot.logical unit-number***) and on the physical uplink tunnel interface (**ut-*fpc/pic/slot.logical unit-number***) owned by the PSD. For example, in both the RSD and PSD configuration, specify **so-0/0/0.1** as the logical SONET interface. In the PSD configuration, configure **ut-0/0/0.1** as the logical peer tunnel interface.

- On the logical SONET interface, the same DLCI must be configured in both the RSD and the PSD. For example, at the **[edit interfaces so-0/0/0.1**] hierarchy level, include the **dcli 101** statement in both the RSD and PSD configuration.

  On the logical Ethernet interface, the same virtual LAN (VLAN) identifier must be configured in both the RSD and the PSD. For example, at the **[edit interfaces ge-0/0/0.2**] hierarchy level, include the **vlan-id 102** statement in both the RSD and PSD configuration.

Related Documentation

- Shared Interfaces on page 6
- Interfaces Hierarchy on page 89
- Configuring Shared Interfaces on the RSD on page 91
- Configuring Shared Interfaces on a PSD on page 93

Configuring Shared Interfaces on the RSD

To configure shared interfaces on the RSD:

1. Configure the physical interface using the **so-*fpc/pic/slot***, **ge-*fpc/pic/slot***, or **xe-*fpc/pic/slot*** statement at the **[edit interfaces]** hierarchy level.
2. Configure Frame Relay encapsulation or VLAN tagging.
   - For Frame Relay encapsulation, use the **encapsulation frame-relay** statement at the **[edit interfaces so-*fpc/pic/slot*]** hierarchy level.
   - For VLAN tagging, use the **vlan-tagging** statement at one of the following hierarchy levels: **[edit interfaces ge-*fpc/pic/slot*]** or **[edit interfaces xe-*fpc/pic/slot*]**.

3. Configure logical interfaces under the physical interface using the **unit *logical-unit-number*** statement at the **[edit interfaces so-*fpc/pic/slot*]** hierarchy level, the **[edit interfaces ge-*fpc/pic/slot*]** hierarchy level, or the **[edit interfaces xe-*fpc/pic/slot*]** hierarchy level.

   NOTE: For Ethernet shared interfaces on the JCS 1200 platform, gratuitous-arp configuration statements are supported on the Root System Domain (RSD), but not on the Protected System Domain (PSD). These statements are configured at the **[edit interfaces ge-*fpc/pic/slot*]** hierarchy level. These statements include: gratuitous-arp-reply, no-gratuitous-arp-replay, and no-gratuitous-arp-request. Values you configure for gratuitous-arp statements on the RSD are not passed to the PSD.

4. For each logical SONET interface, include the following statements at the **[edit interfaces so-*fpc/pic/slot.logical-unit-number*]** hierarchy level:

   - **dlci *dlci-identifier***—Assigns a DLCI for the point-to-point Frame Relay connection between the RSD and the PSD.
   - interface-shared-with **psd*n***—Assigns the logical interface to a PSD.

   For each logical Gigabit Ethernet interface, include the following statements at one of the following hierarchy levels: **[edit interfaces ge-*fpc/pic/slot.logical-unit-number*]** or **[edit interfaces xe-*fpc/pic/slot.logical-unit-number*]**.

   - **vlan-id *number***—Binds an 802.1Q VLAN identifier tag to the logical interface.
   - interface-shared-with **psd*n***—Assigns the logical interface to a PSD.

In the following example, **so-0/0/0.0** and **so-0/0/0.1** belong to PSD1, whereas PSD2 owns **so-0/0/0.2**:

```
interfaces {
  so-0/0/0 {
    encapsulation frame-relay;
    unit 0 {
      dlci 100;
      interface-shared-with psd1;
    }
    unit 1 {
      dlci 101;
      interface-shared-with psd1;
    }
    unit 2 {
      dlci 102;
      interface-shared-with psd2;
    }
  }
}
```

In the following example, **ge-1/0/0.1** and **ge-1/0/0.2** belong to PSD1, whereas PSD2 owns **ge-1/0/0.3**:

```
interfaces {
   ge-1/0/0 {
      vlan-tagging;
      unit 1{
         vlan-id 100;
         interface-shared-with psd1;
      }
      unit 2{
         vlan-id 101;
         interface-shared-with psd1;
      }
      unit 3{
         vlan-id 102;
         interface-shared-with psd2;
      }
   }
}
```

In the following example, **xe-5/0/0.0** and **xe-5/0/0.1** belong to PSD4:

```
interfaces {
   xe-5/0/0 {
      vlan-tagging;
      unit 0{
         vlan-id 209;
         interface-shared-with psd4;
      }
      unit 1{
         vlan-id 200;
         interface-shared-with psd4;
      }
   }
}
```

Related Documentation

- Shared Interfaces on page 6
- Before You Configure Shared Interfaces on page 90
- Interfaces Hierarchy on page 89
- Configuring Shared Interfaces on a PSD on page 93
- Example: Configuring Shared Interfaces (SONET) on page 131
- Example: Configuring Shared Interfaces (Ethernet) on page 142

Configuring Shared Interfaces on a PSD

To configure shared interfaces on a PSD:

1. Configure the physical interface at the **[edit interfaces]** hierarchy level by doing one of the following:
   - Configure the physical SONET interface using the **so-*fpc/pic/slot*** statement.

- Configure the physical Gigabit Ethernet interface using the **ge-*fpc/pic/slot*** statement.
- Configure the physical 10-Gigabit Ethernet interface using the **xe-*fpc/pic/slot*** statement.

2. Configure Frame Relay encapsulation or VLAN tagging:
   - For Frame Relay encapsulation, use the **encapsulation frame-relay** statement at the **[edit interfaces so-*fpc/pic/slot*]** hierarchy level.
   - For VLAN tagging, use the **vlan-tagging** statement at one of the following hierarchy levels: **[edit interfaces ge-*fpc/pic/slot*]** or **[edit interfaces xe-*fpc/pic/slot*]**.
3. Identify the physical interface as a shared interface by including the shared-interface statement at one of the following hierarchy levels: **[edit interfaces so-*fpc/pic/slot*]**, **[edit interfaces ge-*fpc/pic/slot*]**, or **[edit interfaces xe-*fpc/pic/slot*]**.

   NOTE: For Ethernet shared interfaces on the JCS 1200 platform, gratuitous-arp configuration statements are supported on the Root System Domain (RSD), but not on the Protected System Domain (PSD). These statements are configured at the **[edit interfaces ge-*fpc/pic/slot*]** hierarchy level. These statements include: gratuitous-arp-reply, no-gratuitous-arp-replay, and no-gratuitous-arp-request. Values you configure for gratuitous-arp statements on the RSD are not passed to the PSD.

4. Configure logical interfaces under the physical interface using the **unit *logical-unit-number*** statement at one of the following hierarchy levels: **[edit interfaces so-*fpc/pic/slot*]**, or **[edit interfaces ge-*fpc/pic/slot*]**, or **[edit interfaces xe-*fpc/pic/slot*]**. The values for ***logical-unit-number*** must match the values set in the RSD configuration.
5. For each logical interface, include the following statements:
   - For SONET interfaces, include the **dlci *dlci-identifier*** statement at the **[edit interfaces so-*fpc/pic/slot* unit *logical-unit-number*]** hierarchy level to assign a data-link connection identifier (DLCI) for the point-to-point Frame Relay connection between the RSD and the PSD. The value for ***dlci-identifier*** must match the value set in the RSD configuration for the specified logical SONET interface.
   - For Gigabit Ethernet interfaces, include the **vlan-id *number*** statement at one of the following hierarchy levels: **[edit interfaces ge-*fpc/pic/slot* unit *logical-unit-number*]** or **[edit interfaces xe-*fpc/pic/slot* unit *logical-unit-number*]** to bind an 802.1Q VLAN identifier tag to the logical interface. The value for ***number*** must match the value set in the RSD configuration for the specified logical Gigabit Ethernet interface.
6. For each logical interface, include the **peer-interface *interface-name*** statement to configure the tunnel peer interface that is bound to the logical interface.
7. For each logical interface, include the **family *family*** statement to configure the protocol family for the logical interface.

8. Configure the IP address of the logical interface using the **address *address*** statement at one of the following hierarchy levels: **[edit interfaces so-*fpc/pic/slot* unit *logical-unit-number* family *family*]**, or **[edit interfaces ge-*fpc/pic/slot* unit *logical-unit-number* family *family*]**, or **[edit interfaces xe-*fpc/pic/slot* unit *logical-unit-number* family *family*]**.
9. Configure the physical tunnel interface using the **ut-*fpc/pic/slot*** statement at the **[edit interfaces]** hierarchy level.
10. Configure the logical tunnel interfaces using the **unit *logical-unit-number*** statement at the **[ut-*fpc/pic/slot*]** hierarchy level.

    The logical unit number must match the value of the logical unit number for the physical shared interface. For example, if the shared interface logical unit is **1** (as part of **so-0/0/0.1**), configure **ut-0/0/0.1** as the logical peer tunnel interface.
11. For each logical tunnel interface, specify the logical peer interface on the SONET, Gigabit Ethernet, or 10-Gigabit Ethernet PIC using the **peer-interface** statement at the **[ut-*fpc/pic/slot* unit *logical-unit-number*]** hierarchy level.

    As described in Step 10, the logical unit number for the shared interface and the uplink tunnel interface must match.

SONET (PSD1) In the following example, logical SONET interface **so-0/0/0.0** is peered with logical tunnel interface **ut-1/0/0.0** and **so-0/0/0.1** is peered with **ut-1/0/0.1**.

```
interfaces {
  so-0/0/0 {
    encapsulation frame-relay;
    shared-interface;
    unit 0 {
      dlci 100;
      peer-interface ut-1/0/0.0;
      family inet {
        address 10.10.10.1/24;
      }
    }
    unit 1 {
      dlci 101;
      peer-interface ut-1/0/0.1
      family inet {
        address 10.10.11.1/24;
      }
    }
  }
  ut-1/0/0 {
    unit 0 {
      peer-interface so-0/0/0.0;
    }
    unit 1 {
      peer-interface so-0/0/0.1;
    }
  }
}
```

SONET (PSD2) In the following example, logical SONET interface **so-0/0/0.2** is peered with logical tunnel interface **ut-2/0/0.2**.

```
interfaces {
   so-0/0/0 {
      encapsulation frame-relay;
   shared-interface;
      unit 2 {
         dlci 102;
         peer-interface ut-2/0/0.2;
         family inet {
            address 10.10.12.1/24;
         }
      }
   ut-2/0/0 {
      unit 0 {
         peer-interface so-0/0/0.2;
      }
   }
}
```

Ethernet (PSD1) In the following example, logical Gigabit Ethernet interface **ge-1/0/0.1** is peered with logical tunnel interface **ut-3/0/0.1**, and **ge-1/0/0.2** is peered with **ut-4/0/0.2**.

```
interfaces {
   ge-1/0/0 {
      vlan-tagging;
      shared-interface;
      unit 1{
         vlan-id 100;
         peer-interface ut-3/0/0.1;
         family inet {
            address 10.10.13.1/24;
         }
      }
      unit 2{
         vlan-id 101;
         peer-interface ut-4/0/0.2
         family inet {
            address 10.10.14.1/24;
         }
      }
   }
   ut-3/0/0 {
      unit 1{
         peer-interface ge-1/0/0.1;
      }
      unit 2{
         peer-interface ge-1/0/0.2;
      }
   }
}
```

Ethernet (PSD2)

In the following example, logical Gigabit Ethernet interface **ge-1/0/0.3** is peered with logical tunnel interface **ut-4/0/0.3**.

```
interfaces {
   ge-1/0/0 {
      vlan-tagging;
   shared-interface;
      unit 3{
         vlan-id 102;
         peer-interface ut-4/0/0.3;
         family inet {
            address 10.10.15.1/24;
         }
      }
   ut-4/0/0 {
      unit 3{
         peer-interface ge-1/0/0.3;
      }
   }
}
```

10-Gigabit Ethernet (PSD4)

In the following example, logical 10-Gigabit Ethernet interface **xe-5/0/0.0** is peered with logical tunnel interface **ut-2/0/0.0** and **xe-5/0/0.1** is peered with **ut-2/0/0.1**.

```
interfaces {
   xe-5/0/0 {
      vlan-tagging;
      shared-interface;
      unit 0{
         vlan-id 209;
         peer-interface ut-2/0/0.0;
         family inet {
            address 10.1.1.2/30;
         }
         family inet6 {
            address ::10.1.1.2/126;
         }
      }
      unit 1{
         vlan-id 200;
         peer-interface ut-2/0/0.1
         family inet {
            address 11.1.1.2/30;
         }
         family inet6 {
            address ::11.1.1.2/126;
         }
      }
   }
   ut-2/0/0 {
      unit 0{
         peer-interface xe-5/0/0.0;
      }
      unit 1{
         peer-interface xe-5/0/0.1;
      }
```

```
    }
}
```

Related Documentation

- Shared Interfaces on page 6
- Before You Configure Shared Interfaces on page 90
- Interfaces Hierarchy on page 89
- Configuring Shared Interfaces on the RSD on page 91
- Example: Configuring Shared Interfaces (SONET) on page 131
- Example: Configuring Shared Interfaces (Ethernet) on page 142

Configuring Firewall Filters on Shared Interfaces

To allow equitable bandwidth sharing between all logical interfaces on a single shared physical interface, you configure firewall filters on the logical interfaces in the PSD configuration.

Whereas the RSD controls the physical shared interface and allocates a logical interface on it to the PSD, the PSD controls the configuration under the logical interface, including the protocol family. The shared interface on the RSD is not aware of the protocol family information associated with the logical interface. Therefore, on the PSD, the firewall filter must be configured under the **[edit firewall family any]** hierarchy level and the filter applied to the entire logical interface (as opposed to a protocol family under the interface). With Junos OS Release 9.4, only output filters are supported.

To configure a firewall filter on the PSD, create the filter conditions and apply the filter to the logical interfaces:

1. Configure the firewall filter conditions:
    a. Include the **filter** ***filter-name*** statement at the **[edit firewall family any]** hierarchy level.
    b. Include the **term** ***term-name*** statement at the **[edit firewall family any filter** ***filter-name*****]** hierarchy level.
    c. Include the **from** ***match-conditions*** statement at the **[edit firewall family any filter** ***filter-name*** **term** ***term-name*****]** hierarchy level.
    d. Include the **then** ***action*** statement at the **[edit firewall family any filter** ***filter-name*** **term** ***term-name*****]** hierarchy level.
    e. Include the **then** ***action-modifiers*** statement at the **[edit firewall family any filter** ***filter-name*** **term** ***term-name*****]** hierarchy level.
2. Apply the firewall filter to the logical interface on the shared interface by including the **filter output** ***filter-name*** statement at the **[edit interfaces** ***interface-name*** **unit** ***logical-unit-number*****]** hierarchy level.

Starting with Junos OS Release 10.1, firewall filters on logical interfaces can be configured on the RSD. Filtering is performed on the PSD, but logical interface filters configured on the RSD are applied automatically by the PSD.

To configure a logical interface filter on the RSD, apply the firewall filter to the logical interface on the shared interface by including the **filter output** ***filter-name*** statement at the **[edit interfaces** ***interface-name*** **unit** ***logical-unit-number*****]** hierarchy level on the RSD.

Filters configured on the RSD can co-exist with filters configured on the PSD. Counter statistics related to PSD filtering are available on the RSD.

In the following example, **term 1** and **term 2** of the firewall **filter-out** provide per-class policing and **term 3** provides logical interface-based policing. The filter is applied to the **so-4/5/6.0** logical interface.

```
firewall family any {
  filter filter-out {
    term 1 {
      from {
        forwarding-class voice;
      }
      then {
        policer tx-voice;
        next term;
      }
    }
    term 2 {
      from {
        forwarding-class data;
      }
      then {
        policer tx-data;
        next term;
      }
    }
    term 3 {
      then policer iflpolicer;
    }
  }
}
interfaces {
  ut-1/2/3 {
    unit 0 {
      peer-interface so-4/5/6.0;
      }
    }
  }
  so-4/5/6 {
    encapsulation frame-relay;
    unit 0 {
      peer-interface ut-1/2/3.0;
      filter output filter-out;
      family inet {
        address 192.168.0.1/24;
      }
```

```
        family inet6 {
          address fec0::1/64;
        }
      }
    }
```

For more information about firewall filters, see the Routing Policy Configuration Guide.

Related Documentation

- Shared Interfaces on page 6
- Configuring Shared Interfaces on the RSD on page 91
- Configuring Shared Interfaces on a PSD on page 93
- Configuring CoS Features on Shared Interfaces on page 100

Configuring CoS Features on Shared Interfaces

With class-of-service (CoS) features:

- Random early detection (RED) drop profiles and scheduler maps that are bound to physical shared interfaces must be configured on the RSD.
- Classifiers and rewrite rules that are bound to logical shared interfaces must be configured on the PSD.
- Tricolor marking policers must be configured on the PSD.
- CoS queues and forwarding classes must be configured identically on both the RSD and on the PSD that owns the logical shared interfaces.

For example, the following CoS forwarding classes need to be configured on both the RSD and the PSD:

```
class-of-service {
  forwarding-classes {
    queue 0 be priority high;
    queue 1 ef priority high;
    queue 2 af priority high;
    queue 3 nc priority high;
    queue 4 fc4 priority high;
    queue 5 fc5 priority high;
    queue 6 fc6 priority high;
    queue 7 fc7 priority high;
  }
}
```

To view queue statistics on a shared interface, you must issue the **show interfaces queue so-*fpc/pic/slot*** command or the **show interfaces queue ge-*fpc/pic/slot*** command on the RSD. If you issue the command on the PSD, the system displays this message: “Egress queue statistics are not applicable to this interface.”

For more information about CoS features, see the Junos OS Class of Service Configuration Guide.

Related Documentation

- Shared Interfaces on page 6
- Configuring Shared Interfaces on the RSD on page 91
- Configuring Shared Interfaces on a PSD on page 93
- Configuring Firewall Filters on Shared Interfaces on page 98

CHAPTER 11

Configuration Tasks for Inter-PSD Forwarding

Interface Hierarchy

To configure inter-Protected System Domain (PSD) forwarding, you must be familiar with the **[edit interfaces]** hierarchy in the Junos configuration command-line interface (CLI).

Configuration statements that are unique to inter-PSD forwarding are:

- **peer-psd** at the **[edit interfaces xt-*fpc/pic/slot*]** hierarchy level

For detailed information about all other configuration statements under the **[edit interfaces]** hierarchy, see the Junos® OS Network Interfaces.

```
interfaces {
   xt-fpc/pic/slot {
      unit logical-unit-number {
         dlci dlci-number;
         encapsulation frame-relay;
         peer-interfaceinterface-name;
         peer-psd psdn;
      }
   }
}
```

Related Documentation

- Inter-PSD Forwarding Overview on page 8
- Configuring Inter-PSD Forwarding on a PSD on page 104

Before You Configure Inter-PSD Forwarding

Before you configure inter-PSD forwarding, remember that each PSD that uses inter-PSD forwarding must have a tunnel PIC available to it. To configure the cross-connection

between PSDs, a new interface type, **xt**, is implemented in Junos OS Release 9.5. All PSDs configured for inter-PSD forwarding must be running Junos OS Release 9.5 or later. Currently, only Frame Relay encapsulation is supported for inter-PSD forwarding.

Related Documentation

- Inter-PSD Forwarding Overview on page 8
- Configuring Inter-PSD Forwarding on a PSD on page 104

Configuring Inter-PSD Forwarding on a PSD

To configure inter-PSD forwarding on a PSD:

1. Use the **xt-*fpc/pic/slot*** statement at the **[edit interfaces]** hierarchy level to configure cross-connections with the other PSDs.
2. Configure logical interfaces under the cross-connect interface using the **unit *logical-unit-number*** statement at the **[edit interfaces xt-*fpc/pic/slot*]** hierarchy level.

   The values for ***logical-unit-number*** must match values set in the Root System Domain (RSD) configuration.
3. For each logical interface, include the following statements:
   - **peer-psd psd*n***—Configure a peer PSD. The PSD identification is a numeric value with a range of 1 though 31.
   - **peer-interface *interface-name***—Configure the tunnel peer interface that is bound to the logical interface.
   - **encapsulation frame-relay**—Configure Frame Relay encapsulation. Currently, only Frame Relay encapsulation is supported for inter-PSD forwarding.
   - **point-to-point**—Configure the interface as a point-to-point interface.
   - **dlci *dlci-number***—Configure the data-link connection identifier (DLCI) for the point-to-point interface.
   - **family *family-name***—Configure the protocol family for the interface.
4. Repeat this procedure for each PSD that you want to include in inter-PSD forwarding.

In the example illustrated in Figure 12 on page 104, a cross-connect using a tunnel interface transports packets between the logical interfaces configured on each PSD.

Figure 12: Example: Inter-PSD Forwarding

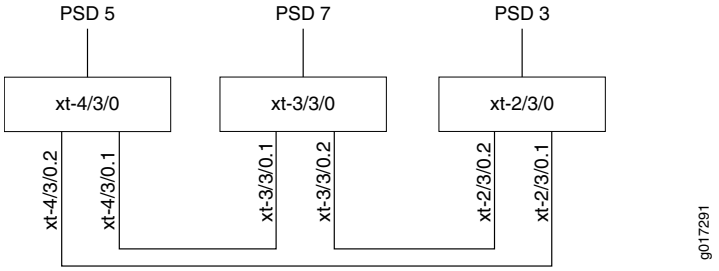


Table 17: Example: Inter-PSD Forwarding

PSD	Interfaces
PSD 5	xt-4/3/0.1 10.0.0.2 2121:2121::2/64
	xt-4/3/0.2 10.0.1.2
PSD 7	xt-3/3/0.1 10.0.0.1 2121:2121::1/64
	xt-3/3/0.2 10.1.1.2
PSD 3	xt-3/3/0.1 10.0.0.1 2121:2121::1/64
	xt-2/3/0.2 10.1.1.1

In this example, the **[edit interfaces]** hierarchy on PSD 5 is configured as follows:

```
interfaces {
    xt-4/3/0 {
      unit 1 {
        peer-psd psd7;
        peer-interface xt-3/3/0.1;
        encapsulation frame-relay;
        point-to-point;
        dlci 1;
        family inet {
          address 10.0.0.2/32 {
            destination 10.0.0.1;
          }
        }
        family inet6 {
          address 2121:2121::2/64;
        }
      }
      unit 2 {
        peer-psd psd3;
        peer-interface xt-2/3/0.1;
        encapsulation frame-relay;
        point-to-point;
        dlci 2;
        family inet {
          address 10.0.1.2/32 {
            destination 10.0.1.1;
          }
        }
      }
```

```
    }
  }
```

In this example, the **[edit interfaces]** hierarchy on PSD 7 is configured as follows:

```
interfaces {
    xt-3/3/0 {
      unit 1 {
        peer-psd psd5;
        peer-interface xt-4/3/0.1;
        encapsulation frame-relay;
        point-to-point;
        dlci 1;
        family inet {
          address 10.0.0.1/32 {
            destination 10.0.0.2;
          }
        }
        family inet6 {
          address 2121:2121::1/64;
        }
      }
      unit 2 {
        peer-psd psd3;
        peer-interface xt-2/3/0.2;
        encapsulation frame-relay;
        point-to-point;
        dlci 2;
        family inet {
          address 10.1.1.1/32 {
            destination 10.1.1.2;
          }
        }
      }
    }
  }
```

In this example, the **[edit interfaces]** hierarchy on PSD 3 is configured as follows:

```
interfaces {
    xt-2/3/0 {
      unit 1 {
        peer-psd psd5;
        peer-interface xt-4/3/0.2;
        encapsulation frame-relay;
        point-to-point;
        dlci 1;
        family inet {
          address 10.0.1.1/32 {
            destination 10.0.1.2;
          }
        }
      }
      unit 2 {
        peer-psd psd7;
        peer-interface xt-3/3/0.2;
        encapsulation frame-relay;
```

```
            point-to-point;
            dlci 2;
            family inet {
              address 10.1.1.2/32 {
                destination 10.1.1.1;
              }
            }
          }
        }
      }
```

Related Documentation

- Inter-PSD Forwarding Overview on page 8
- Interface Hierarchy on page 103
- Before You Configure Inter-PSD Forwarding on page 103

CHAPTER 12

Junos Configuration Statements

control-plane-bandwidth-percent

Syntax control-plane-bandwidth-percent *percent*;

Hierarchy Level [edit chassis system-domains protected-system-domains psd*n*]

Release Information Statement introduced in Junos OS Release 9.2.

Description Allocate a percentage of the bandwidth that exists on the JCS switch modules and the T Series Control Boards (T-CBs) to the specified Protected System Domain (PSD). Allocating bandwidth prevents potential overutilization by one PSD over another.

Options *percent*—Percentage of bandwidth.

Range: 1 through 100

Required Privilege Level view-level—To view this statement in the configuration.
control-level—To add this statement to the configuration.

Related Documentation

- Configuring an RSD and Creating PSDs on page 82

control-slot-numbers

Syntax control-slot-numbers [*slot-numbers*];

Hierarchy Level [edit chassis system-domains protected-system-domains psd*n*]

Release Information Statement introduced in Junos OS Release 9.1.

Description Configure the slot numbers for the Routing Engines on the JCS1200 platform that are part of the specified Protected System Domain (PSD).

Options ***slot-numbers***—Slot numbers for the Routing Engines on the JCS1200 platform to be assigned to the PSD.

Range: 1 through 12

NOTE: The slot numbers for the Routing Engines for the specified PSD must match the REP (primary Routing Engine) and REB (backup Routing Engine) values set through the JCS management module baydata command. In the absence of any Junos OS CLI configuration that affects mastership, the Routing Engine in the slot indicated by REP will boot as the master, and the Routing Engine in slot REB will boot as the backup.

The baydata command assigns the corresponding PSD through the PSD parameter.

Required Privilege Level view-level—To view this statement in the configuration.
control-level—To add this statement to the configuration.

Related Documentation

- Configuring an RSD and Creating PSDs on page 82
- baydata on page 56

control-system-id

Syntax control-system-id *control-system-id*;

Hierarchy Level [edit chassis system-domains protected-system-domains psd*n*]

Release Information Statement introduced in Junos OS Release 9.1.

Description Configure the JCS1200 platform identification.

Options ***control-system-id***—ID value for the JCS1200 platform.
Range: 1 through 4

Required Privilege Level view-level—To view this statement in the configuration.
control-level—To add this statement to the configuration.

Related Documentation
- Configuring an RSD and Creating PSDs on page 82
- baydata on page 56

description (Chassis)

Syntax description *description*;

Hierarchy Level [edit chassis system-domains protected-system-domains psd*n*]

Release Information Statement introduced in Junos OS Release 9.1.

Description Provide a description for the specified Protected System Domain (PSD).

Options ***description***—Description for the PSD.

Required Privilege Level view-level—To view this statement in the configuration.
control-level—To add this statement to the configuration.

Related Documentation
- Configuring an RSD and Creating PSDs on page 82

fpcs

Syntax fpcs [*slot-numbers*];

Hierarchy Level [edit chassis system-domains protected-system-domains psd*n*]

Release Information Statement introduced in Junos OS Release 9.1.

Description Assign Flexible PIC Concentrators (FPCs) to a Protected System Domain (PSD).

Options ***slot-numbers***—Slot numbers for the FPCs to be assigned to the PSD.
Range: For Junos OS Release 9.4, supported values are **0** through **7**.

Required Privilege Level view-level—To view this statement in the configuration.
control-level—To add this statement to the configuration.

Related Documentation
- Configuring an RSD and Creating PSDs on page 82

interface-shared-with

Syntax interface-shared-with psd*n*;

Hierarchy Level [edit interfaces ge-*fpc/pic/slot* unit *logical-unit-number*],
[edit interfaces so-*fpc/pic/slot* unit *logical-unit-number*],
[edit interfaces xe-*fpc/pic/slot* unit *logical-unit-number*]

Release Information Statement introduced in Junos OS Release 9.3.

Description Assign a logical interface under a shared physical interface to a Protected System Domain (PSD).

Options ***n***—PSD identification as a numeric value.
Range: **1** through **31**

Required Privilege Level view-level—To view this statement in the configuration.
control-level—To add this statement to the configuration.

Related Documentation
- Configuring Shared Interfaces on the RSD on page 91.
- Configuring Shared Interfaces on a PSD on page 93.
- shared-interface on page 115

lcc

Syntax lcc *number* fpcs [*slot-numbers*];

Hierarchy Level [edit chassis system-domains protected-system-domains psd*n*]

Release Information Statement introduced in Junos OS Release 11.4.

Description Assign Flexible PIC Concentrators (FPCs) to a Protected System Domain (PSD).

Options ***number***—Specify a T Matrix Plus on a routing matrix.
Range: 0 through 3

slot-numbers—Slot numbers for the FPCs to be assigned to the PSD.
Range: For Junos OS Release 11.4, supported values are **0** through **7**.

Required Privilege Level view-level—To view this statement in the configuration.
control-level—To add this statement to the configuration.

Related Documentation
- Configuring an RSD and Creating PSDs on page 82

peer-psd

Syntax peer-psd psd*n*;

Hierarchy Level [edit interfaces xt-*fpc/pic/slot* unit *logical-unit-number*]

Release Information Statement introduced in Junos OS Release 9.5.

Description Configure a peer Protected System Domain (PSD) for inter-PSD forwarding.

Options *n*—PSD identification as a numeric value.
Range: **1** through **31**

Required Privilege Level view-level—To view this statement in the configuration.
control-level—To add this statement to the configuration.

Related Documentation
- Configuring Inter-PSD Forwarding on a PSD on page 104.
- peer-interface on page 114

peer-interface

Syntax peer-interface *logical-interface-name*;

Hierarchy Level [edit interfaces xt-*fpc/pic/slot* unit *logical-unit-number*]

Release Information Statement introduced in Junos OS Release 9.5.

Description Configure a peer interface on a Protected System Domain (PSD) for PSD-to-PSD communication over internal tunnel PICs.

Options ***logical-interface-name***—Logical interface used for peer-to-peer communication between PSDs.

Required Privilege Level view-level—To view this statement in the configuration.
control-level—To add this statement to the configuration.

Related Documentation
- Configuring Inter-PSD Forwarding on a PSD on page 104.
- peer-psd on page 113

protected-system-domains

Syntax
```
protected-system-domains psdn {
  control-plane-bandwidth-percent percent;
  control-slot-numbers [ slot-numbers ];
  control-system-id control-system-id;
  description description;
  fpcs [ slot-numbers ];
  lcc number fpcs [ slot-numbers ];
}
```

Hierarchy Level [edit chassis system-domains]

Release Information Statement introduced in Junos OS Release 9.1.

Description Configure the Protected System Domain (PSD) identification.

Options **psd*n***—PSD identification as a numeric value.

Range: 1 through 31

The remaining statements are described separately.

Required Privilege Level view-level—To view this statement in the configuration.
control-level—To add this statement to the configuration.

Related Documentation
- Configuring an RSD and Creating PSDs on page 82

root-domain-id

Syntax root-domain-id *root-domain-id*;

Hierarchy Level [edit chassis system-domains]

Release Information Statement introduced in Junos OS Release 9.1.

Description Configure the Root System Domain (RSD) ID.

Options *root-domain-id*—RSD domain ID.
Range: 1 through 3

NOTE: This value must match the value of the SD (Root System Domain) parameter set using the baydata command.

Required Privilege Level view-level—To view this statement in the configuration.
control-level—To add this statement to the configuration.

Related Documentation
- Configuring an RSD and Creating PSDs on page 82

shared-interface

Syntax shared-interface;

Hierarchy Level [edit interfaces ge-*fpc/pic/slot*],
[edit interfaces so-*fpc/pic/slot*],
[edit interfaces xe-*fpc/pic/slot*]

Release Information Statement introduced in Junos OS Release 9.3.

Description Configure a physical interface to be a shared interface. Logical interfaces configured under the shared physical interface can be assigned to different Protected System Domains (PSDs).

Options This statement has no options.

Required Privilege Level view-level—To view this statement in the configuration.
control-level—To add this statement to the configuration.

Related Documentation
- Configuring Shared Interfaces on the RSD on page 91.
- Configuring Shared Interfaces on a PSD on page 93.
- interface-shared-with on page 112

system-domains

Syntax

```
system-domains {
  protected-system-domains psdn {
    control-plane-bandwidth-percent percent;
    control-slot-numbers [ slot-numbers ];
    control-system-id control-system-id;
    description description;
    fpcs [ slot-numbers ];
    lcc number fpcs [ slot-numbers ];
  }
  root-domain-id root-domain-id;
}
```

Hierarchy Level [edit chassis]

Release Information Statement introduced in Junos OS Release 9.1.

Description Configure Root System Domain (RSD) and Protected System Domain (PSD) parameters.

Options All statements are described separately.

Required Privilege Level view-level—To view this statement in the configuration.
control-level—To add this statement to the configuration.

Related Documentation

- Configuring an RSD and Creating PSDs on page 82

CHAPTER 13

Configuration Examples

Example: Configuring a JCS1200 Platform and a Single T Series Router

In this configuration example, the JCS1200 platform is connected to a single T640 router. The configuration is described in the following sections:

Requirements

This configuration example requires the following hardware and software components:

- Junos OS Release 9.1 or later
- JCS1200 platform with Routing Engines in slots 1, 2, 3, and 4
- T640 router with FPCs in slots 0, 1, 2, and 3

Overview

This example configures the JCS1200 platform and one connected T640 router. For this example, you need to configure a single Root System Domain (RSD), create Protected System Domains (PSDs), and assign Routing Engines in the JCS chassis and Flexible PIC Controllers (FPCs) on the T640 router to each PSD as follows:

- PSD1—Routing Engines in slots 1 and 2 on the JCS chassis and FPCs in slots 0, 1, and 2 on the T640 router
- PSD2—Routing Engines in slots 3 and 4 on the JCS chassis and the FPC in slot 3 on the T640 router

Configuration

First, configure the Routing Engines on the JCS1200 platform using the management module command-line interface (CLI). Then, configure the T640 router using the Junos OS CLI.

- JCS1200 Platform Configuration on page 118
- T640 Router Configuration on page 119

JCS1200 Platform Configuration

Step-by-Step Procedure

To configure the parameters required for the Routing Engines in the JCS chassis:

1. Log in to the JCS management module.
2. Assign the Routing Engines in slots 1 (primary) and 2 (backup) to RSD1 and PSD1:

   ```
   system> baydata —b 01 —data “V01–JCS01–SD01–PSD01–REP01–REB02–PRDT640”
   system> baydata —b 02 —data “V01–JCS01–SD01–PSD01–REP01–REB02–PRDT640”
   ```

3. Assign Routing Engines in slots 3 (primary) and 4 (backup) to RSD1 and PSD2:

   ```
   system> baydata —b 03 —data “V01–JCS01–SD01–PSD02–REP03–REB04–PRDT640”
   system> baydata —b 04 —data “V01–JCS01–SD01–PSD02–REP03–REB04–PRDT640”
   ```

   The **baydata** command specifies the target as a bay blade (**-b**), identifies the blade (Routing Engine) slot, and specifies the following parameters:

   - **V**—Product version.
   - **JCS**—JCS platform identifier.
   - **SD**—RSD identifier.
   - **PSD**—PSD identifier.
   - **REP**—Slot in which the primary (or master) Routing Engine resides.
   - **REB**—Slot in which the backup Routing Engine resides.
   - **PRD**—Juniper Networks router product.

Results

Display the results of the configuration:

```
system> baydata

Bay  Status            Definition
1    Supported         V01-JCS01-SD01-PSD01-REP01-REB02-PRDT640
2    Supported         V01-JCS01-SD01-PSD01-REP01-REB02-PRDT640
3    Supported         V01-JCS01-SD01-PSD02-REP03-REB04-PRDT640
4    Supported         V01-JCS01-SD01-PSD02-REP03-REB04-PRDT640
5    No blade present
6    No blade present
7    No blade present
8    No blade present
9    No blade present
10   No blade present
11   No blade present
12   No blade present
```

T640 Router Configuration

Step-by-Step Procedure

To configure the RSD and create the PSDs on the T640 router:

1. At the **[edit chassis system-domains]** hierarchy level of the Junos OS CLI, include the **root-domain-id 1** statement to identify the RSD.
2. At the **[edit chassis system-domains]** hierarchy level, include the **protected-system-domains psd1** statement to create PSD1.
3. At the **[edit chassis system-domains protected-system-domains psd1]** hierarchy level:
   a. Include the **fpcs 0 fpcs 1 fpcs 2** statement to assign the FPCs in slots 0, 1, and 2 to PSD1.
   b. Include the **control-system-id 1** statement to identify the JCS1200 platform.
   c. Include the **control-slot-numbers 1 control-slot-numbers 2** statement to assign the Routing Engines in slots 1 and 2 in the JCS chassis to PSD1.
4. At the **[edit chassis system-domains]** hierarchy level, include the **protected-system-domains psd2** statement to create PSD2.
5. At the **[edit chassis system-domains protected-system-domains psd2]** hierarchy level:
   a. Include the **fpcs 3** statement to assign the FPC in slot 3 to PSD2.
   b. Include the **control-system-id 1** statement to identify the JCS1200 platform.
   c. Include the **control-slot-numbers 3 control-slot-numbers 4** statement to assign the Routing Engines in slots 3 and 4 in the JCS chassis to PSD2.

Results Display the results of the configuration:

```
system-domains {
  root-domain-id 1;
  protected-system-domains {
    psd1 {
      description “psd for customer1”;
      fpcs [ 0 1 2 ];
      control-system-id 1;
      control-slot-numbers [ 1 2 ];
    }
    psd2 {
      description “psd for customer2”;
      fpcs [ 3 ];
      control-system-id 1;
      control-slot-numbers [ 3 4 ];
    }
  }
}
```

Verification

Verify the status of the RSD and PSDs:

- Verifying Configured PSDs on page 120
- Verifying PSD Hardware on page 120

Verifying Configured PSDs

Purpose Verify that the PSDs configured under the RSD are online.

Action On the RSD, issue the **show psd** command:

```
user@rsd1> show chassis psd

PSD  Description         State               Uptime
 1   psd for customer1   Online              1 hour, 12 minutes, 15 seconds
 2   psd for customer2   Online              1 hour, 12 minutes, 15 seconds
```

Meaning PSD1 and PSD2 are configured and online.

Verifying PSD Hardware

Purpose Verify that each PSD has been assigned the correct FPCs on the T640 router and the appropriate Routing Engines on the JCS1200 platform.

Action Issue the **show chassis hardware** command:

PSD1

```
user@psd1> show chassis hardware
rsd-re0:
--------------------------------------------------------------------------

Hardware inventory:
Item            Version  Part number  Serial number     Description
Chassis                               S19068            T1600
```

```
Midplane         REV 04   710-002726   AX5666           T640 Backplane
CIP              REV 05   710-002895   HC0474           T Series CIP
PEM 0           Rev 06   740-017906   TE27806          Power Entry Module 3x80
SCG 0            REV 04   710-003423   HF6042           T640 Sonet Clock Gen.
SCG 1            REV 11   710-003423   HW7765           T640 Sonet Clock Gen.
Routing Engine 0 REV 04   740-014082   1000660098       RE-A-2000
Routing Engine 1 REV 01   740-005022   210865700324     RE-3.0
CB 0             REV 06   710-007655   WE9377           Control Board (CB-T)
CB 1             REV 06   710-007655   WE9379           Control Board (CB-T)
FPC 0            REV 07   710-013035   DN5856           FPC Type 3-ES
  CPU            REV 07   710-016744   DM3593           ST-PMB2
  PIC 0          REV 05   750-007141   HG2427           10x 1GE(LAN), 1000 BASE

    Xcvr 1       REV 01   740-011613   P9F15ZN          SFP-SX
    Xcvr 2       REV 01   740-011613   P9F11CC          SFP-SX
    Xcvr 3       REV 01   740-011613   P9F1AM1          SFP-SX
    Xcvr 4       REV 01   740-011613   P9F11X1          SFP-SX
    Xcvr 5       REV 01   740-011613   P9F1715          SFP-SX
  PIC 1          REV 01   750-004695   HD5978           1x Tunnel
  PIC 2          REV 05   750-004695   HT4383           1x Tunnel
  MMB 0          REV 04   710-016036   DN6989           ST-MMB2
FPC 1            REV 05   710-010157   HR5838           E-FPC Type 2
  CPU            REV 01   710-010169   HN3431           FPC CPU-Enhanced
  PIC 0          REV 07   750-001900   AT1697           1x OC-48 SONET, SMSR
  PIC 1          REV 08   750-009066   NA0423           1x OC-48 SONET SFP
    Xcvr 0       REV 01   740-011785   PAQ0Z8C          SFP-SR
  PIC 2          REV 11   750-003737   NA2450           4x G/E, 1000 BASE-SX
  PIC 3          REV 05   750-001850   WD3132           1x Tunnel
  MMB 1          REV 01   710-010171   HN6495           MMB-288mbit
FPC 2            REV 04   710-013558   JP3361           E2-FPC Type 2
  CPU            REV 02   710-013563   JN4128           FPC CPU-Enhanced
  PIC 0          REV 07   750-010618   CZ6647           4x G/E SFP, 1000 BASE
    Xcvr 0       REV 01   740-011613   P8E2SSM          SFP-SX
    Xcvr 1       REV 01   740-011782   P8C29XQ          SFP-SX
    Xcvr 2       REV 01   740-011782   P86218N          SFP-SX
    Xcvr 3       REV 01   740-011782   PB82CR5          SFP-SX
  PIC 2          REV 16   750-008155   NB8516           2x G/E IQ, 1000 BASE
    Xcvr 0       REV 01   740-007326   P11WLS9          SFP-SX
    Xcvr 1       REV 01   740-011613   PAM2Y9G          SFP-SX
  PIC 3          REV 16   750-008155   ND7764           2x G/E IQ, 1000 BASE
    Xcvr 0       REV 01   740-011782   PBA29H8          SFP-SX
  MMB 1          REV 05   710-010171   JP5579           MMB-5M3-288mbit
SPMB 0           REV 10   710-003229   WE9582           T Series Switch CPU
SPMB 1           REV 10   710-003229   WE9587           T Series Switch CPU
SIB 0            REV 05   710-013074   DB2624           SIB-I8-SF
SIB 1            REV 05   710-013074   DE7881           SIB-I8-SF
SIB 2            REV 05   710-013074   DE7889           SIB-I8-SF
SIB 3            REV 05   710-013074   DE9972           SIB-I8-SF
SIB 4            REV 05   710-013074   DE7937           SIB-I8-SF
Fan Tray 0                                              Front Top Fan Tray
Fan Tray 1                                              Front Bottom Fan Tray
Fan Tray 2                                              Rear Fan Tray

psd1-re0:
--------------------------------------------------------------------------
Hardware inventory:
Item             Version  Part number  Serial number     Description
Chassis                   740-023156   SNJCSJCSAC00      JCS1200 AC Chassis
```

```
Routing Engine 1 REV 01   740-023157   SNBLJCSAC005      RE-JCS1200-1x2330
Routing Engine 2 REV 01   740-023158   SNBLJCSAC006      RE-JCS1200-1x2330
```

PSD2

```
user@psd2> show chassis hardware
rsd-re0:
--------------------------------------------------------------------------
Hardware inventory:
Item             Version  Part number  Serial number     Description
Chassis                                S19068            T1600
Midplane         REV 04   710-002726   AX5666            T640 Backplane
CIP              REV 05   710-002895   HC0474            T Series CIP
PEM 0            Rev 06   740-017906   TE27806           Power Entry Module 3x80
SCG 0            REV 04   710-003423   HF6042            T640 Sonet Clock Gen.
SCG 1            REV 11   710-003423   HW7765            T640 Sonet Clock Gen.
Routing Engine 0 REV 04   740-014082   1000660098        RE-A-2000
Routing Engine 1 REV 01   740-005022   210865700324      RE-3.0
CB 0             REV 06   710-007655   WE9377            Control Board (CB-T)
CB 1             REV 06   710-007655   WE9379            Control Board (CB-T)
FPC 3            REV 01   710-013560   JE4851            E2-FPC Type 3
  CPU            REV 05   710-010169   HX8637            FPC CPU-Enhanced
  MMB 0          REV 04   710-010171   HX7130            MMB-5M3-288mbit
  MMB 1          REV 04   710-010171   HX9460            MMB-5M3-288mbit
SPMB 0           REV 10   710-003229   WE9582            T Series Switch CPU
SPMB 1           REV 10   710-003229   WE9587            T Series Switch CPU
SIB 0            REV 05   710-013074   DB2624            SIB-I8-SF
SIB 1            REV 05   710-013074   DE7881            SIB-I8-SF
SIB 2            REV 05   710-013074   DE7889            SIB-I8-SF
SIB 3            REV 05   710-013074   DE9972            SIB-I8-SF
SIB 4            REV 05   710-013074   DE7937            SIB-I8-SF
Fan Tray 0                                                Front Top Fan Tray
Fan Tray 1                                                Front Bottom Fan Tray
Fan Tray 2                                                Rear Fan Tray

psd2-re0:
--------------------------------------------------------------------------
Hardware inventory:
Item             Version  Part number  Serial number     Description
Chassis                   740-023156   SNJCSJCSAC00      JCS1200 AC Chassis
Routing Engine 3 REV 01   740-023160   SNBLJCSAC007      RE-JCS1200-1x2330
Routing Engine 4 REV 01   740-023161   SNBLJCSAC008      RE-JCS1200-1x2330
```

Meaning

On PSD1, under the **rsd-re0** heading, you can see that PSD1 owns the FPCs in slots 0, 1, and 2 in the T640 chassis. Under the **psd1-re0** output field, the output indicates that the Routing Engines in slots 1 and 2 in the JCS chassis are assigned to PSD1.

On PSD2, under the **rsd-re0** heading, you can see that PSD2 owns the FPC in slot 3 in the T640 chassis. Under the **psd2-re0** output field, the output indicates that the Routing Engines in slots 3 and 4 in the JCS chassis are assigned to PSD2.

Related Documentation

- Configuring an RSD and Creating PSDs on page 82

Example: Configuring a JCS1200 Platform and Multiple T Series Routers

In this configuration example, the JCS1200 platform is connected to multiple T Series routers. The configuration is described in the following sections:

Requirements

This configuration example requires the following hardware and software components:

- Junos OS Release 9.2 or later
- JCS1200 platform with Routing Engines in slots 1 through 12
- T320 router with FPCs in slots 0 through 7
- T640 router with FPCs in slots 0 through 7
- T1600 router with FPCs in slots 0 through 7

Overview

This example configures the JCS1200 platform and three connected T Series routers. For this example, you need to configure a Root System Domain (RSD) for each connected T Series router. Within each RSD, create Protected System Domains (PSDs) and assign Flexible PIC Controllers (FPCs) and Routing Engines to each PSD.

Configuration

First, configure the Routing Engines on the JCS1200 platform using the management module CLI. Then, configure each T Series router using the Junos OS CLI.

JCS1200 Platform Configuration

Step-by-Step Procedure

To configure the parameters required for the Routing Engines in the JCS chassis:

1. Log in to the JCS management module.
2. Refer to the data presented in Table 18 on page 124 for Routing Engine assignments.

Table 18: JCS Chassis Routing Engine Assignments

RSD ID	PSD ID	Primary Routing Engine	Backup Routing Engine	Routing Platform
1	1	01	02	T320
	2	03	04	
2	3	05	06	T640
	4	07	08	
3	5	09	10	T1600
	6	11	12	

3. Assign the Routing Engines in slots 1 (primary) and 2 (backup) to RSD1 and PSD1, which are associated with the T320 router. Assign the Routing Engines in slots 3 (primary) and 4 (backup) to RSD1 and PSD2, which also belong to the T320 router.

```
system> baydata —b 01 —data “V01–JCS01–SD01–PSD01–REP01–REB02–PRDT320”
system> baydata —b 02 —data “V01–JCS01–SD01–PSD01–REP01–REB02–PRDT320”
system> baydata —b 03 —data “V01–JCS01–SD01–PSD02–REP03–REB04–PRDT320”
system> baydata —b 04 —data “V01–JCS01–SD01–PSD02–REP03–REB04–PRDT320”
```

4. Assign the Routing Engines in slots 5 (primary) and 6 (backup) to RSD2 and PSD3, which are associated with the T640 router. Assign the Routing Engines in slots 7 (primary) and 8 (backup) to RSD2 and PSD4, which also belong to the T640 router.

```
system> baydata —b 05 —data “V01–JCS01–SD02–PSD03–REP05–REB06–PRDT640”
system> baydata —b 06 —data “V01–JCS01–SD02–PSD03–REP05–REB06–PRDT640”
system> baydata —b 07 —data “V01–JCS01–SD02–PSD04–REP07–REB08–PRDT640”
system> baydata —b 08 —data “V01–JCS01–SD02–PSD04–REP07–REB08–PRDT640”
```

5. Assign the Routing Engines in slots 9 (primary) and 10 (backup) to RSD3 and PSD5, which are associated with the T1600 router. Assign the Routing Engines in slots 11 (primary) and 12 (backup) to RSD3 and PSD6, which also belong to the T1600 router.

```
system> baydata —b 09 —data “V01–JCS01–SD03–PSD05–REP09–REB10–PRDT1600”
system> baydata —b 10 —data “V01–JCS01–SD03–PSD05–REP09–REB10–PRDT1600”
system> baydata —b 11 —data “V01–JCS01–SD03–PSD06–REP11–REB12–PRDT1600”
system> baydata —b 12 —data “V01–JCS01–SD03–PSD06–REP11–REB12–PRDT1600”
```

Results Display the results of the configuration:

```
system> baydata

Bay   Status           Definition
1     Supported        V01-JCS01-SD01-PSD01-REP01-REB02-PRDT320
2     Supported        V01-JCS01-SD01-PSD01-REP01-REB02-PRDT320
3     Supported        V01-JCS01-SD01-PSD02-REP03-REB04-PRDT320
4     Supported        V01-JCS01-SD01-PSD02-REP03-REB04-PRDT320
5     Supported        V01-JCS01-SD02-PSD03-REP05-REB06-PRDT640
6     Supported        V01-JCS01-SD02-PSD03-REP05-REB06-PRDT640
7     Supported        V01-JCS01-SD02-PSD04-REP07-REB08-PRDT640
8     Supported        V01-JCS01-SD02-PSD04-REP07-REB08-PRDT640
9     Supported        V01-JCS01-SD03-PSD05-REP09-REB10-PRDT1600
10    Supported        V01-JCS01-SD03-PSD05-REP09-REB10-PRDT1600
```

```
11    Supported          V01-JCS01-SD03-PSD06-REP11-REB12-PRDT1600
12    Supported          V01-JCS01-SD03-PSD06-REP11-REB12-PRDT1600
```

T320 Router Configuration

Step-by-Step Procedure

To configure the RSD and create the PSDs on the T320 router:

1. Log in to the T320 router.
2. Configure RSD1 and the parameters specified in Table 19 on page 125.

Table 19: T320 Router Configuration

PSD	FPCs	Redundant Routing Engine Slots
1	0, 1, 2, and 3	1 and 2
2	4, 5, 6, and 7	3 and 4

3. At the **[edit chassis system-domains]** hierarchy level of the Junos OS CLI, include the **root-domain-id 1** statement to identify the RSD.
4. At the **[edit chassis system-domains]** hierarchy level, include the **protected-system-domains psd1** statement to create PSD1.
5. At the **[edit chassis system-domains protected-system-domains psd1]** hierarchy level:
   a. Include the **fpcs 0 fpcs 1 fpcs 2 fpcs 3** statement to assign the FPCs in slots 0, 1, 2, and 3 to PSD1.
   b. Include the **control-system-id 1** statement to identify the JCS1200 platform.
   c. Include the **control-slot-numbers 1 control-slot-numbers 2** statement to assign the Routing Engines in slots 1 and 2 in the JCS chassis to PSD1.
6. At the **[edit chassis system-domains]** hierarchy level, include the **protected-system-domains psd2** statement to create PSD2.
7. At the **[edit chassis system-domains protected-system-domains psd2]** hierarchy level:
   a. Include the **fpcs 4 fpcs 5 fpcs 6 fpcs 7** statement to assign the FPCs in slots 4, 5, 6, and 7 to PSD2.
   b. Include the **control-system-id 1** statement to identify the JCS1200 platform.
   c. Include the **control-slot-numbers 3 control-slot-numbers 4** statement to assign the Routing Engines in slots 3 and 4 in the JCS chassis to PSD2.

Results

Display the results of the configuration:

```
system-domains {
  root-domain-id 1;
  protected-system-domains {
```

```
        psd1 {
          description “psd for customer1”;
          fpcs [ 0 1 2 3];
          control-system-id 1;
          control-slot-numbers [ 1 2 ];
        }
        psd2 {
          description “psd for customer2”;
          fpcs [ 4 5 6 7];
          control-system-id 1;
          control-slot-numbers [ 3 4 ];
        }
      }
    }
```

T640 Router Configuration

Step-by-Step Procedure

To configure the RSD and create the PSDs on the T640 router:

1. Log in to the T640 router.
2. Configure RSD2 and the parameters specified in Table 20 on page 126.

Table 20: T640 Router Configuration

PSD	FPCs	Redundant Routing Engine Slots
3	0, 1, 2, and 3	5 and 6
4	4, 5, 6, and 7	7 and 8

3. At the **[edit chassis system-domains]** hierarchy level of the Junos OS CLI, include the **root-domain-id 2** statement to identify the RSD.
4. At the **[edit chassis system-domains]** hierarchy level, include the **protected-system-domains psd1** statement to create PSD3.
5. At the **[edit chassis system-domains protected-system-domains psd3]** hierarchy level:
   a. Include the **fpcs 0 fpcs 1 fpcs 2 fpcs 3** statement to assign the FPCs in slots 0, 1, 2, and 3 to PSD3.
   b. Include the **control-system-id 1** statement to identify the JCS1200 platform.
   c. Include the **control-slot-numbers 5 control-slot-numbers 6** statement to assign the Routing Engines in slots 5 and 6 in the JCS chassis to PSD3.
6. At the **[edit chassis system-domains]** hierarchy level, include the **protected-system-domains psd4** statement to create PSD4.
7. At the **[edit chassis system-domains protected-system-domains psd4]** hierarchy level:
   a. Include the **fpcs 4 fpcs 5 fpcs 6 fpcs 7** statement to assign the FPCs in slots 4, 5, 6, and 7 to PSD4.

b. Include the **control-system-id 1** statement to identify the JCS1200 platform.

c. Include the **control-slot-numbers 7 control-slot-numbers 8** statement to assign the Routing Engines in slots 7 and 8 in the JCS chassis to PSD4.

Results Display the configuration results:

```
system-domains {
  root-domain-id 2;
  protected-system-domains {
    psd3 {
      description “psd for customer3”;
      fpcs [ 0 1 2 3];
      control-system-id 1;
      control-slot-numbers [ 5 6 ];
    }
    psd4 {
      description “psd for customer4”;
      fpcs [ 4 5 6 7];
      control-system-id 1;
      control-slot-numbers [ 7 8 ];
    }
  }
}
```

T1600 Router Configuration

Step-by-Step Procedure To configure the RSD and create the PSDs on the T1600 router:

1. Log in to the T1600 router.
2. Configure RSD3 and the parameters specified in Table 21 on page 127.

Table 21: T1600 Router Configuration

PSD	FPCs	Redundant Routing Engine Slots
5	0, 1, 2, and 3	9 and 10
6	4, 5, 6, and 7	11 and 12

3. At the **[edit chassis system-domains]** hierarchy level of the Junos OS CLI, include the **root-domain-id 3** statement to identify the RSD.
4. At the **[edit chassis system-domains]** hierarchy level, include the **protected-system-domains psd5** statement to create PSD5.
5. At the **[edit chassis system-domains protected-system-domains psd5]** hierarchy level:

   a. Include the **fpcs 0 fpcs 1 fpcs 2 fpcs 3** statement to assign the FPCs in slots 0, 1, 2, and 3 to PSD3.

   b. Include the **control-system-id 1** statement to identify the JCS1200 platform.

c. Include the **control-slot-numbers 9 control-slot-numbers 10** statement to assign the Routing Engines in slots 9 and 10 in the JCS chassis to PSD5.

6. At the **[edit chassis system-domains]** hierarchy level, include the **protected-system-domains psd6** statement to create PSD6.

7. At the **[edit chassis system-domains protected-system-domains psd6]** hierarchy level:

   a. Include the **fpcs 4 fpcs 5 fpcs 6 fpcs 7** statement to assign the FPCs in slots 4, 5, 6, and 7 to PSD4.

   b. Include the **control-system-id 1** statement to identify the JCS1200 platform.

   c. Include the **control-slot-numbers 11 control-slot-numbers 12** statement to assign the Routing Engines in slots 11 and 12 in the JCS chassis to PSD6.

Results Display the configuration results:

```
system-domains {
  root-domain-id 3;
  protected-system-domains {
    psd5 {
      description “psd for customer5”;
      fpcs [ 0 1 2 3];
      control-system-id 1;
      control-slot-numbers [ 9 10 ];
    }
    psd6 {
      description “psd for customer6”;
      fpcs [ 4 5 6 7];
      control-system-id 1;
      control-slot-numbers [ 11 12 ];
    }
  }
}
```

TX Matrix Plus Router Configuration

Step-by-Step Procedure To configure the RSD and create the PSDs on the TX Matrix Plus router:

1. Log in to the TX Matrix Plus router.

2. Configure RSD3 and the parameters specified.

Table 22: TX Matrix Plus

PSD	FPCs	Redundant Routing Engine Slots
5	0, 1, 2, and 3	9 and 10
6	4, 5, 6, and 7	11 and 12

3. At the **[edit chassis system-domains]** hierarchy level of the Junos OS CLI, include the **root-domain-id 3** statement to identify the RSD.
4. At the **[edit chassis system-domains]** hierarchy level, include the **protected-system-domains psd5** statement to create PSD5.
5. At the **[edit chassis system-domains protected-system-domains psd5]** hierarchy level:
   a. Include the **lcc 3 fpcs 0 fpcs 1 fpcs 2 fpcs 3** statement to assign the FPCs in slots 0, 1, 2, and 3 to PSD3.
   b. Include the **control-system-id 1** statement to identify the JCS1200 platform.
   c. Include the **control-slot-numbers 9 control-slot-numbers 10** statement to assign the Routing Engines in slots 9 and 10 in the JCS chassis to PSD5.
6. At the **[edit chassis system-domains]** hierarchy level, include the **protected-system-domains psd6** statement to create PSD6.
7. At the **[edit chassis system-domains protected-system-domains psd6]** hierarchy level:
   a. Include the **lcc 4 fpcs 4 fpcs 5 fpcs 6 fpcs 7** statement to assign the FPCs in slots 4, 5, 6, and 7 to PSD4.
   b. Include the **control-system-id 1** statement to identify the JCS1200 platform.
   c. Include the **control-slot-numbers 11 control-slot-numbers 12** statement to assign the Routing Engines in slots 11 and 12 in the JCS chassis to PSD6.

Verification

Verifying Configured PSDs

Purpose Verify that the PSDs configured under each RSD are online.

Action On each RSD issue the **show chassis psd** command:

RSD1

```
user@rsd1> show chassis psd

PSD  Description         State               Uptime
 1   psd for customer1   Online              1 hour, 12 minutes, 15 seconds
 2   psd for customer2   Online              1 hour, 12 minutes, 15 seconds
```

RSD2

```
user@rsd2> show chassis psd

PSD  Description         State               Uptime
 3   psd for customer3   Online              1 hour, 12 minutes, 15 seconds
 4   psd for customer4   Online              1 hour, 12 minutes, 15 seconds
```

RSD3

```
user@rsd3> show chassis psd

PSD  Description         State               Uptime
 5   psd for customer5   Online              1 hour, 12 minutes, 15 seconds
 6   psd for customer6   Online              1 hour, 12 minutes, 15 seconds
```

Meaning RSD1 owns PSD1 and PSD2. RSD2 owns PSD3 and PSD4. RSD3 owns PSD4 and PSD5. All PSDs are online.

Verifying PSD Ownership of FPCs

Purpose Verify that each PSD is assigned the correct FPCs on the T Series router.

Action For each PSD, issue the **show chassis fpc** command. For example:

```
user@psd1> show chassis fpc

rsd-re0:
--------------------------------------------------------------------------
                     Temp  CPU Utilization (%)   Memory    Utilization (%)
Slot State            (C)  Total  Interrupt      DRAM (MB) Heap     Buffer
  0  Online            34      3          1       256        12         50
  1  Online            52      4          0       2048        3         24
  2  Online            34      3          1       256        12         50
  3  Online            52      4          0       2048        3         24
```

Meaning In this example, PSD1 owns the FPCs in slots 0, 1, 2, and 3 on the T Series router.

Verifying PSD Ownership of Routing Engines

Purpose Verify that each PSD owns the correct Routing Engines on the JCS chassis.

Action On each PSD, issue the **show chassis routing-engine** command. For example:

```
user@psd2> show chassis routing-engine

Routing Engine status:
  Slot 0:
    Physical Slot                 3
    Current state                 Master
    Election priority             Master (default)
    DRAM                      13312 MB
    Memory utilization           11 percent
    CPU utilization:
      User                        0 percent
      Background                  0 percent
      Kernel                      0 percent
      Interrupt                   0 percent
      Idle                      100 percent
    Model                         RE-JCS1200-1x2330
    Serial ID                     SNBLBCD001
    Start time                    2008-09-03 13:49:00 PDT
    Uptime                        27 days, 2 hours, 50 minutes, 9 seconds
    Last reboot reason            0x49:power cycle/failure power-button hard
power off thermal shutdown
Routing Engine status:
  Slot 1:
```

```
    Physical Slot                   4
    Current state                   Backup
    Election priority               Backup (default)
    DRAM                      13312 MB
    Memory utilization           10 percent
    CPU utilization:
      User                        0 percent
      Background                  0 percent
      Kernel                      0 percent
      Interrupt                   0 percent
      Idle                      100 percent
    Model                           RE-JCS1200-1x2330
    Serial ID                       SNBLBCD002
    Start time                      2008-09-24 17:04:01 PDT
    Uptime                          5 days, 23 hours, 35 minutes, 18 seconds
    Last reboot reason              0x49:power cycle/failure power-button hard
power off thermal shutdown
    Load averages:                  1 minute   5 minute  15 minute
                                        0.00       0.00       0.00
```

Meaning In this example, PSD2 owns the Routing Engines in slots 3 and 4 on the JCS chassis as indicated by the values in the **Physical Slot** fields. The Routing Engine in slot 3 is the **master**, whereas the Routing Engine in slot 4 is the **backup**.

Related Documentation

- Protected System Domains on page 4
- System Domains Configuration Hierarchy on page 81
- Example: Configuring a JCS1200 Platform and a Single T Series Router on page 117

Example: Configuring Shared Interfaces (SONET)

In this configuration example, two Protected System Domains (PSDs) share a single interface on a Flexible PIC Controller (FPC) that is owned by the Root System Domain (RSD).

Requirements

This configuration example requires the following hardware and software components:

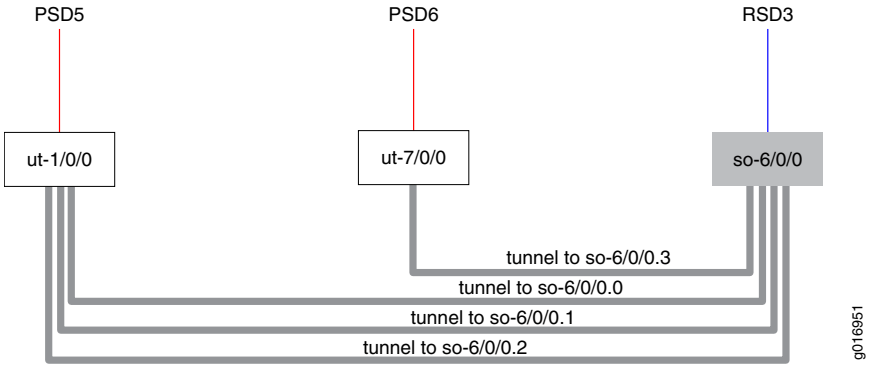
- Junos OS Release 9.3 or later
- JCS1200 platform with Routing Engines in slots 5, 6, and 7
- T640 router with FPCs in slots 1 through 7
- Two Tunnel PICs—one installed on the FPC in slot 1 and the other installed on the FPC in slot 7
- One SONET PIC installed on the FPC in slot 6

Overview

With this example configuration, PSD5 and PSD6 can both transport packets using a single SONET PIC owned by RSD3.

As illustrated in Figure 13 on page 132, RSD3 owns physical interface (**so-6/0/0**). PSD5 owns logical interfaces **so-6/0/0.0**, **so-6/0/0.1**, and **so-6/0/0.2**. A cross-connect using tunnel interface **ut-1/0/0** transports packets between the logical interfaces configured on the PSD and the physical SONET interface on RSD3. Similarly, PSD5 owns logical interface **so-6/0/0.3** and uses **ut-7/0/0** to transport packets between **so-6/0/0.3** and the physical interface on RSD3.

Figure 13: Example: Shared Interfaces (SONET)



Configuration

First, configure the Routing Engines on the JCS1200 platform using the management module command-line interface (CLI). Then, configure each T Series router using the Junos OS CLI.

- JCS1200 Configuration on page 132
- RSD Configuration on page 133
- PSD5 Configuration on page 135
- PSD6 Configuration on page 137

JCS1200 Configuration

Step-by-Step Procedure

To configure the parameters required for the Routing Engines in the JCS chassis:

1. Log in to the JCS management module.
2. Assign the Routing Engines in slots 5 (primary) and 6 (backup) to RSD3 and PSD1. Assign the Routing Engine in slot 7 to RSD3 and PSD2.

```
system> baydata —b 05 —data “V01–JCS01–SD03–PSD01–REP05–REB06–PRDT640”
system> baydata —b 06 —data “V01–JCS01–SD03–PSD01–REP05–REB06–PRDT640”
system> baydata —b 07 —data “V01–JCS01–SD03–PSD02–REP07–REB00–PRDT640”
```

Results

Display the results of the configuration:

```
system> baydata
```

```
Bay  Status            Definition
1    No blade present
2    No blade present
3    No blade present
4    No blade present
5    Supported         V01-JCS01-SD03-PSD01-REP05-REB06-PRDT640
6    Supported         V01-JCS01-SD03-PSD01-REP05-REB06-PRDT640
7    Supported         V01-JCS01-SD03-PSD02-REP07-REB00-PRDT640
8    No blade present
9    No blade present
10   No blade present
11   No blade present
12   No blade present
```

RSD Configuration

Step-by-Step Procedure

To configure the RSD:

1. Log in to the T640 router.
2. At the **[edit chassis system-domains]** hierarchy level of the Junos OS CLI, include the **root-domain-id 3** statement to identify the RSD.
3. At the **[edit chassis system-domains]** hierarchy level, include the **protected-system-domains psd1** statement to create PSD1.
4. At the **[edit chassis system-domains protected-system-domains psd1]** hierarchy level:
   a. Include the **fpcs 1 fpcs 2 fpcs 3** statement to assign the FPCs in slots 1, 2, and 3 to PSD1.
   b. Include the **control-system-id 1** statement to identify the JCS1200 platform.
   c. Include the **control-slot-numbers 5 control-slot-numbers 6** statement to assign the Routing Engines in slots 5 and 6 in the JCS chassis to PSD1.
   d. Include the **control-plane-bandwidth-percent 50** statement to allocate 50 percent of the bandwidth on the JCS switch modules and T Series Control Boards (T-CBs) to PSD1.
5. At the **[edit chassis system-domains]** hierarchy level, include the **protected-system-domains psd2** statement to create PSD2.
6. At the **[edit chassis system-domains protected-system-domains psd2]** hierarchy level:
   a. Include the **fpcs 4 fpcs 5 fpcs 6 fpcs 7** statement to assign the FPCs in slots 4, 5, 6, and 7 to PSD2.
   b. Include the **control-system-id 1** statement to identify the JCS1200 platform.
   c. Include the **control-slot-numbers 3 control-slot-numbers 4** statement to assign the Routing Engines in slots 3 and 4 in the JCS chassis to PSD2.
   d. Include the **control-plane-bandwidth-percent 50** statement to allocate 50 percent of the bandwidth on the JCS switch modules and T-CBs to PSD2.

7. At the **[edit interfaces]** hierarchy level, include the **so-6/0/0** statement to configure the physical SONET interface.
8. At the **[edit interfaces so-6/0/0]** hierarchy level, include the **encapsulation frame-relay** statement to configure Frame Relay encapsulation on the physical interface, and include the **unit 0**, **unit 1**, **unit 2**, and **unit 3** statements to configure the logical interfaces.
9. At the **[edit interfaces so-6/0/0 unit *n*]** hierarchy level, include the following statements:
   - **interface-shared-with psd*n***—Assign the logical interface to a PSD:
     - For unit 0, the value is **5** (PSD5).
     - For unit 1, the value is **5** (PSD5).
     - For unit 2, the value is **5** (PSD5).
     - For unit 3, the value is **6** (PSD6).
   - **dlci *dlci-identifier***—Configure the data-link connection identifier (DLCI) for the point-to-point Frame Relay connection:
     - For unit 0, the value is **16**.
     - For unit 1, the value is **17**.
     - For unit 2, the value is **18**.
     - For unit 3, the value is **100**.

Results Display the results of the configuration:

```
system-domains {
  root-domain-id 3;
  protected-system-domains {
    psd5 {
      description customerA;
      fpcs [ 1 2 3 ];
      control-system-id 1;
      control-slot-numbers [ 5 6 ];
      control-plane-bandwidth-percent 50;
    }
    psd6 {
      description customerB;
      fpcs [ 4 5 7 ];
      control-system-id 1;
      control-slot-numbers 7;
      control-plane-bandwidth-percent 50;
    }
  }
  }
}
interfaces
  so-6/0/0 {
```

```
    no-keepalives;
    encapsulation frame-relay;
    unit 0 {
      interface-shared-with psd5;
      dlci 16;
    }
    unit 1 {
      interface-shared-with psd5;
      dlci 17;
    }
    unit 2 {
      interface-shared-with psd5;
      dlci 18;
    }
    unit 3 {
      interface-shared-with psd6;
      dlci 100;
    }
  }
```

PSD5 Configuration

Step-by-Step Procedure

To configure PSD5:

1. At the **[edit interfaces]** hierarchy level, include the **ut-1/0/0** statement to configure the physical tunnel interface.
2. At the **[edit interfaces ut-1/0/0]** hierarchy level, include the **unit 0**, **unit 1**, and **unit 2** statements to configure the logical tunnel interfaces.
3. At the **[edit interfaces ut-1/0/0 unit *n*]** hierarchy level, include the **peer-interface so-6/0/0.*logical-unit-number*** statement to bind the tunnel and SONET interfaces together. Use the following ***logical-unit-number*** values:
   - For unit 0, the value is **0**.
   - For unit 1, the value is **1**.
   - For unit 2, the value is **2**.
4. At the **[edit interfaces so-6/0/0]** hierarchy level, include the **encapsulation frame-relay** statement to match the configuration on the RSD, and the **shared-interface** statement to identify the physical interface as the shared interface.
5. At the **[edit interfaces so-6/0/0]** hierarchy level, include **unit 0**, **unit 1**, and **unit 2** statements to configure logical interfaces.
6. At the [**edit interfaces so-6/0/0 unit *n***] hierarchy level, include the following statements:
   - **peer-interface *peer-interface***—Bind the SONET and tunnel interface interfaces together. Use the following ***peer-interface*** values:
     - For **unit 0**, the value is **ut-1/0/0.0**.
     - For **unit 1**, the value is **ut-1/0/0.1**.

- For **unit 2**, the value is **ut-1/0/0.2**.

- **dlci *dlci***—Configure the DLCI for the point-to-point Frame Relay connection. Use the following ***dlci*** values:
  - For **unit 0**, the value is **16**.
  - For **unit 1**, the value is **17**.
  - For **unit 2**, the value is **18**.
- **family inet address *address***—Configure the IP version 4 (IPv4) suite protocol family on the logical SONET interface. Use the following ***address*** values:
  - For **unit 0**, the value is **10.70.0.1/30**.
  - For **unit 1**, the value is **17.17.17.1/30**.
  - For **unit 2**, the value is **18.18.18.1/30**.

Results Display the results of the configuration:

```
interfaces {
  ut-1/0/0 {
    unit 0 {
      peer-interface so-6/0/0.0;
    }
    unit 1 {
      peer-interface so-6/0/0.1;
    }
    unit 2 {
      peer-interface so-6/0/0.2;
    }
  }
    so-6/0/0 {
      encapsulation frame-relay;
      shared-interface;
      unit 0 {
        peer-interface ut-1/0/0.0;
        dlci 16;
        family inet {
          address 10.70.0.1/30;
        }
      }
      unit 1 {
        peer-interface ut-1/0/0.1;
        dlci 17;
        family inet {
          address 17.17.17.1/30;
        }
      }
      unit 2 {
        peer-interface ut-1/0/0.2;
        dlci 18;
        family inet {
```



```
            address 18.18.18.1/30;
          }
        }
      }
```

PSD6 Configuration

Step-by-Step Procedure

To configure PSD6:

1. At the **[edit interfaces]** hierarchy level, include the **ut-7/0/0** statement to configure the physical tunnel interface.
2. At the **[edit interfaces ut-7/0/0]** hierarchy level, include the **unit 0** statement to configure the logical tunnel interface.
3. At the **[edit interfaces ut-1/0/0 unit 0]** hierarchy level, include the **peer-interface so-6/0/0.*logical-unit-number*** statement to bind the tunnel and the SONET interfaces together.
4. At the **[edit interfaces so-6/0/0]** hierarchy level, include the **encapsulation frame-relay** statement to match the configuration on the RSD, and the **shared-interface** statement to identify the SONET interface as the shared physical interface.
5. At the **[edit interfaces so-6/0/0]** hierarchy level, include the **unit 3** statement to configure the logical interface.
6. At the **[edit interfaces so-6/0/0 unit 3]** hierarchy level, include the following statements:
   - **peer-interface ut-7/0/0.0**—Bind the SONET and tunnel interfaces together.
   - **dlci 100**—Configure the DLCI for the point-to-point Frame Relay connection.
   - **family inet address 10.10.10.1/24**—Configure the IP version 4 (IPv4) suite protocol family.

Results

Display the results of the configuration:

```
interfaces {
  ut-7/0/0 {
    unit 0 {
      peer-interface so-6/0/0.3;
    }
  }
  so-6/0/0 {
    encapsulation frame-relay;
    shared-interface;
    unit 3 {
      peer-interface ut-7/0/0.0;
      dlci 100;
      family inet {
        address 10.10.10.1/24;
      }
    }
```

```
}
```

Verification

Verifying Shared Interfaces on RSD3

Purpose From RSD3, display the status of shared interfaces.

Action Issue the **show interfaces so-6/0/0** command:

```
user@rsd3> show interfaces so-6/0/0
Physical interface: so-6/0/0, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 109
  Link-level type: Frame-Relay, MTU: 4474, Clocking: Internal, SONET mode,
  Speed: OC192, Loopback: None, FCS: 16, Payload scrambler: Enabled
  Device flags   : Present Running Down
  Interface flags: Hardware-Down Point-To-Point SNMP-Traps Internal: 0x4000
  Shared-interface  : Owner
  Link flags     : No-Keepalives DTE
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  LMI: Input: 0 (never), Output: 0 (never)
  DTE statistics:
    Enquiries sent                      : 0
    Full enquiries sent                 : 0
    Enquiry responses received          : 0
    Full enquiry responses received     : 0
  DCE statistics:
    Enquiries received                  : 0
    Full enquiries received             : 0
    Enquiry responses sent              : 0
    Full enquiry responses sent         : 0
  Common statistics:
    Unknown messages received           : 0
    Asynchronous updates received       : 0
    Out-of-sequence packets received    : 0
    Keepalive responses timedout        : 0
  CoS queues     : 8 supported, 8 maximum usable queues
  Last flapped   : 2008-08-11 10:51:51 PDT (1w1d 04:47 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  SONET alarms   : LOL, PLL
  SONET defects  : LOL, PLL, LOF, SEF, AIS-L, AIS-P

  Logical interface so-6/0/0.0 (Index 67) (SNMP ifIndex 117)
    Flags: Device-Down Point-To-Point SNMP-Traps 0x4000 Encapsulation: FR-NLPID
    Shared interface:
      Shared with: psd5
      Tunnel token: Rx: 2.517, Tx: 1.517
    Input packets : 0
    Output packets: 0
    DLCI 16
      Flags: Active
      Total down time: 00:01:09 sec, Last down: 264:48:29 ago
        Input packets : 0
```

```
      Output packets: 0
DLCI statistics:
  Active DLCI  :1  Inactive DLCI  :0

Logical interface so-6/0/0.1 (Index 68) (SNMP ifIndex 118)
  Flags: Device-Down Point-To-Point SNMP-Traps 0x4000 Encapsulation: FR-NLPID
  Shared interface:
    Shared with: psd5
    Tunnel token: Rx: 2.345, Tx: 1.346
  Input packets : 0
  Output packets: 0
  DLCI 17
    Flags: Active
    Total down time: 00:01:09 sec, Last down: 257:53:11 ago
      Input packets : 0
      Output packets: 0
DLCI statistics:
  Active DLCI  :1  Inactive DLCI  :0

Logical interface so-6/0/0.2 (Index 69) (SNMP ifIndex 119)
  Flags: Device-Down Point-To-Point SNMP-Traps 0x4000 Encapsulation: FR-NLPID
  Shared interface:
    Shared with: psd5
    Tunnel token: Rx: 2.333, Tx: 1.334
  Input packets : 0
  Output packets: 0
  DLCI 18
    Flags: Active
    Total down time: 00:01:09 sec, Last down: 284:58:21 ago
      Input packets : 0
      Output packets: 0
DLCI statistics:
  Active DLCI  :1  Inactive DLCI  :0

Logical interface so-6/0/0.3 (Index 67) (SNMP ifIndex 117)
  Flags: Device-Down Point-To-Point SNMP-Traps 0x4000 Encapsulation: FR-NLPID
  Shared interface:
    Shared with: psd5
    Tunnel token: Rx: 2.522, Tx: 1.523
  Input packets : 0
  Output packets: 0
  DLCI 100
    Flags: Active
    Total down time: 00:01:09 sec, Last down: 278:38:41 ago
      Input packets : 0
      Output packets: 0
DLCI statistics:
  Active DLCI  :1  Inactive DLCI  :0
```

Meaning Under the **Physical interface** section of the output, the **Shared-interface** field displays the value **Owner**, meaning that RSD owns the physical shared interface **so-6/0/0**. In the **Shared interface** fields for each logical interface, you see that **so-6/0/0.0**, **so-6/0/0.1**, and **so-6/0/0.2** are shared with PSD5, whereas logical interface **so-6/0/0.3** is shared with PSD6.

Verifying Shared Interfaces on PSD5

Purpose From PSD5, display the status of shared interfaces.

Action Issue the **show interfaces so-6/0/0** command:

```
user@psd5> show interfaces so-6/0/0
Physical interface: so-6/0/0, Enabled, Physical link is Up
  Interface index: 151, SNMP ifIndex: 19353
  Link-level type: Frame-Relay, MTU: 4474, Clocking: Internal, Speed: OC192,
  Loopback: None, FCS: 16, Payload scrambler: Enabled
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Shared-interface  : Non-Owner
  Link flags     : No-Keepalives DTE
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  CoS queues     : 8 supported, 8 maximum usable queues
  Last flapped   : Never
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)

  Logical interface so-6/0/0.0 (Index 68) (SNMP ifIndex 19352)
    Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: FR-NLPID
    Shared interface:
      Peer interface: ut-1/0/0.0
      Tunnel token: Rx: 2.455, Tx: 1.456
    Input packets : 9
    Output packets: 10
    Protocol inet, MTU: 4470
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 16.16.0.0/30, Local: 16.16.0.1, Broadcast: 16.16.0.3
    DLCI 16
      Flags: Active
      Total down time: 00:00:00 sec, Last down: 00:00:55 ago
        Input packets : 9
        Output packets: 10
  DLCI statistics:
    Active DLCI  :1  Inactive DLCI  :0

  Logical interface so-6/0/0.1 (Index 68) (SNMP ifIndex 19352)
    Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: FR-NLPID
    Shared interface:
      Peer interface: ut-1/0/0.1
      Tunnel token: Rx: 2.567, Tx: 1.568
    Input packets : 9
    Output packets: 10
    Protocol inet, MTU: 4470
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 16.16.0.0/30, Local: 16.16.0.1, Broadcast: 16.16.0.3
    DLCI 17
      Flags: Active
      Total down time: 00:00:00 sec, Last down: 00:00:55 ago
        Input packets : 9
        Output packets: 10
  DLCI statistics:
    Active DLCI  :1  Inactive DLCI  :0


  Logical interface so-6/0/0.2 (Index 68) (SNMP ifIndex 19352)
    Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: FR-NLPID
    Shared interface:
      Peer interface: ut-1/0/0.2
      Tunnel token: Rx: 2.567, Tx: 1.568
    Input packets : 9
    Output packets: 10
```



```
    Protocol inet, MTU: 4470
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 16.16.0.0/30, Local: 16.16.0.1, Broadcast: 16.16.0.3
    DLCI 18
      Flags: Active
      Total down time: 00:00:00 sec, Last down: 00:00:55 ago
        Input packets : 9
        Output packets: 10
  DLCI statistics:
    Active DLCI  :1  Inactive DLCI  :0
```

Meaning Under the **Physical interfaces** section of the output, the **Shared-interface** field displays a value of **Non-owner**, indicating that the shared physical interface **so-6/0/0** is not owned by PSD5. The **Shared interface** field for each logical interface provides the name of its peer uplink tunnel (**ut-**) interface. For example, for **so-6/0/0.0**, the peer interface is **ut-1/0/0.0**.

Verifying Shared Interfaces on PSD6

Purpose From PSD6, display the status of shared interfaces.

Action Issue the **show interfaces so-6/0/0** command:

```
user@psd6> show interfaces so-6/0/0
Physical interface: so-6/0/0, Enabled, Physical link is Up
  Interface index: 151, SNMP ifIndex: 19353
  Link-level type: Frame-Relay, MTU: 4474, Clocking: Internal, Speed: OC192,
  Loopback: None, FCS: 16, Payload scrambler: Enabled
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Shared-interface  : Non-Owner
  Link flags     : No-Keepalives DTE
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  CoS queues     : 8 supported, 8 maximum usable queues
  Last flapped   : Never
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)

  Logical interface so-6/0/0.3 (Index 68) (SNMP ifIndex 19352)
    Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: FR-NLPID
    Shared interface:
      Peer interface: ut-7/0/0.3
      Tunnel token: Rx: 2.455, Tx: 1.456
    Input packets : 9
    Output packets: 10
    Protocol inet, MTU: 4470
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 16.16.0.0/30, Local: 16.16.0.1, Broadcast: 16.16.0.3
    DLCI 100
      Flags: Active
      Total down time: 00:00:00 sec, Last down: 00:00:55 ago
        Input packets : 9
        Output packets: 10
  DLCI statistics:
    Active DLCI  :1  Inactive DLCI  :0
```

Meaning Under the **Physical interfaces** section of the output, the **Shared-interface** field displays a value of **Non-owner**, indicating that the shared physical interface **so-6/0/0** is not owned

by PSD6. The **Shared interface** field for **so-6/0/0.3** indicates that its peer interface is **ut-7/0/0.3**.

Related Documentation

- Configuring Shared Interfaces on the RSD on page 91
- Configuring Shared Interfaces on a PSD on page 93

Example: Configuring Shared Interfaces (Ethernet)

In this configuration example, two Protected System Domains (PSDs) share a single interface on a Flexible PIC Controller (FPC) that is owned by the Root System Domain (RSD).

Requirements

This configuration example requires the following hardware and software components:

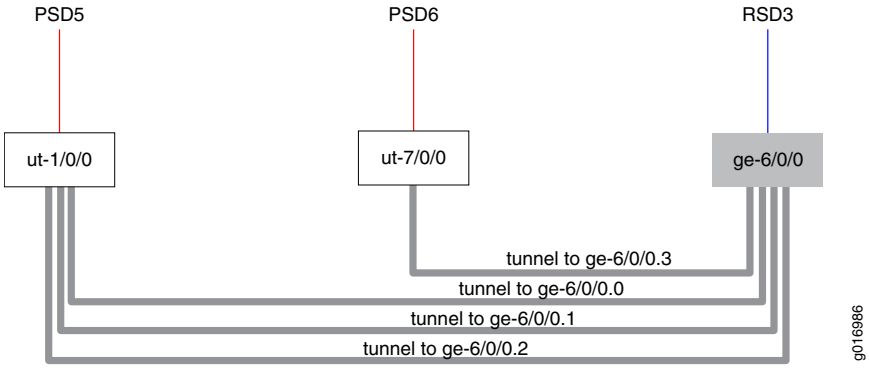
- Junos OS Release 9.4 or later
- JCS1200 platform with Routing Engines in slots 5, 6, and 7
- T640 router with FPCs in slots 1 through 7
- Two Tunnel PICs—one installed on the FPC in slot 1 and the other installed on the FPC in slot 7
- One Gigabit Ethernet PIC installed on the FPC in slot 6

Overview

With this example configuration, PSD5 and PSD6 can both transport packets using a single Gigabit Ethernet PIC owned by RSD3.

As illustrated in Figure 14 on page 143, RSD3 owns physical interface (**ge-6/0/0**). PSD5 owns logical interfaces **ge-6/0/0.0**, **ge-6/0/0.1**, and **ge-6/0/0.2**. A cross-connect using tunnel interface **ut-1/0/0** transports packets between the logical interfaces configured on the PSD and the physical Gigabit Ethernet interface on RSD3. Similarly, PSD6 owns logical interface **ge-6/0/0.3** and uses **ut-7/0/0** to transport packets between **ge-6/0/0.3** and the physical interface on RSD3.

Figure 14: Example: Shared Interfaces (Gigabit Ethernet)



Configuration

First, configure the Routing Engines on the JCS1200 platform using the management module command-line interface (CLI). Then, configure each T Series router using the Junos OS CLI.

- JCS1200 Configuration on page 143
- RSD Configuration on page 144
- PSD5 Configuration on page 146
- PSD6 Configuration on page 148

JCS1200 Configuration

Step-by-Step Procedure

To configure the parameters required for the Routing Engines in the JCS chassis:

1. Log in to the JCS management module.
2. Assign the Routing Engines in slots 5 (primary) and 6 (backup) to RSD3 and PSD1. Assign the Routing Engine in slot 7 to RSD3 and PSD2.

```
system> baydata —b 05 —data “V01–JCS01–SD03–PSD01–REP05–REB06–PRDT640”
system> baydata —b 06 —data “V01–JCS01–SD03–PSD01–REP05–REB06–PRDT640”
system> baydata —b 07 —data “V01–JCS01–SD03–PSD02–REP07–REB00–PRDT640”
```

Results Display the results of the configuration:

```
system> baydata

Bay  Status            Definition
1    No blade present
2    No blade present
3    No blade present
4    No blade present
5    Supported         V01-JCS01-SD03-PSD01-REP05-REB06-PRDT640
6    Supported         V01-JCS01-SD03-PSD01-REP05-REB06-PRDT640
7    Supported         V01-JCS01-SD03-PSD02-REP07-REB00-PRDT640
8    No blade present
9    No blade present
10   No blade present
11   No blade present
12   No blade present
```

RSD Configuration

Step-by-Step Procedure To configure the RSD:

1. Log in to the T640 router.
2. At the **[edit chassis system-domains]** hierarchy level of the Junos OS CLI, include the **root-domain-id 3** statement to identify the RSD.
3. At the **[edit chassis system-domains]** hierarchy level, include the **protected-system-domains psd1** statement to create PSD1.
4. At the **[edit chassis system-domains protected-system-domains psd1]** hierarchy level:
   a. Include the **fpcs 1 fpcs 2 fpcs 3** statement to assign the FPCs in slots 1, 2, and 3 to PSD1.
   b. Include the **control-system-id 1** statement to identify the JCS1200 platform.
   c. Include the **control-slot-numbers 5 control-slot-numbers 6** statement to assign the Routing Engines in slots 5 and 6 in the JCS chassis to PSD1.
   d. Include the **control-plane-bandwidth-percent 50** statement to allocate 50 percent of the bandwidth on the JCS switch modules and T Series Control Boards (T-CBs) to PSD1.
5. At the **[edit chassis system-domains]** hierarchy level, include the **protected-system-domains psd2** statement to create PSD2.
6. At the **[edit chassis system-domains protected-system-domains psd2]** hierarchy level:
   a. Include the **fpcs 4 fpcs 5 fpcs 6 fpcs 7** statement to assign the FPCs in slots 4, 5, 6, and 7 to PSD2.
   b. Include the **control-system-id 1** statement to identify the JCS1200 platform.

c. Include the **control-slot-numbers 3 control-slot-numbers 4** statement to assign the Routing Engines in slots 3 and 4 in the JCS chassis to PSD2.

d. Include the **control-plane-bandwidth-percent 50** statement to allocate 50 percent of the bandwidth on the JCS switch modules and T-CBs to PSD2.

7. At the **[edit interfaces]** hierarchy level, include the **ge-6/0/0** statement to configure the physical Gigabit Ethernet interface.

8. At the **[edit interfaces ge-6/0/0]** hierarchy level:

   - Include the **vlan-tagging** statement to enable the receiving and forwarding of routed or bridged Ethernet frames with 802.1Q VLAN tags.
   - Include the **unit 0**, **unit 1**, **unit 2**, and **unit 3** statements to configure the logical interfaces.

9. At the **[edit interfaces ge-6/0/0 unit *n*]** hierarchy level, include the following statements:

   - interface-shared-with **psd*n***—Assign the logical interface to a PSD:
     - For unit 0, the value is **5** (PSD5).
     - For unit 1, the value is **5** (PSD5).
     - For unit 2, the value is **5** (PSD5).
     - For unit 3, the value is **6** (PSD6).
   - **vlan *vlan-id***—Configure the virtual LAN (VLAN) identifier to bind the 802.1Q VLAN tag ID to the logical interface:
     - For unit 0, the value is **16**.
     - For unit 1, the value is **17**.
     - For unit 2, the value is **18**.
     - For unit 3, the value is **100**.

Results Display the results of the configuration:

```
system-domains {
  root-domain-id 3;
  protected-system-domains {
    psd5 {
      description customerA;
      fpcs [ 1 2 3 ];
      control-system-id 1;
      control-slot-numbers [ 5 6 ];
      control-plane-bandwidth-percent 50;
    }
    psd6 {
      description customerB;
      fpcs [ 4 5 7 ];
```

```
        control-system-id 1;
        control-slot-numbers 7;
        control-plane-bandwidth-percent 50;
      }
    }
    }
}
interfaces {
  ge-6/0/0 {
  vlan-tagging;
  unit 0 {
    interface-shared-with psd5;
    vlan-id 16;
  }
  unit 1 {
    interface-shared-with psd5;
    vlan-id 17;
  }
  unit 2 {
    interface-shared-with psd5;
    vlan-id 18;
  }
  unit 3 {
    interface-shared-with psd6;
    vlan-id 100;
  }
}
```

PSD5 Configuration

Step-by-Step Procedure

To configure PSD5:

1. At the **[edit interfaces]** hierarchy level, include the **ut-1/0/0** statement to configure the physical tunnel interface.
2. At the **[edit interfaces ut-1/0/0]** hierarchy level, include the **unit 0**, **unit 1**, and **unit 2** statements to configure the logical tunnel interfaces.
3. At the **[edit interfaces ut-1/0/0 unit *n*]** hierarchy level, include the **peer-interface ge-6/0/0.*logical-unit-number*** statement to bind the tunnel and Gigabit Ethernet interfaces together. Use the following ***logical-unit-number*** values:
   - For unit 0, the value is **0**.
   - For unit 1, the value is **1**.
   - For unit 2, the value is **2**.
4. At the **[edit interfaces ge-6/0/0]** hierarchy level, include the **vlan-tagging** statement to match the configuration on the RSD, and the shared-interface statement to identify the physical interface as the shared interface.

5. At the **[edit interfaces ge-6/0/0]** hierarchy level, include **unit 0**, **unit 1**, and **unit 2** statements to configure logical interfaces.
6. At the [**edit interfaces ge-6/0/0 unit *n***] hierarchy level, include the following statements:
   - **peer-interface *peer-interface***—Bind the Gigabit Ethernet and tunnel interface interfaces together. Use the following ***peer-interface*** values:
     - For **unit 0**, the value is **ut-1/0/0.0**.
     - For **unit 1**, the value is **ut-1/0/0.1**.
     - For **unit 2**, the value is **ut-1/0/0.2**.
   - **vlan *vlan-id***—Bind the 802.1Q VLAN tag ID to the logical interface. Use the following ***vlan-id*** values:
     - For **unit 0**, the value is **16**.
     - For **unit 1**, the value is **17**.
     - For **unit 2**, the value is **18**.
   - **family inet address *address***—Configure the IP version 4 (IPv4) suite protocol family on the logical Gigabit Ethernet interface. Use the following ***address*** values:
     - For **unit 0**, the value is **10.70.0.1/30**.
     - For **unit 1**, the value is **17.17.17.1/30**.
     - For **unit 2**, the value is **18.18.18.1/30**.

Results Display the results of the configuration:

```
interfaces {
  ut-1/0/0 {
    unit 0 {
      peer-interface ge-6/0/0.0;
    }
    unit 1 {
      peer-interface ge-6/0/0.1;
    }
    unit 2 {
      peer-interface ge-6/0/0.2;
    }
  }
    ge-6/0/0 {
      vlan-tagging;
      shared-interface;
      unit 0 {
        peer-interface ut-1/0/0.0;
        vlan-id 16;
        family inet {
          address 10.70.0.1/30;
        }
```

```
    }
    unit 1 {
      peer-interface ut-1/0/0.1;
      vlan-id 17;
      family inet {
        address 17.17.17.1/30;
      }
    }
    unit 2 {
      peer-interface ut-1/0/0.2;
      vlan-id 18;
      family inet {
        address 18.18.18.1/30;
      }
    }
  }
```

PSD6 Configuration

Step-by-Step Procedure

To configure PSD6:

1. At the **[edit interfaces]** hierarchy level, include the **ut-7/0/0** statement to configure the physical tunnel interface.
2. At the **[edit interfaces ut-7/0/0]** hierarchy level, include the **unit 0** statement to configure the logical tunnel interface.
3. At the **[edit interfaces ut-1/0/0 unit 0]** hierarchy level, include the **peer-interface ge-6/0/0.*logical-unit-number*** statement to bind the tunnel and the Gigabit Ethernet interfaces together.
4. At the **[edit interfaces ge-6/0/0]** hierarchy level, include the **vlan-tagging** statement to match the configuration on the RSD, and the **shared-interface** statement to identify the Gigabit Ethernet interface as the shared physical interface.
5. At the **[edit interfaces ge-6/0/0]** hierarchy level, include the **unit 3** statement to configure the logical interface.
6. At the **[edit interfaces ge-6/0/0 unit 3]** hierarchy level, include the following statements:
   - **peer-interface ut-7/0/0.0**—Bind the Gigabit Ethernet and tunnel interfaces together.
   - **vlan-id 100**—Bind the 802.1Q VLAN tag ID to the logical interface.
   - **family inet address 10.10.10.1/24**—Configure the IP version 4 (IPv4) suite protocol family.

Results

Display the results of the configuration:

```
interfaces {
  ut-7/0/0 {
    unit 0 {
      peer-interface ge-6/0/0.3;
```

```
    }
  }
  ge-6/0/0 {
    vlan-tagging;
    unit 3 {
      peer-interface ut-7/0/0.0;
      vlan-id 100;
      family inet {
        address 10.10.10.1/24;
      }
    }
  }
```

Verification

Verifying Shared Interfaces on RSD3

Purpose From RSD3, display the status of shared interfaces.

Action Issue the **show interfaces ge-6/0/0** command:

```
user@rsd3> show interfaces ge-6/0/0
Physical interface: ge-0/6/0, Enabled, Physical link is Up
  Interface index: 143, SNMP ifIndex: 187
  Link-level type: Ethernet, MTU: 1518, Speed: 10Gbps, BPDU Error: None,
  MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled,
  Flow control: Enabled
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Shared-interface : Owner
  CoS queues     : 8 supported, 8 maximum usable queues
  Current address: 00:17:cb:25:48:7e, Hardware address: 00:17:cb:25:48:7e
  Last flapped   : 2008-12-08 12:19:25 PST (01:17:11 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  Active alarms  : None
  Active defects : None

  Logical interface ge-0/6/0.0 (Index 69) (SNMP ifIndex 236)
    Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.10 ]  Encapsulation: ENET2
    Shared-interface:
      Shared with: psd5
      Tunnel token: Rx: 1.520, Tx: 2.530
    Input packets : 0
    Output packets: 0
    Protocol multiservice, MTU: Unlimited
      Flags: None

  Logical interface ge-0/6/0.1 (Index 69) (SNMP ifIndex 236)
    Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.10 ]  Encapsulation: ENET2
    Shared-interface:
      Shared with: psd5
      Tunnel token: Rx: 1.520, Tx: 2.530
```

```
    Input packets : 0
    Output packets: 0
    Protocol multiservice, MTU: Unlimited
      Flags: None

  Logical interface ge-0/6/0.3 (Index 69) (SNMP ifIndex 236)
    Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.10 ]  Encapsulation: ENET2
    Shared-interface:
      Shared with: psd6
      Tunnel token: Rx: 1.520, Tx: 2.530
    Input packets : 0
    Output packets: 0
    Protocol multiservice, MTU: Unlimited
      Flags: None
```

Meaning Under the **Physical interface** section of the output, the **Shared-interface** field displays the value **Owner**, meaning that RSD owns the physical shared interface **ge-6/0/0**. In the **Shared interface** fields for each logical interface, you see that **ge-6/0/0.0**, **ge-6/0/0.1**, and **ge-6/0/0.2** are shared with PSD5, whereas logical interface **ge-6/0/0.3** is shared with PSD6.

Verifying Shared Interfaces on PSD5

Purpose From PSD5, display the status of shared interfaces.

Action Issue the **show interfaces ge-6/0/0** command:

```
user@psd5> show interfaces ge-6/0/0
Physical interface: ge-0/6/0, Enabled, Physical link is Up
  Interface index: 143, SNMP ifIndex: 157
  Link-level type: Ethernet, MTU: 1518, Speed: 10Gbps, BPDU Error: None,
  MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled,
  Flow control: Enabled
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Shared-interface : Non-Owner
  CoS queues     : 8 supported, 8 maximum usable queues
  Current address: 00:17:cb:25:48:7e, Hardware address: 00:17:cb:25:48:7e
  Last flapped   : Never
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  Active alarms  : None
  Active defects : None

  Logical interface ge-0/6/0.0 (Index 72) (SNMP ifIndex 158)
    Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.10 ]  Encapsulation: ENET2
    Shared-interface:
      Peer interface: ut-1/0/0.0
      Tunnel token: Rx: 2.530, Tx: 1.520
    Input packets : 0
    Output packets: 0
    Protocol inet, MTU: 1500
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 16.16.0.0/30, Local: 16.16.0.1, Broadcast: 16.16.0.3
    Protocol multiservice, MTU: Unlimited
      Flags: None

  Logical interface ge-0/6/0.1 (Index 72) (SNMP ifIndex 158)
```

```
    Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.10 ]  Encapsulation: ENET2
    Shared-interface:
      Peer interface: ut-1/0/0.1      Tunnel token: Rx: 2.530, Tx: 1.520
    Input packets : 0
    Output packets: 0
    Protocol inet, MTU: 1500
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 16.16.0.0/30, Local: 16.16.0.1, Broadcast: 16.16.0.3
    Protocol multiservice, MTU: Unlimited
      Flags: None

  Logical interface ge-0/6/0.2 (Index 72) (SNMP ifIndex 158)
    Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.10 ]  Encapsulation: ENET2
    Shared-interface:
      Peer interface: ut-1/0/0.2      Tunnel token: Rx: 2.530, Tx: 1.520
    Input packets : 0
    Output packets: 0
    Protocol inet, MTU: 1500
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 16.16.0.0/30, Local: 16.16.0.1, Broadcast: 16.16.0.3
    Protocol multiservice, MTU: Unlimited
      Flags: None
```

Meaning Under the **Physical interfaces** section of the output, the **Shared-interface** field displays a value of **Non-owner**, indicating that the shared physical interface **ge-6/0/0** is not owned by PSD5. The **Shared interface** field for each logical interface provides the name of its peer uplink tunnel (**ut-**) interface. For example, for **ge-6/0/0.0**, the peer interface is **ut-1/0/0.0**.

Verifying Shared Interfaces on PSD6

Purpose From PSD6, display the status of shared interfaces.

Action Issue the **show interfaces ge-6/0/0** command:

```
user@psd6> show interfaces ge-6/0/0
Physical interface: ge-6/0/0, Enabled, Physical link is Down
  Interface index: 172, SNMP ifIndex: 152
  Link-level type: Ethernet, MTU: 1518, Speed: 1000mbps, BPDU Error: None,
  MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled,
  Flow control: Enabled, Auto-negotiation: Enabled, Remote fault: Online
  Device flags   : Present Running
  Interface flags: Hardware-Down SNMP-Traps Internal: 0x4000
  Shared-interface : Non-Owner
  CoS queues     : 8 supported, 8 maximum usable queues
  Current address: 00:17:cb:25:48:40, Hardware address: 00:17:cb:25:48:40
  Last flapped   : Never
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  Active alarms  : None
  Active defects : None

  Logical interface ge-6/0/0.3 (Index 72) (SNMP ifIndex 1220)
    Flags: Link-Layer-Down Device-Down SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.101 ]

    Encapsulation: ENET2
    Shared-interface:
      Peer interface: ut-7/0/0.3
```

```
  Tunnel token: Rx: 14.538
Input packets : 13
Output packets: 7774
Output Filters: filter-safari
Protocol inet, MTU: 1500
  Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
   Destination: 173.16.254.0/30, Local: 173.16.254.1, Broadcast: 173.16.254.3

Protocol inet6, MTU: 1500
  Flags: None
  Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
    Destination: 1000::173:16:0:0/96, Local: 1000::173:16:254:1
  Addresses, Flags: Dest-route-down Is-Preferred
    Destination: fe80::/64, Local: fe80::217:cb00:6525:4840
Protocol multiservice, MTU: Unlimited
  Flags: None
```

Meaning Under the **Physical interfaces** section of the output, the **Shared-interface** field displays a value of **Non-owner**, indicating that the shared physical interface **ge-6/0/0** is not owned by PSD6. The **Shared interface** field for **ge-6/0/0.3** indicates that its peer interface is **ut-7/0/0.3**.

Related Documentation

- Configuring Shared Interfaces on the RSD on page 91
- Configuring Shared Interfaces on a PSD on page 93

Example: Configuring the JCS1200 Platform as a Route Reflector

In this configuration example, a T640 router and four Routing Engines on the JCS1200 platform are configured for route reflection.

Requirements

This configuration example requires the following hardware and software components:

- Junos OS Release 9.5 or later
- One JCS1200 platform with Routing Engines in slots 1, 2, 3, and 4
- One T640 router with FPCs in slots 0, 1, and 2

Overview and Topology

Figure 15: Example: Route Reflection

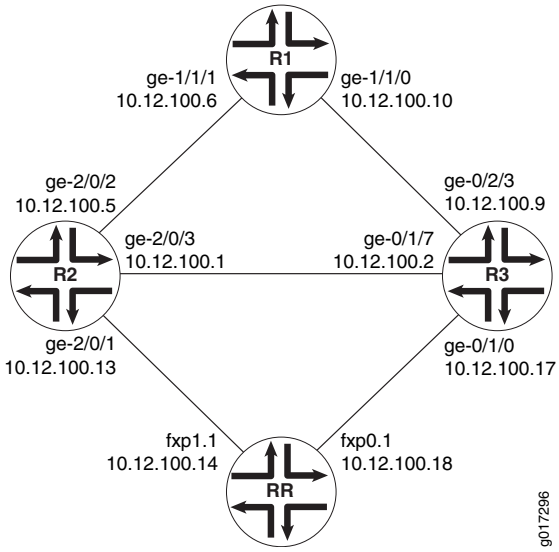


Figure 15 on page 153 shows a T640 router (T-route) and four Routing Engines (RR, R1, R2, and R3) on the JCS1200 chassis (bcg) configured for route reflection.

Each router is configured as a separate PSD. Each PSD has an associated Routing Engine assigned on the JCS chassis and an associated FPC assigned on the T640 router. Table 23 on page 153 provides the chassis parameters required for the JCS1200 platform and for the T640 router for each PSD.

Table 23: Chassis Parameters for Route Reflection

Router	PSD	JCS 1200 Platform (bcg)	T640 Routing Node (T-route)
Route Reflector (RR)	PSD15	Routing Engine in slot 1 (bcgcpu1)	(No FPC required)
Router 1 (R1)	PSD11	Routing Engine in slot 2 (bcgcpu2)	FPC in slot 1 (FPC1)
Router 2 (R2)	PSD12	Routing Engine in slot 3 (bcgcpu3)	FPC in slot 2 (FPC2)
Router 3 (R3)	PSD13	Routing Engine in slot 3 (bcgcpu4)	FPC in slot 0 (FPC0)

Configuration

The configuration of route reflection is described in the following sections:

JCS1200 Configuration

Step-by-Step Procedure

To configure the parameters required for Routing Engines in the JCS chassis:

1. Log in to the JCS management module CLI.
2. Configure the Routing Engine that is part of PSD15. This Routing Engine is located in slot **1** of the JCS chassis and acts as the route reflector.

   To configure the Routing Engine in slot 1, issue the following command:

   ```
   system> baydata -b 01 -data "V01–JCS1–SD2–PSD15–REP01–REB00–PRDSCE"
   ```

   The **baydata** command specifies the target as a bay blade (**-b**), identifies the Routing Engine (blade) in slot **01**, and specifies the following parameters:

   - **V01**—Product version, which is **01**.
   - **JCS1**—JCS platform identifier, which is **1**.
   - **SD2**—RSD identifier, which is **2**.
   - **PSD15**—PSD identifier, which is **15**.
   - **REP01**—Slot in which the primary Routing Engine resides, which is **01**.
   - **REB00**—Slot in which the backup Routing Engine resides. **00** indicates that there is no backup Routing Engine.
   - **PRDSCE**—Juniper Networks router product. There is a special product type for the route reflector: Standalone Control Element (**SCE**).
3. Configure the Routing Engine that is part of PSD11 This Routing Engine is located in slot **2** of the JCS chassis and acts as standalone router (not a route reflector).

   To configure the Routing Engine in slot 2, issue the following command:

   ```
   system> baydata -b 02 -data "V01–JCS1–SD1–PSD11–REP02–REB00–PRDT640"
   ```

   The **baydata** command specifies the target as a bay blade (**-b**), identifies the blade (Routing Engine) in slot **02**, and specifies the following parameters:

   - **V01**—Product version, which is **01**.
   - **JCS1**—JCS platform identifier, which is **1**.

- **SD1**—RSD identifier, which is **1**. This router is in **SD1**, the route reflector is in **SD2**.
- **PSD11**—PSD identifier, which is **11**.
- **REP02**—Slot in which the primary Routing Engine resides, which is **02**.
- **REB00**–Slot in which the backup Routing Engine resides. **00** indicates that there is no backup Routing Engine.
- **PRDT640**—Juniper Networks router product, which is the T640 router.

4. Configure the Routing Engine that is part of PSD12. This Routing Engine is located in slot **3** of the JCS chassis and acts as standalone router (not a route reflector).

   To configure the Routing Engine in slot 3, issue the following command:

   ```
   system> baydata -b 03 -data "V01–JCS1–SD1–PSD12–REP03–REB00–PRDT640"
   ```

   The **baydata** command specifies the target as a bay blade (**-b**), identifies the blade (Routing Engine) in slot **03**, and specifies the following parameters:

   - **V01**—Product version, which is **01**.
   - **JCS1**—JCS platform identifier, which is **1**.
   - **SD1**—RSD identifier, which is **1**. This router is in **SD1**, the route reflector is in **SD2**.
   - **PSD12**—PSD identifier, which is **12**.
   - **REP03**—Slot in which the primary Routing Engine resides, which is **03**.
   - **REB00**–Slot in which the backup Routing Engine resides. **00** indicates that there is no backup Routing Engine.
   - **PRDT640**—Juniper Networks router product, which is the T640 router.

5. Configure the Routing Engine that is part of PSD13. This Routing Engine is located in slot **4** of the JCS chassis and acts as standalone router (not a route reflector).

   To configure the Routing Engine in slot 4, issue the following command:

   ```
   system> baydata -b 04 -data "V01–JCS1–SD1–PSD13–REP04–REB00–PRDT640"
   ```

   The **baydata** command specifies the target as a bay blade (**-b**), identifies the blade (Routing Engine) in slot **04**, and specifies the following parameters:

   - **V01**—Product version, which is **01**.
   - **JCS1**—JCS platform identifier, which is **1**.
   - **SD1**—RSD identifier, which is **1**. This router is in **SD1**, the route reflector is in **SD2**.
   - **PSD13**—PSD identifier, which is **13**.
   - **REP04**—Slot in which the primary Routing Engine resides, which is **04**.

- **REB00**—Slot in which the backup Routing Engine resides. **00** indicates that there is no backup Routing Engine.
- **PRDT640**—Juniper Networks router product, which is the T640 router.

Results Display the results of the configuration:

```
system> baydata
Bay   Status            Definition
1     Supported         V01-JCS1-SD2-PSD15-REP01-REB00-PRDSCE
2     Supported         V01-JCS1-SD1-PSD11-REP02-REB00-PRDT640
3     Supported         V01-JCS1-SD1-PSD12-REP03-REB00-PRDT640
4     Supported         V01-JCS1-SD1-PSD13-REP04-REB00-PRDT640
5     No blade present
6     No blade present
7     No blade present
8     No blade present
9     No blade present
10    No blade present
11    No blade present
12    No blade present
```

RSD Configuration

Step-by-Step Procedure To configure the RSD:

1. Log in to the T640 router.
2. At the **[edit chassis system-domains]** hierarchy level of the Junos OS CLI, include the **root-domain-id 1** statement to identify the RSD associated with Router 1, 2, and 3.
3. At the **[edit chassis system-domains]** hierarchy level, include the **protected-system-domains psd11** statement to create PSD11.
4. At the **[edit chassis system-domains protected-system-domains psd11]** hierarchy level:
   a. Include the **description "bcgcpu2 SWLab R1"** statement to describe the PSD.
   b. Include the **fpcs 1** statement to assign the FPC in slot 1 to PSD11.
   c. Include the **control-system-id 1** statement to identify the JCS1200 platform.
   d. Include the **control-slot-numbers 2** statement to assign the Routing Engine in slot 2 in the JCS chassis to PSD11.
5. At the **[edit chassis system-domains]** hierarchy level, include the **protected-system-domains psd12** statement to create PSD12.
6. At the **[edit chassis system-domains protected-system-domains psd12]** hierarchy level:
   a. Include the **description "bcgcpu3 SWLab R2"** statement to describe the PSD.
   b. Include the **fpcs 2** statement to assign the FPC in slot 2 to PSD12.

c. Include the **control-system-id 1** statement to identify the JCS1200 platform.

d. Include the **control-slot-numbers 3** statement to assign the Routing Engine in slot 3 in the JCS chassis to PSD12.

7. At the **[edit chassis system-domains]** hierarchy level, include the **protected-system-domains psd13** statement to create PSD13.

8. At the **[edit chassis system-domains protected-system-domains psd13]** hierarchy level:

a. Include the **description "bcgcpu4 SWLab R3"** statement to describe the PSD.

b. Include the **fpcs 0** statement to assign the FPC in slot 0 to PSD13.

c. Include the **control-system-id 1** statement to identify the JCS1200 platform.

d. Include the **control-slot-numbers 4** statement to assign the Routing Engine in slot 4 in the JCS chassis to PSD13.

Results Display the results of the configuration:

```
chassis {
  system-domains {
    root-domain-id 1;
    protected-system-domains {
      psd11 {
        description "bcgcpu2 SWLab R1";
        fpcs 1;
        control-system-id 1;
        control-slot-numbers 2;
      }
      psd12 {
        description "bcgcpu3 SWLab R2";
        fpcs 2;
        control-system-id 1;
        control-slot-numbers 3;
      }
      psd13 {
        description "bcgcpu4 SWLab R3";
        fpcs 0;
        control-system-id 1;
        control-slot-numbers 4;
      }
    }
  }
}
```

The RSD configuration on the T640 router does not include a **root-domain-id 2** statement for domain 2 (the route reflector domain) or any **protected-system-domains PSD15** statements for the route reflector PSD. This is because the route reflector is self-contained within the JCS chassis and does not require configuration on the T640 router.

PSD15 Configuration (Route Reflector)

Step-by-Step Procedure

To configure the route reflector (PSD15):

1. At the **[edit interfaces]** hierarchy level, include the **fxp0** statement to configure the internal Ethernet interface.
2. At the **[edit interfaces fxp0]** hierarchy level, include the **unit 1** statement to configure the logical interface.
3. At the **[edit interfaces fxp0 unit 1]** hierarchy level, include the **family inet address 10.12.100.18/30** statement to configure the IP version 4 (IPv4) suite protocol family.
4. At the **[edit interfaces]** hierarchy level, include the **fxp1** statement to configure the internal Ethernet interface.
5. At the **[edit interfaces fxp1]** hierarchy level, include the **unit 1** statement to configure the logical interface.
6. At the **[edit interfaces fxp1 unit 1]** hierarchy level, include the **family inet address 10.12.100.14/30** statement to configure the IPv4 suite protocol family.

Results

Display the results of the configuration:

```
interfaces {
    fxp0 {
        unit 1 {
            family inet {
                address 10.12.100.18/30;
            }
        }
    }
    fxp1 {
        unit 1 {
            family inet {
                address 10.12.100.14/30;
            }
        }
    }
}
```

PSD11 Configuration (Router 1)

Step-by-Step Procedure

To configure Router 1 (PSD11):

1. At the **[edit interfaces]** hierarchy level, include the **ge-1/1/0** statement to configure the Gigabit Ethernet interface.
2. At the **[edit interfaces ge-1/1/0]** hierarchy level, include the **unit 0** statement to configure the logical interface.
3. At the **[edit interfaces ge-1/1/0 unit 0]** hierarchy level, include the **family inet address 10.12.100.10/30** statement to configure the IPv4 suite protocol family.

4. At the **[edit interfaces]** hierarchy level, include the **ge-1/1/1** statement to configure the internal Ethernet interface.
5. At the **[edit interfaces ge-1/1/1]** hierarchy level, include the **unit 0** statement to configure the logical interface.
6. At the **[edit interfaces ge-1/1/1 unit 0]** hierarchy level, include the **family inet address 10.12.100.6/30** statement to configure the IPv4 suite protocol family.

Results Display the results of the configuration:

```
interfaces {
    ge-1/1/0 {
        unit 0 {
            family inet {
                address 10.12.100.10/30;
            }
        }
    }
    ge-1/1/1 {
        unit 0 {
            family inet {
                address 10.12.100.6/30;
            }
        }
    }
}
```

PSD12 Configuration (Router 2)

Step-by-Step Procedure To configure Router 2 (PSD12):

1. At the **[edit interfaces]** hierarchy level, include the **ge-2/0/1** statement to configure the Gigabit Ethernet interface.
2. At the **[edit interfaces ge-2/0/1]** hierarchy level, include the **unit 0** statement to configure the logical interface.
3. At the **[edit interfaces ge-2/0/1 unit 0]** hierarchy level, include the **family inet address 10.12.100.13/30** statement to configure the IPv4 suite protocol family.
4. At the **[edit interfaces]** hierarchy level, include the **ge-2/0/2** statement to configure the internal Ethernet interface.
5. At the **[edit interfaces ge-2/0/2]** hierarchy level, include the **unit 0** statement to configure the logical interface.
6. At the **[edit interfaces ge-2/0/2 unit 0]** hierarchy level, include the **family inet address 10.12.100.5/30** statement to configure the IPv4 suite protocol family.
7. At the **[edit interfaces]** hierarchy level, include the **ge-2/0/3** statement to configure the internal Ethernet interface.

8. At the **[edit interfaces ge-2/0/3]** hierarchy level, include the **unit 0** statement to configure the logical interface.
9. At the **[edit interfaces ge-2/0/3 unit 0]** hierarchy level, include the **family inet address 10.12.100.1/30** statement to configure the IPv4 suite protocol family.

Results Display the results of the configuration:

```
interfaces {
    ge-2/0/1 {
        unit 0 {
            family inet {
                address 10.12.100.13/30;
            }
        }
    }
    ge-2/0/2 {
        unit 0 {
            family inet {
                address 10.12.100.5/30;
            }
        }
    }
    ge-2/0/3 {
        unit 0 {
            family inet {
                address 10.12.100.1/30;
            }
        }
    }
}
```

PSD13 Configuration (Router 3)

Step-by-Step Procedure To configure Router 3 (PSD13):

1. At the **[edit interfaces]** hierarchy level, include the **ge-0/1/7** statement to configure the Gigabit Ethernet interface.
2. At the **[edit interfaces ge-0/1/7]** hierarchy level, include the **unit 0** statement to configure the logical interface.
3. At the **[edit interfaces ge-0/1/7 unit 0]** hierarchy level, include the **family inet address 10.12.100.2/30** statement to configure the IPv4 suite protocol family.
4. At the **[edit interfaces]** hierarchy level, include the **ge-0/2/3** statement to configure the internal Ethernet interface.
5. At the **[edit interfaces ge-0/2/3]** hierarchy level, include the **unit 0** statement to configure the logical interface.
6. At the **[edit interfaces ge-0/2/3 unit 0]** hierarchy level, include the **family inet address 10.12.100.9/30** statement to configure the IPv4 suite protocol family.
7. At the **[edit interfaces]** hierarchy level, include the **ge-0/1/0** statement to configure the internal Ethernet interface.

8. At the **[edit interfaces ge-0/1/0]** hierarchy level, include the **unit 0** statement to configure the logical interface.
9. At the **[edit interfaces ge-0/1/0 unit 0]** hierarchy level, include the **family inet address 10.12.100.17/30** statement to configure the IPv4 suite protocol family.

Results Display the results of the configuration:

```
interfaces {
    ge-0/1/7 {
        unit 0 {
            family inet {
                address 10.12.100.2/30;
            }
        }
    }
    ge-0/2/3 {
        unit 0 {
            family inet {
                address 10.12.100.9/30;
            }
        }
    }
    ge-0/1/0 {
        unit 0 {
            family inet {
                address 10.12.100.17/30;
            }
        }
    }
}
```

Related Documentation

- Route Reflection Overview on page 8
- Example: Configuring Client-to-Client Reflection (OSPF) on page 161
- *Junos Policy Framework Configuration Guide*

Example: Configuring Client-to-Client Reflection (OSPF)

Building on the topology shown in "Example: Configuring the JCS1200 Platform as a Route Reflector" on page 152, this example shows how to configure routers for OSPF client-to-client route reflection.

Requirements

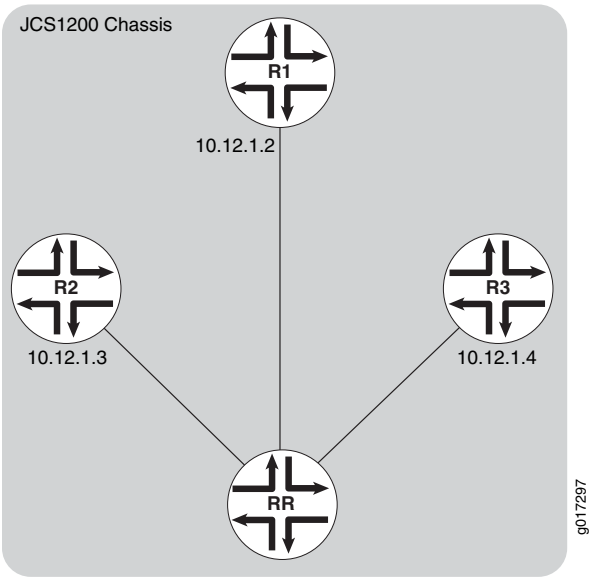
This example requires the following hardware and software components:

- Junos OS Release 9.5 or later

- One JCS1200 platform with Routing Engines in slots 1,2, 3, and 4
- One T640 router with FPCs in slots 0, 1, and 2

Overview and Topology

Figure 16: Example: Configuring Client-to-Client Reflection (OSPF)



The example configuration shown in Figure 16 on page 162 contains one router reflector (RR) and three client routers (R1, R2, and R3). The three routers (R1 through R3) and the route reflector (RR) are configured as PSDs that include Routing Engines on the JCS chassis.

The routers have the following loopback addresses:

- RR—**10.12.1.1**
- R1—**10.12.1.2**
- R2—**10.12.1.3**
- R3—**10.12.1.4**

With this configuration example, a route added to client router R1 is propagated to the route reflector (RR) and to the other client routers (R2, R3). This example uses OSPF as the IGP and enables BFD for the connections from the route reflector.

Configuration

First, configure protocols for the route reflector (RR), then configure protocols for the routers (R1, R2, and R3).

- PSD15 Configuration (Route Reflector) on page 163
- PSD11 Configuration (Router 1) on page 165

PSD15 Configuration (Route Reflector)

Step-by-Step Procedure

To configure the route reflector (PSD15):

1. At the **[edit routing-options]** hierarchy level, include the **autonomous-system 2** statement to configure the router's AS number.
2. At the **[edit protocols]** hierarchy level, include the **bgp** statement to enable BGP on the router.
3. At the **[edit protocols bgp]** hierarchy level, include the **group int** statement to define the routing group.

   A BGP system must know which routers are its peers (neighbors). You define the peer relationship explicitly by configuring the neighboring routers that are the peers of the local BGP system. After peer relationships have been established, the BGP peers exchange update messages to advertise network reachability information.
4. At the **[edit protocols bgp group int]** hierarchy level:
   a. Include the **type internal** statement to configure an internal BGP group.
   b. Include the **local-address 10.12.1.1** statement to specify the address of the local end of a BGP session. This address is used to accept incoming connections to the peer and to establish connections to the remote peer.
   c. Include the **cluster 1.2.3.4** statement to specify the cluster identifier (IPV4 address) to be used by the route reflector cluster in the internal BGP group.
   d. Include the **neighbor 10.12.1.2**, **neighbor 10.12.1.2**, and **neighbor 10.12.1.4** statements to specify which routers (Router 1, Router 2, and Router 3) are peers (neighbors) of the route reflector.
5. At the **[edit protocols]** hierarchy level, include the **ospf** statement to enable OSPF on the router.
6. At the **[edit protocols ospf]** hierarchy level, include the **overload** statement to prevent other routers from attempting to route data traffic through the route reflector. This option is set in the route reflector (RR), but not in Router 1, 2, and 3.
7. At the **[edit protocols ospf]** hierarchy level, include the **area 0.0.0.0** statement to specify the area identifier for this router to use when participating in OSPF routing. All routers in the area must use the same area identifier to establish adjacencies.
8. At the **[edit protocols ospf area 0.0.0.0]** hierarchy level, include the **interface fxp1.1** statement to configure the internal Ethernet interface in the backbone area.
9. At the **[edit protocols ospf area 0.0.0.0 fxp1.1]** hierarchy level, include the **bfd-liveness-detection** statement to specify bidirectional failure detection timers.
10. At the **[edit protocols ospf area 0.0.0.0 fxp1.1 bfd-liveness-detection]** hierarchy level, include the **minimum-interval 333** statement to specify 333 milliseconds as the

minimum interval at which the local router transmits a hello packet and then expects to receive a reply from its BFD neighbor.

11. Repeat Steps 7 through 9 for the **fxp0.1** internal Ethernet interface:

    a. At the **[edit protocols ospf area 0.0.0.0]** hierarchy level, include the **interface fxp0.1** statement to configure the internal Ethernet interface in the backbone area.

    b. At the **[edit protocols ospf area 0.0.0.0 fxp0.1]** hierarchy level, include the **bfd-liveness-detection** statement to specify bidirectional failure detection timers.

    c. At the **[edit protocols ospf area 0.0.0.0 fxp0.1 bfd-liveness-detection]** hierarchy level, include the **minimum-interval 333** statement to specify 333 milliseconds as the minimum interval at which the local router transmits a hello packet and then expects to receive a reply from its BFD neighbor.

Results Display the results of the configuration:

```
routing-options {
  autonomous-system 2;
}
protocols {
  bgp {
    group int {
      type internal;
      local-address 10.12.1.1;
      cluster 1.2.3.4;
      neighbor 10.12.1.2;
      neighbor 10.12.1.3;
      neighbor 10.12.1.4;
    }
  }
  ospf {
    overload;
    area 0.0.0.0 {
      interface fxp1.1 {
        bfd-liveness-detection {
          minimum-interval 333;
        }
      }
      interface fxp0.1 {
        bfd-liveness-detection {
          minimum-interval 333;
        }
      }
    }
  }
}
```

PSD11 Configuration (Router 1)

Step-by-Step Procedure

To configure the route reflector (PSD11):

1. At the **[edit routing-options]** hierarchy level, include the **autonomous-system 2** statement to configure the router's AS number.
2. At the **[edit protocols]** hierarchy level, include the **bgp** statement to enable BGP on the router.
3. At the **[edit protocols bgp]** hierarchy level, include the **group int** statement to define the routing group.
4. At the **[edit protocols bgp group int]** hierarchy level:
   a. Include the **type internal** statement to configure an internal BGP group.
   b. Include the **local-address 10.12.1.2** statement to specify the address of the local end of a BGP session. This address is used to accept incoming connections to the peer and to establish connections to the remote peer.
   c. Include the **export nh-self** statement to apply the **nh-self** policy to routes being exported from the routing table into BGP.
   d. Include the **neighbor 10.12.1.1** statement to specify the route reflector (RR) as peer (neighbor) of Router 1. You do not need to include neighbor statements for Router 2 or Router 3.
5. At the **[edit protocols]** hierarchy level, include the **ospf** statement to enable OSPF on the router.
6. At the **[edit protocols ospf]** hierarchy level, include the **area 0.0.0.0** statement to specify the area identifier for this router to use when participating in OSPF routing. All routers in the area must use the same area identifier to establish adjacencies.
7. At the **[edit protocols ospf area 0.0.0.0]** hierarchy level, include the **interface ge-1/1/1.0** statement to configure the Gigabit Ethernet interface in the backbone area.
8. At the **[edit protocols ospf area 0.0.0.0]** hierarchy level, include the **interface ge-1/1/0.0** statement to configure the Gigabit Ethernet interface in the backbone area.
9. At the **[edit policy-options]** hierarchy level, include the **policy-statement nh-self** statement to define the **nh-self** policy.

   A routing policy contains one or more terms. The **nh-self** policy you are defining includes three terms (**term a**, **term b,** and **term c**). This policy is applied to routes exported from the routing table into BGP.
10. At the **[edit policy-options nh-self]** hierarchy level, include the **term a** statement to define the first term for the **nh-self** policy.
11. At the **[edit policy-options nh-self term a]** hierarchy level, include the following statements to specify that any static route with destination prefix **0.0.0.0/0** is rejected:

```
from {
  protocol static;
  route-filter 0.0.0.0/0 exact;
  }
then reject;
```

12. At the **[edit policy-options nh-self]** hierarchy level, include the **term b** statement to define the next term for the **nh-self** policy.

13. At the **[edit policy-options nh-self term b]** hierarchy level, include the following statements:

    ```
    from protocol static;
      then {
        next-hop self;
        accept;
      }
    ```

    These statements specify that for all remaining static routes, the next-hop address is replaced by the local IP address used for the BGP adjacency. The router is then accepted with the new, next-hop value.

14. At the **[edit policy-options nh-self]** hierarchy level, include the **term c** statement to define the next term for the **nh-self** policy.

15. At the **[edit policy-options nh-self term c]** hierarchy level, include the **then reject** statement to reject all other routes.

Results Display the results of the configuration:

```
routing-options {
  autonomous-system 2;
}
protocols {
  bgp {
    group int {
      type internal;
      local-address 10.12.1.2;
      export nh-self;
      neighbor 10.12.1.1;
    }
  }
  ospf {
    area 0.0.0.0 {
      interface ge-1/1/1.0;
      interface ge-1/1/0.0;
    }
  }
}
policy-options {
  policy-statement nh-self {
    term a {
      from {
        protocol static;
        route-filter 0.0.0.0/0 exact;
      }
```

```
        then reject;
      }
      term b {
        from protocol static;
        then {
          next-hop self;
          accept;
        }
      }
      term c {
        then reject;
      }
    }
  }
```

PSD12 Configuration (Router 2)

Step-by-Step Procedure

To configure the route reflector (PSD12):

1. At the **[edit routing-options]** hierarchy level, include the **autonomous-system 2** statement to configure the router's AS number.
2. At the **[edit protocols]** hierarchy level, include the **bgp** statement to enable BGP on the router.
3. At the **[edit protocols bgp]** hierarchy level, include the **group int** statement to define the routing group.
4. At the **[edit protocols bgp group int]** hierarchy level:
   a. Include the **type internal** statement to configure an internal BGP group.
   b. Include the **local-address 10.12.1.3** statement to specify the address of the local end of a BGP session. This address is used to accept incoming connections to the peer and to establish connections to the remote peer.
   c. Include the **export nh-self** statement to apply the **nh-self** policy to routes being exported from the routing table into BGP.
   d. Include the **neighbor 10.12.1.1** statement to specify the route reflector (RR) as peer (neighbor) of Router 2. You do not need to include neighbor statements for Router 1 or Router 3.
5. At the **[edit protocols]** hierarchy level, include the **ospf** statement to enable OSPF on the router.
6. At the **[edit protocols ospf]** hierarchy level, include the **area 0.0.0.0** statement to specify the area identifier for this router to use when participating in OSPF routing. All routers in the area must use the same area identifier to establish adjacencies.
7. At the **[edit protocols ospf area 0.0.0.0]** hierarchy level, include the **interface ge-2/0/2.0** statement to configure the Gigabit Ethernet interface in the backbone area.

8. At the **[edit protocols ospf area 0.0.0.0]** hierarchy level, include the **interface ge-2/0/3.0** statement to configure the Gigabit Ethernet interface in the backbone area.

9. At the **[edit protocols ospf area 0.0.0.0]** hierarchy level, include the **interface ge-2/0/1.0** statement to configure the Gigabit Ethernet interface in the backbone area.

10. At the **[edit protocols ospf area 0.0.0.0 interface ge-2/0/1.0]** hierarchy level, include the **bfd-liveness-detection** statement to specify bidirectional failure detection timers.

11. At the **[edit protocols ospf area 0.0.0.0 interface ge-2/0/1.0 bfd-liveness-detection]** hierarchy level, include the **minimum-interval 333** statement to specify 333 milliseconds as the minimum interval at which the local router transmits a hello packet and then expects to receive a reply from its BFD neighbor.

12. At the **[edit policy-options]** hierarchy level, include the **policy-statement nh-self** statement to define the **nh-self** policy.

    A routing policy contains one or more terms. The **nh-self** policy you are defining includes three terms (**term a**, **term b,** and **term c**). This policy is applied to routes exported from the routing table into BGP.

13. At the **[edit policy-options nh-self]** hierarchy level, include the **term a** statement to define the first term for the **nh-self** policy.

14. At the **[edit policy-options nh-self term a]** hierarchy level, include the following statements to specify that any static route with destination prefix **0.0.0.0/0** or destination prefix **10.12.1.1/32** is rejected:

    ```
    from {
      protocol static;
      route-filter 0.0.0.0/0 exact;
      route-filter 10.12.1.1/32 exact;
      }
    then reject;
    ```

15. At the **[edit policy-options nh-self]** hierarchy level, include the **term b** statement to define the next term for the **nh-self** policy.

16. At the **[edit policy-options nh-self term b]** hierarchy level, include the following statements:

    ```
    from protocol static;
      then {
        next-hop self;
        accept;
      }
    ```

    These statements specify that for all remaining static routes, the next-hop address is replaced by the local IP address used for the BGP adjacency. The router is then accepted with the new, next-hop value.

17. At the **[edit policy-options nh-self]** hierarchy level, include the **term c** statement to define the next term for the **nh-self** policy.

18. At the **[edit policy-options nh-self term c]** hierarchy level, include the **then reject** statement to reject all other routes.

Results Display the results of the configuration:

```
routing-options {
  autonomous-system 2;
}
protocols {
  bgp {
    group int {
      type internal;
      local-address 10.12.1.3;
      export nh-self;
      neighbor 10.12.1.1;
    }
  }
  ospf {
    area 0.0.0.0 {
      interface ge-2/0/2.0;
      interface ge-2/0/3.0;
      interface ge-2/0/1.0 {
        bfd-liveness-detection {
          minimum-interval 333;
        }
      }
    }
  }
}
policy-options {
  policy-statement nh-self {
    term a {
      from {
        protocol static;
        route-filter 0.0.0.0/0 exact;
        route-filter 10.12.1.1/32 exact;
      }
      then reject;
    }
    term b {
      from protocol static;
      then {
        next-hop self;
        accept;
      }
    }
    term c {
      then reject;
    }
  }
}
```

PSD13 Configuration (Router 3)

Step-by-Step Procedure

To configure the route reflector (PSD13):

1. At the **[edit routing-options]** hierarchy level, include the **autonomous-system 2** statement to configure the router's AS number.
2. At the **[edit protocols]** hierarchy level, include the **bgp** statement to enable BGP on the router.
3. At the **[edit protocols bgp]** hierarchy level, include the **group int** statement to define the routing group.
4. At the **[edit protocols bgp group int]** hierarchy level:
   a. Include the **type internal** statement to configure an internal BGP group.
   b. Include the **local-address 10.12.1.4** statement to specify the address of the local end of a BGP session. This address is used to accept incoming connections to the peer and to establish connections to the remote peer.
   c. Include the **export nh-self** statement to apply the **nh-self** policy to routes being exported from the routing table into BGP.
   d. Include the **neighbor 10.12.1.1** statement to specify the route reflector (RR) as peer (neighbor) of Router 3. You do not need to include neighbor statements for Router 1 or Router 2.
5. At the **[edit protocols]** hierarchy level, include the **ospf** statement to enable OSPF on the router.
6. At the **[edit protocols ospf]** hierarchy level, include the **area 0.0.0.0** statement to specify the area identifier for this router to use when participating in OSPF routing. All routers in the area must use the same area identifier to establish adjacencies.
7. At the **[edit protocols ospf area 0.0.0.0]** hierarchy level, include the **interface ge-0/2/3.0** statement to configure the Gigabit Ethernet interface in the backbone area.
8. At the **[edit protocols ospf area 0.0.0.0]** hierarchy level, include the **interface ge-0/1/7.0** statement to configure the Gigabit Ethernet interface in the backbone area.
9. At the **[edit protocols ospf area 0.0.0.0]** hierarchy level, include the **interface ge-0/1/0.0** statement to configure the Gigabit Ethernet interface in the backbone area.
10. At the **[edit protocols ospf area 0.0.0.0 interface ge-0/1/0.0]** hierarchy level, include the **bfd-liveness-detection** statement to specify bidirectional failure detection timers.
11. At the **[edit protocols ospf area 0.0.0.0 interface ge-0/1/0.0 bfd-liveness-detection]** hierarchy level, include the **minimum-interval 333** statement to specify 333 milliseconds as the minimum interval at which the local router transmits a hello packet and then expects to receive a reply from its BFD neighbor.

12. At the **[edit policy-options]** hierarchy level, include the **policy-statement nh-self** statement to define the **nh-self** policy.

    A routing policy contains one or more terms. The **nh-self** policy you are defining includes three terms (**term a**, **term b,** and **term c**). This policy is applied to routes exported from the routing table into BGP.

13. At the **[edit policy-options nh-self]** hierarchy level, include the **term a** statement to define the first term for the **nh-self** policy.

14. At the **[edit policy-options nh-self term a]** hierarchy level, include the following statements to specify that any static route with destination prefix **0.0.0.0/0** is rejected:

    ```
    from {
      protocol static;
      route-filter 0.0.0.0/0 exact;
      }
    then reject;
    ```

15. At the **[edit policy-options nh-self]** hierarchy level, include the **term b** statement to define the next term for the **nh-self** policy.

16. At the **[edit policy-options nh-self term b]** hierarchy level, include the following statements:

    ```
    from protocol static;
      then {
        next-hop self;
        accept;
      }
    ```

    These statements specify that for all remaining static routes, the next-hop address is replaced by the local IP address used for the BGP adjacency. The router is then accepted with the new, next-hop value.

17. At the **[edit policy-options nh-self]** hierarchy level, include the **term c** statement to define the next term for the **nh-self** policy.

18. At the **[edit policy-options nh-self term c]** hierarchy level, include the **then reject** statement to reject all other routes.

Results Display the results of the configuration:

```
routing-options {
  autonomous-system 2;
}
protocols {
  bgp {
    group int {
      type internal;
      local-address 10.12.1.4;
      export nh-self;
      neighbor 10.12.1.1;
    }
  }
  ospf {
```

```
        area 0.0.0.0 {
          interface ge-0/2/3.0;
          interface ge-0/1/7.0;
          interface ge-0/1/0.0 {
            bfd-liveness-detection {
              minimum-interval 333;
            }
          }
        }
      }
    }
    policy-options {
      policy-statement nh-self {
        term a {
          from {
            protocol static;
            route-filter 0.0.0.0/0 exact;
          }
          then reject;
        }
        term b {
          from protocol static;
          then {
            next-hop self;
            accept;
          }
        }
        term c {
          then reject;
        }
      }
    }
```

Related Documentation

- Route Reflection Overview on page 8
- Example: Configuring the JCS1200 Platform as a Route Reflector on page 152
- *Junos Policy Framework Configuration Guide*

Example: Consolidating a Layer 2 VPN Network

In this configuration example, a Layer 2 VPN network topology is reduced and simplified by replacing two M320 routers at the provider edge (PE) of the network with a single platform. The configuration for the consolidated Layer 2 VPN topology is described in the following sections:

- Requirements on page 173
- Overview and Topology on page 173
- Configuration on page 174
- Verification on page 183

Requirements

This example requires the following hardware and software components:

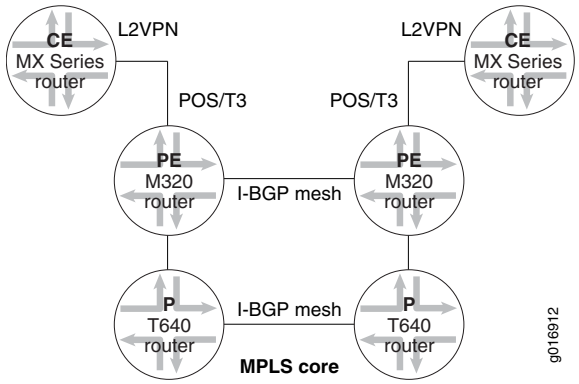
- Junos OS Release 9.1 or later
- One JCS1200 platform with Routing Engines in slots 4, 5, and 6
- One T640 router with FPCs in slots 4 and 5

Overview and Topology

In a typical Layer 2 VPN topology, a customer edge (CE) router is located on each customer site, providing an Ethernet interface between the customer LAN and the provider core network. Provider (P) routers are located in the core of the provider network, and provider edge (PE) routers sit at the edge of the network.

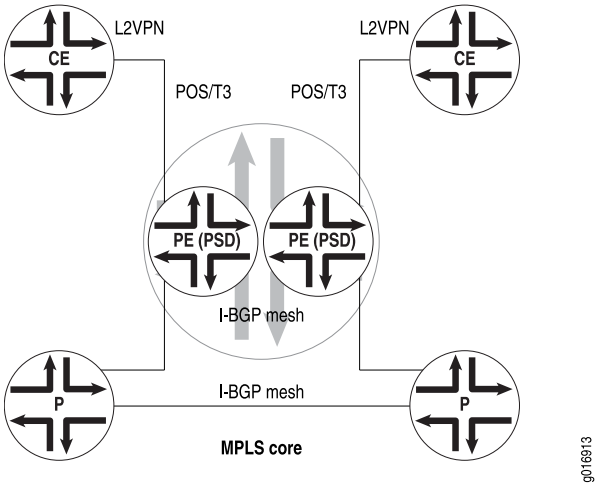
Figure 17 on page 173 illustrates a typical Layer 2 VPN topology, with T640 routers as P routers, M320 routers as PE routers, and MX Series Ethernet Services routers as CE routers. The service provider uses a separate PE router for each customer.

Figure 17: Typical Layer 2 VPN Network Topology



By replacing the two M320 routers with the JCS1200 chassis interconnected with the T640 router, the service provider simplifies and consolidates the network at the provider edge. One platform supports both customer networks through the creation of PSDs, as shown in Figure 18 on page 174.

Figure 18: Consolidated Layer 2 VPN Network Topology



Configuration

Table 24 on page 174 provides the chassis parameters required for the JCS1200 platform and the T640 router for each PSD.

Table 24: Chassis Parameters

PSD	JCS1200 Platform	T640 Routing Node
PSD1	Routing Engine in slot 4	FPC in slot 4 (with PICs supporting Fast Ethernet and SONET interfaces)
PSD2	Routing Engines in slots 5 and 6	FPC in slot 5 (with PICs supporting Fast Ethernet and SONET interfaces)

The configuration for the consolidated Layer 2 VPN topology is described in the following sections:

- JCS1200 Platform Configuration on page 174
- RSD Configuration on page 176
- PSD1 Configuration on page 177
- PSD2 Configuration on page 180

JCS1200 Platform Configuration

Step-by-Step Procedure

To configure the parameters required for the Routing Engines in the JCS chassis:

1. Log in to the JCS management module CLI.
2. Configure the Routing Engine that is part of PSD1. The Routing Engine in slot 4 of the JCS chassis is the master Routing Engine. There is no backup Routing Engine.

   To configure the Routine Engine in slot 4, issue the following command:

   ```
   system> baydata —b 04 —data “V01–JCS01–SD01–PSD01–REP04–REB00–PRDT640”
   OK
   ```

The **baydata** command specifies the target as a bay blade (**-b**), identifies the blade (Routing Engine) in slot **04**, and specifies the following parameters:

- **V01**—Product version, which is **01**.
- **JCS01**—JCS platform identifier, which is **01**.
- **SD01**—RSD identifier, which is **01**.
- **PSD01**–PSD identifier, which is **01**.
- **REP04**—Slot in which the primary (or master) Routing Engine resides, which is **04**.
- **REB00**—Slot in which the backup Routing Engine resides. **00** indicates that there is no backup Routing Engine.
- **PRDT640**—Juniper Networks router product, which is a T640 router.

3. Configure the **baydata** command parameters for the Routing Engines that are part of PSD2. The Routing Engine in slot 5 is the master, whereas the Routing Engine in slot 6 is the backup Routing Engine.

   a. To configure the Routing Engine in slot 5, issue the following command:

      ```
      system> baydata –b 05 –data "V01–JCS01–SD01–PSD02–REP05–REB06–PRDT640"
      OK
      ```

      The **baydata** command specifies the target as a bay blade (**-b**), identifies the blade (Routing Engine) in slot **05**, and specifies the following parameters:

      - **V01**—Product version. Junos OS Release 9.1 supports only the value of **01**.
      - **JCS01**—JCS platform identifier of 01. Junos OS Release 9.1 supports only the value of **01**.
      - **SD01**—RSD identifier, which is **01**.
      - **PSD02**–PSD identifier, which is **02**.
      - **REP05**—Slot in which the primary (or master) Routing Engine resides, which is **05**.
      - **REB06**—Slot in which the backup Routing Engine resides, which is **06**.
      - **PRDT640**—Juniper Networks router product, which is a T640 router.

   b. To configure the Routing Engine in slot 6, issue the following command:

      ```
      system> baydata –b 06 –data "V01–JCS01–SD01–PSD02–REP05–REB06–PRDT640"
      OK
      ```

      The **baydata** command specifies the target as a bay blade (**-b**), identifies the blade (Routing Engine) in slot **06**, and specifies the following parameters:

      - **V01**—Product version, which is **01**.
      - **JCS01**—JCS platform identifier, which is **01**.

- **SD01**—RSD identifier, which is **01**.
- **PSD02**—PSD identifier, which is **02**.
- **REP05**—Slot in which the primary (or master) Routing Engine resides, which is **05**.
- **REB06**—Slot in which the backup Routing Engine resides, which is **06**.
- **PRDT640**—Juniper Networks router product, which is a T640 router.

Results Display the results of the configuration:

```
system> baydata

Bay  Status            Definition
1    No blade present
2    No blade present
3    No blade present
4    Supported         V01-JCS01-SD01-PSD01-REP04-REB00-PRDT640
5    Supported         V01-JCS01-SD01-PSD02-REP05-REB06-PRDT640
6    Supported         V01-JCS01-SD01-PSD02-REP05-REB06-PRDT640
7    No blade present
8    No blade present
9    No blade present
10   No blade present
11   No blade present
12   No blade present
```

RSD Configuration

Step-by-Step Procedure To configure the RSD and create the PSDs on the master Routing Engine in the T640 router:

1. At the **[edit chassis system-domains]** hierarchy level of the Junos OS CLI, include the **root-domain-id 1** statement to identify the RSD.
2. At the **[edit chassis system-domains]** hierarchy level, include the **protected-system-domains psd1** statement to create PSD1.
3. At the **[edit chassis system-domains protected-system-domains psd1]** hierarchy level:
   a. Include the **fpcs 4** statement to assign the FPC in slot 4 to PSD1.
   b. Include the **control-system-id 1** statement to identify the JCS1200 platform.
   c. Include the **control-slot-numbers 4** statement to assign the Routing Engine in slot 4 in the JCS chassis to PSD1.
4. At the **[edit chassis system-domains]** hierarchy level, include the **protected-system-domains psd2** statement to create PSD2.
5. At the **[edit chassis system-domains protected-system-domains psd2]** hierarchy level:

a. Include the **fpcs 5** statement to assign the FPC in slot 5 to PSD2.

b. Include the **control-system-id 1** statement to identify the JCS1200 platform.

c. Include the **control-slot-numbers 5 control-slot-numbers 6** statement to assign the Routing Engines in slot 5 and slot 6 in the JCS chassis to PSD2.

Results Display the results of the configuration:

```
chassis {
  system-domains {
    root-domain-id 1;
    protected-system-domains {
      psd1 {
        fpcs 4;
        control-system-id 1;
        control-slot-numbers 4;
      }
      psd2 {
        fpcs 5;
        control-system-id 1;
        control-slot-numbers [5 6];
      }
    }
  }
}
```

PSD1 Configuration

Step-by-Step Procedure The configuration for PSD1 is much the same as the configuration that was running on the T640 router in the original VPN network topology before the consolidation of two routers into a single platform.

The key difference is the management configuration. To configure the unique parameters for PSD1:

1. Configure the following statements at the **[edit groups re0 system]** hierarchy level:

   a. Include the **host-name customer-a** statement to configure the hostname for PSD1.

   b. Include the **backup-router 192.168.71.254** statement to configure a backup router. The backup router should be directly connected to the local routing platform by way of the management interface.

   c. Include the **address 192.168.66.240/21** statement at the **[edit interfaces fxp0 unit 0 family inet]** hierarchy level to configure the management interface.

Results Display the results of the configuration:

```
re0 {
  system {
    host-name customer-a;
```

```
        backup-router 192.168.71.254 destination [ 172.16.0.0/12 192.168.0.0/16
          207.17.136.192/32 10.9.0.0/16 10.10.0.0/16 10.13.10.0/23 10.84.0.0/16 10.5.0.0/16
          10.6.128.0/17 192.168.102.0/23 207.17.136.0/24 10.209.0.0/16 10.227.0.0/16
          10.150.0.0/16 10.157.64.0/19 10.204.0.0/16 ];
      }
      interfaces {
        fxp0 {
          unit 0 {
            family inet {
              address 192.168.66.240/21;
            }
          }
        }
      }
    }
  interfaces {
    fe-0/2/3 {
      unit 0 {
        family inet {
          address 10.6.1.1/30;
        }
        family iso;
        family mpls;
      }
    }
    so-4/0/3 {
      encapsulation frame-relay-ccc;
      unit 2 {
        encapsulation frame-relay-ccc;
        dlci 512;
      }
    }
    fe-4/3/0 {
      unit 0 {
        family inet {
          address 10.5.1.2/30;
        }
        family iso;
        family mpls;
      }
    }
  }
    routing-options {
      autonomous-system 65299;
      confederation 702 members [ 65299 65235 65240 65269 ];
    }
    protocols {
      mpls {
        interface all;
      }
      bgp {
        group ibgp {
          type internal;
          local-address 10.255.171.124;
          import match-all;
          family l2vpn {
```

```
            signaling;
          }
          export match-all;
          neighbor 10.255.171.125;
        }
      }
      isis {
        interface fe-4/2/3.0 {
          level 2 metric 10;
          level 1 disable;
        }
        interface fe-4/3/0.0 {
          level 2 metric 10;
          level 1 disable;
        }
        interface all;
        interface fxp0.0 {
          disable;
        }
        interface lo0.0 {
          passive;
        }
      }
      ldp {
        interface all;
        interface lo0.0;
      }
    }
    policy-options {
      policy-statement frame-relay-vpn-export {
        term a {
          then {
            community add frame-relay-vpn-comm;
            accept;
          }
        }
        term b {
          then reject;
        }
      }
      policy-statement frame-relay-vpn-import {
        term a {
          from {
            protocol bgp;
            community frame-relay-vpn-comm;
          }
          then accept;
        }
        term b {
          then reject;
        }
      }
      policy-statement match-all {
        then accept;
      }
      community frame-relay-vpn-comm members target:65299:400;
```

```
}
routing-instances {
   frame-relay-vpn {
      instance-type l2vpn;
      interface so-4/0/3.2;
      route-distinguisher 10.255.171.124:4;
      vrf-import frame-relay-vpn-import;
      vrf-export frame-relay-vpn-export;
      protocols {
         l2vpn {
            encapsulation-type frame-relay;
            site 2 {
               site-identifier 2;
               interface so-4/0/3.2 {
                  remote-site-id 1;
               }
            }
         }
      }
   }
}
```

PSD2 Configuration

Step-by-Step Procedure

The configuration for PSD2 is much the same as the configuration that was running on the T640 router in the original VPN network topology before the consolidation of two routers into a single platform.

The key difference is the management configuration. To configure the unique parameters for PSD2:

1. Configure the following statements at the **[edit system re0]** hierarchy level:

   a. Include the **host-name customer-b** statement to configure the hostname for the master Routing Engine (**re0**) on PSD2.

   b. Include the **backup-router 192.168.71.254** statement to configure a backup router. The backup router should be directly connected to the local routing platform by way of the management interface.

   c. Include the **address 192.168.66.240/21** statement at the **[edit interfaces fxp0 unit 0 family inet]** hierarchy level to configure the **fxp0** management interface.

2. Configure the backup Routing Engine parameters by including the following statements at the **[edit system re1]** hierarchy level:

   a. Include the **host-name customer-b1** statement to configure the hostname for the backup Routing Engine (**re1**) on PSD2.

   b. Include the **backup-router 192.168.71.254** statement to configure a backup router. The backup router should be directly connected to the local routing platform by way of the management interface.

   c. Include the **address 192.168.66.242/21** statement at the **[edit interfaces fxp0 unit 0 family inet]** hierarchy level to configure the **fxp0** management interface.

Results Display the results of the configuration:

```
re0 {
    system {
        host-name customer-b;
        backup-router 192.168.71.254 destination [ 172.16.0.0/12 192.168.0.0/16
            207.17.136.192/32 10.9.0.0/16 10.10.0.0/16 10.13.10.0/23 10.84.0.0/16 10.5.0.0/16
            10.6.128.0/17 192.168.102.0/23 207.17.136.0/24 10.209.0.0/16 10.227.0.0/16
            10.150.0.0/16 10.157.64.0/19 10.204.0.0/16 ];
    }
    interfaces {
        fxp0 {
            unit 0 {
                family inet {
                    address 192.168.66.242/21;
                }
            }
        }
    }
}
    re1 {
        system {
            host-name customer-b1;
            backup-router 192.168.71.254 destination [ 172.16.0.0/12 192.168.0.0/16
                207.17.136.192/32 10.9.0.0/16 10.10.0.0/16 10.13.10.0/23 10.84.0.0/16 10.5.0.0/16
                10.6.128.0/17 192.168.102.0/23 207.17.136.0/24 10.209.0.0/16 10.227.0.0/16
                10.150.0.0/16 10.157.64.0/19 10.204.0.0/16 ];
        }
        interfaces {
            fxp0 {
                unit 0 {
                    family inet {
                        address 192.168.66.241/21;
                    }
                }
            }
        }
    }
interfaces {
    fe-5/1/1 {
        unit 0 {
            family inet {
                address 10.5.1.1/30;
            }
            family iso;
            family mpls;
        }
    }
    fe-5/1/2 {
        unit 0 {
            family inet {
                address 10.8.1.1/30;
            }
            family iso;
            family mpls;
        }
```

```
    }
    so-5/3/0 {
      encapsulation frame-relay-ccc;
      unit 1 {
        encapsulation frame-relay-ccc;
        dlci 512;
      }
    }
}
    routing-options {
      autonomous-system 65299;
      confederation 702 members [ 65299 65235 65240 65269 ];
    }
    protocols {
      mpls {
        interface all;
      }
      bgp {
        group ibgp {
          type internal;
          local-address 10.255.171.125;
          import match-all;
          family l2vpn {
            signaling;
          }
          export match-all;
          neighbor 10.255.171.124;
        }
      }
      isis {
        interface fe-5/1/1.0 {
          level 2 metric 10;
          level 1 disable;
        }
        interface fe-5/1/2.0 {
          level 2 metric 10;
          level 1 disable;
        }
        interface all;
        interface fxp0.0 {
          disable;
        }
        interface lo0.0 {
          passive;
        }
      }
      ldp {
        interface all;
        interface lo0.0;
      }
    }
    policy-options {
      policy-statement frame-relay-vpn-export {
        term a {
          then {
            community add frame-relay-vpn-comm;
```

```
            accept;
          }
        }
        term b {
          then reject;
        }
      }
      policy-statement frame-relay-vpn-import {
        term a {
          from {
            protocol bgp;
            community frame-relay-vpn-comm;
          }
          then accept;
        }
        term b {
          then reject;
        }
      }
      policy-statement match-all {
        then accept;
      }
      community frame-relay-vpn-comm members target:65299:400;
    }
    routing-instances {
      frame-relay-vpn {
        instance-type l2vpn;
        interface so-5/3/0.1;
        route-distinguisher 10.255.171.125:4;
        vrf-import frame-relay-vpn-import;
        vrf-export frame-relay-vpn-export;
        protocols {
          l2vpn {
            encapsulation-type frame-relay;
            site 1 {
              site-identifier 1;
              interface so-5/3/0.1 {
                remote-site-id 2;
              }
            }
          }
        }
      }
    }
```

Verification

Verify that the two PSDs are configured and operating properly:

- Verifying Configured PSDs on page 184
- Verifying PSD Hardware on page 184
- Verifying PSD Routing Engine Information on page 185
- Verifying PSD Ethernet Switch Statistics on page 187

Verifying Configured PSDs

Purpose Verify that PSD1 and PSD2 are configured and online.

Action On the RSD, issue the **show chassis psd** command.

```
{master}

user@host> show chassis psd
PSD  Description   State        Uptime
1                  Online        5 days, 19 hours, 16 minutes, 16 seconds
2                  Online        5 days, 18 hours, 12 minutes, 11 seconds
```

Meaning The example shows that the PSDs are configured and online.

Verifying PSD Hardware

Purpose Display information about the FPCs and Routing Engines that are part of each PSD.

Action On each PSD, issue the **show chassis hardware** command.

The following example displays the hardware components belonging to PSD1:

```
user@psd1> show chassis hardware
rsd-re0:
--------------------------------------------------------------------------
Hardware inventory:
Item             Version  Part number  Serial number     Description
Chassis                                S19068            T640
Midplane         REV 04   710-002726   AX5666            T640 Backplane
FPM GBUS         REV 02   710-002901   HE3251            T640 FPM Board
FPM Display      REV 02   710-002897   HE7860            FPM Display
CIP              REV 05   710-002895   HC0474            T Series CIP
PEM 1            Rev 03   740-002595   MH15367           Power Entry Module
SCG 0            REV 04   710-003423   HF6042            T640 Sonet Clock Gen.
SCG 1            REV 11   710-003423   HW7765            T640 Sonet Clock Gen.
Routing Engine 0 REV 04   740-014082   1000660098        RE-A-2000
Routing Engine 1 REV 01   740-005022   210865700324      RE-3.0
CB 0             REV 06   710-007655   WE9377            Control Board (CB-T)
CB 1             REV 06   710-007655   WE9379            Control Board (CB-T)
FPC 4            REV 02   710-002385   HC0619            FPC Type 2
  CPU            REV 06   710-001726   HB1916            FPC CPU
  MMB 1          REV 03   710-004047   HE3195            MMB-288mbit
  ICBM           REV 04   710-003384   HC0377            FPC ICBM
  PPB 0          REV 02   710-003758   HC0585            PPB Type 2
  PPB 1          REV 02   710-003758   HC0574            PPB Type 2
SPMB 0           REV 10   710-003229   WE9582            T Series Switch CPU
SPMB 1           REV 10   710-003229   WE9587            T Series Switch CPU
SIB 0            REV 05   750-005486   HV8445            SIB-I8-F16
SIB 1            REV 05   750-005486   HW2650            SIB-I8-F16
SIB 2            REV 05   750-005486   HW7041            SIB-I8-F16
SIB 3            REV 05   750-005486   HV4274            SIB-I8-F16
SIB 4            REV 05   750-005486   HV8464            SIB-I8-F16
Fan Tray 0                                                Front Top Fan Tray
Fan Tray 1                                                Front Bottom Fan Tray
Fan Tray 2                                                Rear Fan Tray

psd1-re0:
```

```
--------------------------------------------------------------------------
Hardware inventory:
Item             Version  Part number  Serial number     Description
Chassis                   740-023156   SNJCSJCSAC00      JCS1200 AC Chassis
Routing Engine 0 REV 01   740-023157   SNBLJCSAC004      RE-JCS1200-1x2330
```

The following example displays the hardware components belonging to PSD2:

```
user@psd2> show chassis hardware
rsd-re0:
--------------------------------------------------------------------------
Hardware inventory:
Item             Version  Part number  Serial number     Description
Chassis                                S19068            T640
Midplane         REV 04   710-002726   AX5666            T640 Backplane
FPM GBUS         REV 02   710-002901   HE3251            T640 FPM Board
FPM Display      REV 02   710-002897   HE7860            FPM Display
CIP              REV 05   710-002895   HC0474            T Series CIP
PEM 1            Rev 03   740-002595   MH15367           Power Entry Module
SCG 0            REV 04   710-003423   HF6042            T640 Sonet Clock Gen.
SCG 1            REV 11   710-003423   HW7765            T640 Sonet Clock Gen.
Routing Engine 0 REV 04   740-014082   1000660098        RE-A-2000
Routing Engine 1 REV 01   740-005022   210865700324      RE-3.0
CB 0             REV 06   710-007655   WE9377            Control Board (CB-T)
CB 1             REV 06   710-007655   WE9379            Control Board (CB-T)
FPC 5            REV 01   710-010233   HM4187            E-FPC Type 1
  CPU            REV 01   710-010169   HS9939            FPC CPU-Enhanced
  MMB 1          REV 01   710-010171   HR0833            MMB-288mbit
SPMB 0           REV 10   710-003229   WE9582            T Series Switch CPU
SPMB 1           REV 10   710-003229   WE9587            T Series Switch CPU
SIB 0            REV 05   750-005486   HV8445            SIB-I8-F16
SIB 1            REV 05   750-005486   HW2650            SIB-I8-F16
SIB 2            REV 05   750-005486   HW7041            SIB-I8-F16
SIB 3            REV 05   750-005486   HV4274            SIB-I8-F16
SIB 4            REV 05   750-005486   HV8464            SIB-I8-F16
Fan Tray 0                                                Front Top Fan Tray
Fan Tray 1                                                Front Bottom Fan Tray
Fan Tray 2                                                Rear Fan Tray

psd2-re0:
--------------------------------------------------------------------------
Hardware inventory:
Item             Version  Part number  Serial number     Description
Chassis                   740-023156   SNJCSJCSAC00      JCS1200 AC Chassis
Routing Engine 0 REV 01   740-023157   SNBLJCSAC006      RE-JCS1200-1x2330
Routing Engine 1 REV 01   740-023157   SNBLJCSAC005      RE-JCS1200-1x2330
```

Meaning In the command output, the FPC that belongs to the PSD is displayed under the **rsd-re0:** field heading. The Routing Engines on the JCS chassis that belong to the PSD are displayed under the **psd2-re0:** heading.

Verifying PSD Routing Engine Information

Purpose Display detailed information about the Routing Engines assigned to each PSD.

Action On each PSD, issue the **show chassis routing-engine** command.

The following example displays detailed information about the Routing Engine assigned to PSD1.

```
user@psd1> show chassis routing-engine
Routing Engine status:
  Slot 0:
    Physical Slot                  4
    Current state                  Master
    Election priority              Master (default)
    DRAM                       13312 MB
    Memory utilization            10 percent
    CPU utilization:
      User                         0 percent
      Background                   0 percent
      Kernel                       0 percent
      Interrupt                    0 percent
      Idle                       100 percent
    Model                          RE-JCS1200-1x2330
    Serial ID                      SNBLJCSAC004
    Start time                     2008-03-30 03:19:49 PDT
    Uptime                         11 hours, 46 minutes, 24 seconds
    Load averages:                 1 minute   5 minute  15 minute
                                       0.00       0.00       0.00
```

The following example displays detailed information about the Routing Engines assigned to PSD2.

```
user@psd2> show chassis routing-engine
Routing Engine status:
  Slot 0:
    Physical Slot                  6
    Current state                  Master
    Election priority              Master (default)
    DRAM                       13312 MB
    Memory utilization            10 percent
    CPU utilization:
      User                         0 percent
      Background                   0 percent
      Kernel                       0 percent
      Interrupt                    0 percent
      Idle                       100 percent
    Model                          RE-JCS1200-1x2330
    Serial ID                      SNBLJCSAC006
    Start time                     2008-03-30 03:25:43 PDT
    Uptime                         11 hours, 49 minutes, 30 seconds
    Load averages:                 1 minute   5 minute  15 minute
                                       0.00       0.00       0.00
Routing Engine status:
  Slot 1:
    Physical Slot                  5
    Current state                  Backup
    Election priority              Backup (default)
    DRAM                       13312 MB
    Memory utilization             9 percent
    CPU utilization:
      User                         0 percent
      Background                   0 percent
      Kernel                       0 percent
      Interrupt                    0 percent
      Idle                       100 percent
    Model                          RE-JCS1200-1x2330
```

```
    Serial ID                       SNBLJCSAC005
    Start time                      2008-03-30 03:25:40 PDT
    Uptime                          11 hours, 49 minutes, 36 seconds
```

Meaning The **Physical Slot** field displays the JCS chassis slot number in which each Routing Engine is installed.

Verifying PSD Ethernet Switch Statistics

Purpose Display the Ethernet switch statistics for each PSD.

Action On each PSD, issue the **show chassis ethernet-switch statistics** command.

The following example displays information about the Ethernet switch statistics for PSD1:

```
user@psd1> show chassis ethernet-switch statistics
Statistics for switch[1] port INT4 connected to fpx0:
  TX Octets                 3295346375
  TX Unicast Packets        47634559
  TX Multicast Packets      1848912
  TX Broadcast Packets      28900124
  Tx Discards               0
  TX Errors                 0
  RX Octets                 1393157883
  RX Unicast Packets        25671001
  RX Multicast Packets      453
  RX Broadcast Packets      1568098
  RX Discards               1539
  RX Errors                 0
  RX Unknown Protocol       0
  Link State Changes        209
Statistics for switch[1] port EXT1 connected to RSD 1:
  TX Octets                 2205898607
  TX Unicast Packets        23928658
  TX Multicast Packets      412974
  TX Broadcast Packets      4848743
  Tx Discards               0
  TX Errors                 0
  RX Octets                 2391964542
  RX Unicast Packets        26419568
  RX Multicast Packets      226
  RX Broadcast Packets      6025807
  RX Discards               8
  RX Errors                 4
  RX Unknown Protocol       0
  Link State Changes        113
Statistics for switch[1] port EXT6 connected to external management:
  TX Octets                 1528646621
  TX Unicast Packets        7591565
  TX Multicast Packets      112
  TX Broadcast Packets      6025
  Tx Discards               0
  TX Errors                 0
  RX Octets                 509146577
  RX Unicast Packets        30206303
  RX Multicast Packets      3036487
  RX Broadcast Packets      12226460
  RX Discards               18650
  RX Errors                 6
```



```
  RX Unknown Protocol       0
  Link State Changes        1
Statistics for switch[2] port INT4 connected to fpx1:
  TX Octets                 3973176699
  TX Unicast Packets        27784685
  TX Multicast Packets      90293282
  TX Broadcast Packets      35160560
  Tx Discards               0
  TX Errors                 0
  RX Octets                 2278093260
  RX Unicast Packets        10421370
  RX Multicast Packets      496
  RX Broadcast Packets      1881084
  RX Discards               1936
  RX Errors                 0
  RX Unknown Protocol       0
  Link State Changes        231
Statistics for switch[2] port EXT1 connected to RSD 1:
  TX Octets                 3175062867
  TX Unicast Packets        4961873
  TX Multicast Packets      509882
  TX Broadcast Packets      5622328
  Tx Discards               0
  TX Errors                 0
  RX Octets                 478994886
  RX Unicast Packets        49004
  RX Multicast Packets      251
  RX Broadcast Packets      7419709
  RX Discards               12
  RX Errors                 6
  RX Unknown Protocol       0
  Link State Changes        129
Statistics for switch[2] port EXT6 connected to external management:
  TX Octets                 778154
  TX Unicast Packets        4244
  TX Multicast Packets      73
  TX Broadcast Packets      769
  Tx Discards               0
  TX Errors                 0
  RX Octets                 723965940
  RX Unicast Packets        43991082
  RX Multicast Packets      91767677
  RX Broadcast Packets      15655861
  RX Discards               24442638
  RX Errors                 3331664
  RX Unknown Protocol       0
  Link State Changes        1
```

The following example displays information about the Ethernet switch statistics for PSD2:

```
user@psd2> show chassis ethernet-switch statistics
Statistics for switch[1] port INT6 connected to fpx0:
  TX Octets                 2686108265
  TX Unicast Packets        45820458
  TX Multicast Packets      1849567
  TX Broadcast Packets      28901148
  Tx Discards               0
  TX Errors                 0
  RX Octets                 3814661840
  RX Unicast Packets        23875023
```



```
  RX Multicast Packets      364
  RX Broadcast Packets      1578993
  RX Discards               1492
  RX Errors                 0
  RX Unknown Protocol       0
  Link State Changes        151
Statistics for switch[1] port EXT1 connected to RSD 1:
  TX Octets                 2206358846
  TX Unicast Packets        23930762
  TX Multicast Packets      413155
  TX Broadcast Packets      4850581
  Tx Discards               0
  TX Errors                 0
  RX Octets                 2392164387
  RX Unicast Packets        26421668
  RX Multicast Packets      226
  RX Broadcast Packets      6026725
  RX Discards               8
  RX Errors                 4
  RX Unknown Protocol       0
  Link State Changes        113
Statistics for switch[1] port EXT6 connected to external management:
  TX Octets                 1528692454
  TX Unicast Packets        7591911
  TX Multicast Packets      112
  TX Broadcast Packets      6027
  Tx Discards               0
  TX Errors                 0
  RX Octets                 510609656
  RX Unicast Packets        30209066
  RX Multicast Packets      3037753
  RX Broadcast Packets      12229518
  RX Discards               18650
  RX Errors                 6
  RX Unknown Protocol       0
  Link State Changes        1
Statistics for switch[2] port INT6 connected to fpx1:
  TX Octets                 3938845805
  TX Unicast Packets        27450378
  TX Multicast Packets      90293642
  TX Broadcast Packets      35156025
  Tx Discards               0
  TX Errors                 0
  RX Octets                 2016108068
  RX Unicast Packets        9832240
  RX Multicast Packets      448
  RX Broadcast Packets      1897002
  RX Discards               1844
  RX Errors                 0
  RX Unknown Protocol       0
  Link State Changes        195
Statistics for switch[2] port EXT1 connected to RSD 1:
  TX Octets                 3175192403
  TX Unicast Packets        4961873
  TX Multicast Packets      510063
  TX Broadcast Packets      5624171
  Tx Discards               0
  TX Errors                 0
  RX Octets                 479053702
  RX Unicast Packets        49004
  RX Multicast Packets      251
```

```
  RX Broadcast Packets      7420628
  RX Discards               12
  RX Errors                 6
  RX Unknown Protocol       0
  Link State Changes        129
Statistics for switch[2] port EXT6 connected to external management:
  TX Octets                 778154
  TX Unicast Packets        4244
  TX Multicast Packets      73
  TX Broadcast Packets      769
  Tx Discards               0
  TX Errors                 0
  RX Octets                 732481038
  RX Unicast Packets        44041821
  RX Multicast Packets      91768932
  RX Broadcast Packets      15658928
  RX Discards               24443758
  RX Errors                 3331666
  RX Unknown Protocol       0
  Link State Changes        1
```

Meaning In the output for PSD1:

- INT4 provides the internal connection between the Routing Engine in slot 4 and the JCS switch module.
- EXT1 provides the connection between the JCS switch module and the RSD.
- EXT6 provides the connection between the JCS switch module and the management ports on each Routing Engine in the JCS chassis.

In the output for PSD2:

- INT6 provides the internal connection between the master Routing Engine in slot 6 and the JCS switch module.
- EXT1 provides the connection between the JCS switch module and the RSD.
- EXT6 provides the connection between the JCS switch module and the management ports on each Routing Engine in the JCS chassis.

Related Documentation

- Configuring an RSD and Creating PSDs on page 82

PART 3

Administration

CHAPTER 14

Managing the JCS1200 Platform

JCS Management Module Verification Tasks

Table 25 on page 193 lists some JCS management module verification tasks useful for monitoring JCS operations.

Table 25: Summary of Commonly Used JCS Management Module Verification Tasks

Items to Check	Description	Task
Vital product data	Display hardware part numbers, system component counts, and software versions.	"Displaying Vital Product Data" on page 194
Event log	Display (or clear) the contents of the event log—including user access events.	"Clearing the Event Log" on page 196 "Displaying the Event Log" on page 196
Power domains	Display power domain information.	"Displaying Power Domain Information" on page 197
System component status	Display the status of all system components.	"Displaying System Component Status" on page 198
System configuration	Display the system configuration list.	"Displaying a List of Components" on page 199
Temperature	Display component temperature values and ranges.	"Displaying Temperature Information" on page 200

Table 25: Summary of Commonly Used JCS Management Module Verification Tasks *(continued)*

Items to Check	Description	Task
Voltage	Display voltage information for system components.	"Displaying Voltage Information" on page 201

Related Documentation

- Configuring JCS Management Module Settings on page 43
- Junos OS Verification Tasks on page 230

Displaying Vital Product Data

Purpose Display identification and configuration information for the component specified. This includes hardware part numbers, system component counts, and software versions. You can use this information to determine whether a particular feature is supported, whether firmware requires updating, or whether a particular software bug occurs in your version of the software.

Action Display identification and configuration information using the JCS management module CLI **info** command.

The following sample output appears when the **info** command is targeted for the entire JCS1200 platform:

```
system> info
UUID: 597A 6B81 C99F 333 9DE7 A3D4 52F9 95D1
Manufacturer: ZX1234
Manufacturer ID: 20301Product code: System Enclosure/CHAS-BP-JCS1200-S
Serial number: 02Part no.: 740-025747
Component serial no.: ZX001
CLEI: Not Available
AMM slots: 2
Blade slots: 12
I/O Module slots: 10
Power Module slots: 4
Blower slots: 4
Media Tray slots: 2
...
```

The sample output shows relevant hardware information about the JCS1200 platform, including the JCS chassis serial number (**Manufacturer** field) and JCS midplane serial number (**Component Serial No.** field). It also includes the number and type of chassis slots supported.

The following sample output appears when the **info** command is targeted for the JCS management module:

```
system> info –T mm[1]
Name: bcgmm1
UUID: 369C 7EB6 4067 11DC AAAE 0014 5EDF 924E
Manufacturer ID: 20301
Product code: JCS Adv Management Module
Serial number: Not Available
Part no.: 740-023172
```

```
Component serial no.: JCS-MM-SN-BCG001
CLEI: Not Available
AMM firmware
        Build ID:       BPE034E
        File name:      CNETCMUS.PKT
        Rel date:       11-20-07
        Rev:            34
...
```

The sample output shows relevant hardware information about the JCS management module including the product code and part number. It also includes the build ID and release date of the management module firmware.

The following sample output appears when the **info** command is targeted for the JCS switch module:

```
system> info –T switch[1]
UUID: 0018 B11B 8900 0000 0000 0000 0000 0000
Manufacturer ID: 20301
Product code: JCS L2/L3 Switch Module
Serial number: Not Available
Part no.: 740-023179
Component serial no.: JCS-SWITCH-SN-BCG001
CLEI: COUCAAGAAA
Unique ID 1: Not Available
Boot ROM
        Build ID:       WMZ02000
        Rel date:       10/15/2007
        Rev:            0104
Main Application 1
        Build ID:       WMZ02000
        Rel date:       10/15/2007
        Rev:            0104
Main Application 2
        Build ID:       WMZ02000
        Rel date:       10/15/2007
        Rev:            0104
MAC Address:    00:18:B1:1B:89:00
...
```

The following sample output appears when the **info** command is targeted for a Routing Engine:

```
system> info –T blade[1]
Name: bcgcpu1
UUID: 7393 CA1C 00C3 3A97 AC4C 6EE7 608B CA0D
Manufacturer ID: 20301
Product code: 4 X86 CPU Blade Server/JCS Routing Engine
Serial number: KQLABC2
Part no.: 740-023157
Component serial no.: JCS-BLADE-SN-BCG001
CLEI: Not Available
MAC Address 1: 00:1A:64:32:E4:D8
MAC Address 2: 00:1A:64:32:E4:DA
BIOS
        Build ID:       LJE104BUS
        Rel date:       12/11/2007
        Rev:            1.00
Diagnostics
        Build ID:       BCYT24AUS
        Rel date:       08/27/2007
```

```
        Rev:            1.04
Blade sys. mgmt. proc.
        Build ID:       BCBT42B
        Rev:             1.11
Local Control
        KVM:            Yes
        Media Tray:     Yes
SCOD: Unknown
Power On Time: 5 days 20 hours 35 min 12 secs
Number of Boots: 3
```

Related Documentation

- JCS1200 Platform Hardware Components on page 21
- info on page 213

Clearing the Event Log

Purpose The event log stores events that occur on the JCS1200 platform. This includes user login activity, configuration changes, error conditions, and so on. Periodically, you may wish to clear the event log to remove exiting events.

Action Clear the event log using the JCS management module CLI **clearlog** command.

The following sample output appears when the event log for the JCS management module is cleared:

```
system> clearlog —T system:mm[1]
OK
```

The following sample output shows information that is returned if the **displaylog** command is run after the event log has been cleared.

```
system:mm[1]> displaylog -f
1 I SERVPROC 01/28/08 19:50:15  System log cleared.
(There are no more entries in the event log.)
```

Related Documentation

- clearlog on page 205
- displaylog on page 206

Displaying the Event Log

Purpose The JCS software generates event log messages to record events that occur on the JCS1200 platform, including the following:

- Routine operations, such as configuration changes and user login activities.
- Failure and error conditions.
- Emergency and critical conditions, such as power-off due to excessive temperature.

You can display the event log to monitor JCS1200 platform operations and to diagnose and troubleshoot problems.

Action Display the event log using the JCS management module CLI **displaylog** command:

The following sample output appears when the **displaylog** command is targeted for the most recent events:

```
system> displaylog —T mm[1]
1 I Audit    01/28/08 19:47:01 Remote logoff for 'gdickey' from Serial via COM1
2 I Blade_03 01/28/08 19:46:14 (bcgcpu3) Blade reboot
3 I SERVPROC 01/27/08 19:45:57 Login ID:''USERID' from 192.168.70.231.
4 E SERVPROC 01/27/08 19:42:58 Failure reading I2C device. Check bus 4.
5 I SERVPROC 01/27/08 19:41:54 Login ID:''USERID' from WEB browser at
IP@=192.168.70.231'
```

The sample output shows the event log for the JCS management module. By default, the first time the command is executed, the five most recent log entries are displayed. Each subsequent time the command is issued, the next five log entries are displayed.

The following sample output shows the complete event log for the JCS management module. All events since the last time the log was cleared are shown.

```
system:mm[1]> displaylog -a
1 I Audit    01/28/08 19:47:01  Remote logoff successful for user 'gdickey'
2 I Blade_03 01/28/08 19:46:14 (bcgcpu3) Blade reboot
3 I SERVPROC 01/27/08 19:45:57 Login ID:''USERID' CLI telnet authenticated.
4 E SERVPROC 01/27/08 19:42:58 Failure reading I2C device. Check bus 4.
5 I SERVPROC 01/27/08 19:41:54 Login ID:''USERID' from WEB browser.
6 E SERVPROC 01/27/08 19:41:53 Blower 2 Fault Multiple blower failures.
7 E SERVPROC 01/27/08 19:41:53 Blower 1 Fault Single blower failure.
8 I SERVPROC 01/27/08 19:41:48 Ethernet[1] Link Established at 100Mb.
9 I SERVPROC 01/27/08 19:41:48 Ethernet[1] configured to do 100Mb/Full Duplex.
10 I SERVPROC 01/27/08 19:41:48 Ethernet[1] MAC Address: 0x00-09-6B-CA-0C-81
11 I SERVPROC 01/27/08 19:41:48 Ethernet[0] Link Established at 100Mb.
12 I SERVPROC 01/27/08 19:41:48 Ethernet[0] configured to do Auto Speed/Auto.
13 I SERVPROC 01/27/08 19:41:48 Ethernet[0] MAC Address: 0x00-09-6B-CA-0C-80
14 I SERVPROC 01/27/08 19:41:48 Management Module Network Initialization.
15 I SERVPROC 01/27/08 19:41:46 ENET[1] IP-Cfg:HstName=MM00096BCA0C81.
```

Related Documentation

- clearlog on page 205
- displaylog on page 206

Displaying Power Domain Information

Purpose You can display power domain information to make sure the power domains are operating properly. The JCS chassis is separated into two power domains. Power domain A supports all JCS modules and slots (bays) 1 through 6. Power domain A uses power modules 1 and 2. Power domain B supports slots 7 though 14 and uses power modules 3 and 4.

NOTE: To support devices in power domain B, a power-supply option (consisting of two power modules) must be installed.

Action Display power domain information using the JCS CLI **fuelg** command.

The following sample output appears when power domain information is displayed:

```
system> fuelg
Note: All power values are displayed in Watts.

Power Domain 1
--------------
Status: Power domain status is good.
Modules:
 Bay 1:   2880
 Bay 2:   2880
Power Management Policy: Basic Power Management
Power in Use:            907
Total Power:            4000
Allocated Power (Max):  1921
Remaining Power:        2079

Power Domain 2
--------------
Status: Power domain status is good.
Modules:
 Bay 3:   2880
 Bay 4:   2880
Power Management Policy: Basic Power Management
Power in Use:            116
Total Power:            4000
Allocated Power (Max):   800
Remaining Power:        3200
```

Related Documentation

- fuelg on page 208

Displaying System Component Status

Purpose You can display the current health status for the JCS1200 platform to determine if system components are operating properly. For each component, health status can be:

- Ok
- Warning
- Critical

Action Display health status for the JCS1200 platform using the JCS management module CLI **health** command.

The following sample output appears when health status is displayed for all components installed in the JCS1200 platform:

```
system> health —l a
OK
         mm[1]     :          OK
         mm[2]     :          OK
         blade[1]  :          OK
         blade[2]  :          OK
         blade[3]  :          OK
         blade[4]  :          OK
         blade[5]  :          Minor
         blade[6]  :          OK
         power[1]  :          OK
         power[2]  :          OK
         power[3]  :          OK
         power[4]  :          OK
         blower[1] :          OK
         blower[2] :          OK
         blower[3] :          OK
         blower[4] :          OK
         switch[1] :          OK
         switch[2] :          OK
```

The following sample output appears when health status is displayed for a JCS Routing Engine:

```
system> health -l —a T system:blade[5]
system: Minor
        blade[5]:Minor
   5V over voltage
   CPU1 temperature warning
```

In this example, a minor warning appears for the Routing Engine in slot 5. The voltage level has risen, causing a temperature increase.

Related Documentation

- health on page 210

Displaying a List of Components

Purpose You can display a list of components included in the JCS chassis. This information is useful for determining how many Routing Engines and management modules are installed and which management module is primary.

Action Display a list of components in the JCS chassis using the JCS management module CLI **list** command.

The following sample output appears when the list is displayed for all components installed in the JCS chassis:

```
system> list —l a
system
        mm[1]     primary
        mm[2]     standby
        power[1]
        power[2]
```

```
power[3]
power[4]
blower[1]
blower[2]
blower[3]
blower[4]
switch[1]
switch[2]
blade[1]  bcgcpu1
        sp
        cpu[1]

blade[3]  bcgcpu3
        sp
        cpu[1]
blade[4]  bcgcpu4
        sp
        cpu[1]
blade[5]  bcgcpu5
        sp
        cpu[1]
blade[6]  bcgcpu6
        sp
        cpu[1]
mt[1]
mt[2]
tap
mux[1]
mux[2]
```

In this example, two management modules (**mm**) are installed and **mm[1]** is the primary management module. There are also four power supplies (**power**), four fan assemblies (**blowers**), and two JCS switch modules (**switch**). There are six Routing Engines (**blade**) and two media trays (**mt**).

Related Documentation

- JCS1200 Platform Hardware Components on page 21
- list on page 216

Displaying Temperature Information

Purpose You can display temperature information for components in the JCS chassis. This information is useful for viewing current temperature values and temperature threshold settings.

Action Display temperature information (in degrees Fahrenheit) for components in the JCS chassis using the JCS CLI **temps** command.

The following sample output appears when temperature information is displayed for a JCS management module:

```
system> temps –T mm[1]
          Warning
Component    Value   Warning   Reset   Hysteresis
```



```
----------  -------  -------  -------  ----------
MM Ambient  43.00    60.00    55.00    (5.00)
```

The following sample output appears when temperature information is displayed for a JCS Routing Engine:

```
system> temps –T blade[3]
         Warning
Component    Value   Warning   Reset   Hysteresis
----------  -------  -------  -------  ----------
CPU 1       38.00    85.00    95.00    (7.00)
```

Related Documentation

- temps on page 223

Displaying Voltage Information

Purpose You can display voltage information for components in the JCS chassis. This information is useful for viewing current voltage values and voltage threshold settings.

Action Display voltage information for components in the JCS chassis using the JCS CLI **volts** command.

The following sample output appears when voltage information is displayed for a JCS management module:

```
system> volts –T mm[1]
                                    Warning
Source  Value       Warning          Reset       Hysteresis
------  ------  ---------------  --------------  ----------
+5v     +4.84   (+4.50,+5.25)    (+4.85,+5.15)   (+0.35,+0.10)
+3.3v   +3.26   (+3.00,+3.47)    (+3.20,+3.40)   (+0.20,+0.07)
+12v    +12.03  (+10.80,+12.60)  (+11.64,+12.36) (+0.84,+0.24)
-5v     -4.90   (-5.50,-4.75)    (-5.15,-4.85)   (+0.35,+0.10)
+2.5v   +2.48   (+2.25,+2.63)    (+2.42,+2.58)   (+0.17,+0.05)
+1.8v   +1.76   (+1.62,+1.89)    (+1.74,+1.86)   (+0.12,+0.03)
```

The following sample output appears when voltage information is displayed for a JCS Routing Engine:

```
system> volts –T blade[1]
    Source         Value      Critical
---------------  -------  ----------------
Planar 0.9V      +0.88    (+0.40,+1.50)
Planar 12V       +12.12   (+10.20,+13.80)
Planar 3.3V      +3.30    (+2.78,+3.79)
Planar 5V        +4.90    (+4.23,+5.74)
Planar VBAT      +3.05    (+2.54,+3.44)
```

Related Documentation

- volts on page 225

CHAPTER 15

Monitoring Commands for the JCS Management Module

boot

Syntax **boot -T system:blade[*x*]**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Perform an immediate reset and restart of a specified Routing Engine (blade).

Options **-T system:blade[*x*]**—Specify the Routing Engine to boot. Replace ***x*** with the Routing Engine slot number (**1** through **12**).

Required Privilege Level supervisor

Related Documentation
- power on page 218

List of Sample Output boot on page 204

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

boot

```
system> boot –T system:blade[10]
OK
```

clearlog

Syntax **clearlog -T system:mm[*x*]**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Clear the JCS management module event log to remove existing events.

Options **-T system:mm[*x*]**—Specify the management module as the target of the command. Replace ***x*** with a value of **1** or **2**.

Required Privilege Level supervisor

Related Documentation
- Clearing the Event Log on page 196
- displaylog on page 206

List of Sample Output clearlog on page 205

Output Fields When you enter this command, you are provided feedback on the status of your request. The command prompt changes to reflect the new command target.

Sample Output

clearlog

```
system> clearlog –T system:mm[1]
OK
```

displaylog

Syntax **displaylog -T system:mm[*x*] <-a> <-date *date-filter*> <-sev *severity-filter*> <-src *source-filter*>**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Display the JCS management module event log entries.

Options **-T system:mm[*x*]**—Specify the management module as the target of the command. Replace ***x*** with a value of **1** or **2**.

-a—(Optional) Display all entries in the JCS management module event log. By default, the **displaylog** command displays only the first five entries in the log.

-date *date-filter*—(Optional) Display all entries in the JCS management module event log that meet the date filter criteria. Replace ***date-filter*** with a list of dates in ***mm/dd/yy*** format. Use the pipe symbol (**|**) to separate dates in the list. For example, specify the a **-date 03/17/2008|03/18/2008** filter to show all events in the log that occurred on March 17, 2008 and March 18, 2008.

-sev *severity-filter*—(Optional) Display all entries in the JCS management module event log that meet the severity filter criteria. Replace ***severity-filter*** with a list of severities. Use the pipe symbol (|) to separate severities in the list. Severities you can specify include:

- **I**—information
- **E**—error
- **W**—warning

For example, you can specify a **-sev E|W** filter to show all error and warning events in the log.

-src *source-filter*—(Optional) Display all entries in the JCS management module event log that meet the source filter criteria. Replace ***source-filter*** with a list of event sources. Use the pipe symbol (|) to separate sources in the list. Sources you can specify include:

- **blade_*x***—Routing Engine (blade). Replace ***x*** with a value of **01** through **12**.
- **blower-*x***—JCS fan (blower). Replace ***x*** with a value of **1** through **4**.
- **mm_*x***—JCS management module. Replace ***x*** with a value of **1** or **2**.
- **mt_*x***—JCS media tray. Replace ***x*** with a value of **1** or **2**.
- **power_*x***—JCS power supply. Replace ***x*** with a value of **1** through **4**.
- **switch_*x***—JCS switch module. Replace ***x*** with a value of **1** or **2**.

Required Privilege Level supervisor

Related Documentation

- Displaying the Event Log on page 196
- clearlog on page 205

List of Sample Output

displaylog (All Entries) on page 207
displaylog (Filter by Severity) on page 207

Output Fields

Table 26 on page 207 lists the output fields for the **displaylog** command. Output fields are listed in the approximate order in which they appear.

Table 26: displaylog Output Fields

Field Name	Field Description
Index Number	Log entry number. The most recent entries have the lowest numbers.
Entry Type	Type of log entry. Log entries can be informational (I), warnings (W), or errors (E).
System	System where the entry occurred; for example, Blade_03 (Routing Engine in slot 3).
Date and Time	Date and time the entry was logged.
Message	Message associated with the log entry.

Sample Output

displaylog (All Entries)

```
system> displaylog –T system:mm[1] -a
1 I Audit    01/28/08 19:47:01  Remote logoff successful for user 'kmarkham'
2 I Blade_03 01/27/08 19:46:14 (bcgcpu3) Blade reboot
3 I SERVPROC 01/27/08 19:45:57 Login ID:''USERID' CLI telnet authenticated.
4 E SERVPROC 01/27/08 19:42:58 Failure reading I2C device. Check bus 4.
5 I SERVPROC 01/27/08 19:41:54 Login ID:''USERID' from WEB browser.
6 E SERVPROC 01/27/08 19:41:53 Blower 2 Fault Multiple blower failures.
7 E SERVPROC 01/27/08 19:41:53 Blower 1 Fault Single blower failure.
8 I SERVPROC 01/27/08 19:41:48 Ethernet[1] Link Established at 100Mb.
9 I SERVPROC 01/27/08 19:41:48 Ethernet[1] configured to do 100Mb/Full Duplex.
10 I SERVPROC 01/27/08 19:41:48 Ethernet[1] MAC Address: 0x00-09-6B-CA-0C-81
11 I SERVPROC 01/27/08 19:41:48 Ethernet[0] Link Established at 100Mb.
12 I SERVPROC 01/27/08 19:41:48 Ethernet[0] configured to do Auto Speed/Auto.
13 I SERVPROC 01/27/08 19:41:48 Ethernet[0] MAC Address: 0x00-09-6B-CA-0C-80
14 I SERVPROC 01/27/08 19:41:48 Management Module Network Initialization.
15 I SERVPROC 01/27/08 19:41:46 ENET[1] IP-Cfg:HstName=MM00096BCA0C81.
```

displaylog (Filter by Severity)

```
system> displaylog –T system:mm[1] -sev E
1 E SERVPROC 01/27/08 19:42:58 Failure reading I2C device. Check bus 4.
2 E SERVPROC 01/27/08 19:41:53 Blower 2 Fault Multiple blower failures.
3 E SERVPROC 01/27/08 19:41:53 Blower 1 Fault Single blower failure.
```

fuelg

Syntax **fuelg -T system:mm[*x*] <*domain*> <-qm (off | on)>**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Display or configure power domain information for power supplies on the JCS1200 platform.

Options **-T system:mm[*x*]**—Specify the JCS management module as the target of the command. Replace ***x*** with a value of **1** or **2**.

domain—(Optional) Display information for a specific power domain. Replace ***domain*** with **pd1** (power domain **1**) or **pd2** (power domain **2**). By default, power domain information is displayed for both power domains.

The JCS1200 platform has two power domains. Power domain 1 supports all JCS modules and slots (bays) **1** through **6**. Power domain 1 uses power supply modules **1** and **2**. Power domain **2** supports slots **7** through **12** and uses power supply modules **3** and **4**.

-qm (on | off)—(Optional) Specify a thermal event response (quiet mode):

- **off**—Fans will increase speed to provide additional cooling.
- **on**—Fans will remain at fixed speed. Power is throttled (for components that support power throttling) to reduce power consumption and heat.

Required Privilege Level supervisor (configure)
operator (display)

Related Documentation
- Displaying Power Domain Information on page 197

List of Sample Output
fuelg (Display) on page 209
fuelg (Configure) on page 209

Output Fields Table 27 on page 208 lists the output fields for the **fuelg** command. Output fields are listed in the approximate order in which they appear.

Table 27: fuelg Output Fields

Field Name	Field Description
Domain Number	Status information for the power domain (power domain **1** or power domain **2**).
Bay *x*	Bay (slot) number and power value (in watts) for the power supply.
Power Budget	Total amount of power (in watts) allocated to the domain.
Reserved Power	Amount of power (in watts) held in reserve.

Table 27: fuelg Output Fields *(continued)*

Field Name	Field Description
Remaining Power	Amount of power (in watts) available to the domain (power budget – reserved power = remaining power).
Power in Use	Amount of power (in watts) currently being used by the power supplies in the domain.

Sample Output

fuelg (Display)

```
system> fuelg –T system:mm[1]
Power Domain 1
– – – – – – – –
Status: Power domain status is good.
Modules:
    Bay 1: 2000
    Bay 2: 2000
Power Budget: 3200
Reserved Power: 400
Remaining Power: 2800
Power in Use: 400

Power Domain 2
– – – – – – – –
Status: Power domain status is good.
Modules:
    Bay 3: 1800
    Bay 4: 1800
Power Budget: 2880
Reserved Power: 0
Remaining Power: 2880
Power in Use: 0
```

fuelg (Configure)

```
system> fuelg –T system:mm[1] -qm off
OK
```

health

Syntax **health -T *target*<-l *depth*> <-f>**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Display the current health status of a device on the JCS1200 platform.

Options **-T *target***—Specify the target of the command. Command targets include:

- **system:mm[*x*]**—JCS management module. Replace ***x*** with a value of **1** or **2**.
- **system:switch[*x*]**—JCS switch module. Replace ***x*** with a value of **1** or **2**.
- **system:blade[*x*]**—JCS Routing Engine (blade). Replace ***x*** with a value of **1** through **12**.
- **system:power[*x*]**—JCS power supply. Replace ***x*** with a value of **1** through **4**.
- **system:blower[*x*]**—JCS fan (blower). Replace ***x*** with a value of **1** through **4**.

-l *depth*—(Optional) Display health status for a hierarchy of devices (starting with the device specified as the command target). Replace ***depth*** with one of the following values:

- **2 | all | a**—Health status for the full hierarchy of devices (starting at the command target level). You can enter **a** as an abbreviation for **all**.
- **1**—Health status for the command target only.

-f—(Optional) Display health status and active alerts for the device specified as the command target.

Required Privilege Level operator

Related Documentation
- Displaying System Component Status on page 198

List of Sample Output
health (All) on page 210
health (Routing Engine) on page 211
health (with Alerts) on page 211

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

health (All)

```
system> health -l a
mm[1]: OK
mm[2]: OK
blade[1]: OK
blade[2]: OK
blade[3]: OK
blade[4]: OK
blade[5]: Minor
```



```
blade[6]: OK
power[1]: OK
power[2]: OK
power[3]: OK
power[4]: OK
blower[1]: OK
blower[2]: OK
blower[3]: OK
blower[4]: OK
switch[1]: OK
switch[2]: OK
```

health (Routing Engine)

```
system> health -T system:blade[5]
blade[5]: Minor
```

health (with Alerts)

```
system> health -l a -f
system: Major
    blade[5]: Minor
        5V over voltage
        CPU1 temperature warning
    power[2]: Minor
        5V over voltage
    switch[1]: Major
        temperature fault
```

history

Syntax **history**

<!*n*>

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Display the last eight commands entered. You can use this list to reenter commands. To reenter a command, use the **history** command to display a list of recent commands, then type an exclamation point (!) followed by the number of the command you wish to reenter.

Options !*n*—(Optional) Reenter a command from the history list. Replace ***n*** with a value of **0** through **7** to indicate the number of the command you wish to reenter.

Required Privilege Level operator

Related Documentation
- JCS1200 Software Components on page 23

List of Sample Output
history (Listing) on page 212
history (Reentering a Command) on page 212

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

history (Listing)

```
system:mm[1]> history

0 dns
1 dns -on
2 dns
3 dns -i1 192.168.70.29
4 dns
5 dns -i1 192.168.70.29 -on
6 dns
7 history
```

history (Reentering a Command)

```
system:mm[1]> !2

Enabled
-i1 192.168.70.29
-i2 0.0.0.0
-i3 0.0.0.0
```

info

Syntax info -T *target*

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Display information about JCS hardware components and component configuration.

Options **-T *target***—Specify a command target to display information about a specific hardware component. You can only display information for one target at a time. Valid targets for this command include:

- **system:blade[*x*]**—Specify a Routing Engine as the command target. Replace ***x*** with the Routing Engine slot number (**1** through **12**).
- **system:blower[*x*]**—Specify a JCS fan module as the command target. Replace ***x*** with the fan module number (**1** through **4**).
- **system:mm[*x*]**—Specify a JCS management module as the command target. Replace ***x*** with the primary management module number (**1** or **2**).
- **system:mt[*x*]**—Specify a JCS media tray as the command target. Replace ***x*** with the media tray number (**1** or **2**).
- **system:mux[*x*]**—Specify a JCS MUX card as the command target. Replace ***x*** with the MUX card number (**1** or **2**).
- **system:power[*x*]**—Specify a JCS power module as the command target. Replace ***x*** with the power module number (**1** through **4**).
- **system:switch[*x*]**—Specify a JCS switch module as the command target. Replace ***x*** with the switch module number (**1** or **2**).
- **system:tap**—Specify the JCS alarm panel as the command target.

Required Privilege Level operator

Related Documentation
- Displaying Vital Product Data on page 194

List of Sample Output
info (System) on page 214
info (Management Module) on page 215
info (Routing Engine) on page 215

Output Fields Table 28 on page 214 lists the output fields for the **info** command. Output fields are listed in the approximate order in which they appear.

Table 28: info Output Fields

Field Name	Field Description
UUID	Universal unique identifier. This hexadecimal number is generated automatically and uniquely identifies the hardware component on the network.
Manufacturer	(**system** keyword only) JCS chassis serial number.
Manufacturer ID	Manufacturer's ID. ID number assigned to the hardware component manufacturer.
Product Code	Product code assigned to the hardware component.
Serial Number	Serial number assigned to the hardware.
Part No.	(**system** keyword only) JCS chassis part number.
Component Serial Number	(**system** keyword only) JCS midplane serial number.
CLEI	Common Language Equipment Identification (industry standard used to identify telecommunications equipment).
AMM Firmware	(JCS Management Module only) Build ID, filename, release date, and revision number of the firmware installed on the JCS management module.
AMM Slots	(**system** keyword only) Number of JCS management module slots.
Blade Slots	(**system** keyword only) Number of Routing Engine (blade) slots.
I/O Module Slots	(**system** keyword only) Number of I/O module slots.
Power Module Slots	(**system** keyword only) Number of power module slots.
Blower Slots	(**system** keyword only) Number of fan (blower) slots.
Media Tray Slots	(**system** keyword only) Number of media tray slots.

Sample Output

info (System)

```
system> info –T system

UUID: 597A 6B81 C99F 9DE7 A3D4 52F9 95D1
Manufacturer: ZX1234
Manufacturer ID: 20301
Product code: System Enclosure/CHAS-BP-JCS1200-S
Serial number: 02
Part no.: 740-025747
Component serial no.: ZX0001
CLEI: Not Available
AMM slots: 2
```

```
Blade slots: 12
I/O Module slots: 10
Power Module slots: 4
Blower slots: 4
Media Tray slots: 2
```

info (Management Module)

```
system> info –T system:mm[1]

Name: bcgmm1
UUID: 369C 7EB6 4067 11DC AAAE 0014 5EDF 924E
Manufacturer: ZX1234
Manufacturer ID: 20301
Product code: JCS Management Module
Serial number: 02
Part no.: 740-023172
Component serial no.: JX002
CLEI: Not Available
AMM firmware
        Build ID:       BPE034E
        File name:      CNETCMUS.PKT
        Rel date:       11-20-07
        Rev:            34
...
```

info (Routing Engine)

```
system> info –T system:blade[6]

Name: bcgcpu1
UUID: 7393 CA1C 00C3 3A97 AC4C 6EE7 608B CA0D
Manufacturer: ZX1234
Manufacturer ID: 20301
Product code: 4 X86 CPU Blade Server/JCS Routing Engine
Serial number: 02
Part no.: 740-023157
Component serial no.: ZX0014
CLEI: Not Available
MAC Address 1: 00:1A:64:32:E4:D8
MAC Address 2: 00:1A:64:32:E4:DA
BIOS
        Build ID:       LJE104BUS
        Rel date:       12/11/2007
        Rev:            1.00
Diagnostics
        Build ID:       BCYT24AUS
        Rel date:       08/27/2007
        Rev:            1.04
Blade sys. mgmt. proc.
        Build ID:       BCBT42B
        Rev:             1.11
Local Control
        KVM:            Yes
        Media Tray:     Yes
SCOD: Unknown
Power On Time: 5 days 20 hours 35 min 12 secs
Number of Boots: 3
```

list

Syntax **list -T *target* <-l *depth*>**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) List devices on the JCS1200 platform. This information is useful for determining how many Routing Engines and JCS management modules are installed and which JCS management module is primary.

Options **-T *target***—Specify a command target. Valid targets for this command include:

- **system:blade[*x*]**—Specify a Routing Engine as the command target. Replace ***x*** with the Routing Engine slot number (**1** through **12**).
- **system:blower[*x*]**—Specify a JCS fan (blower) as the command target.
- **system:mm[*x*]**—Specify a JCS management module as the command target. Replace ***x*** with the primary management module number (**1** or **2**).
- **system:power[*x*]**—Specify a JCS power module as the command target. Replace ***x*** with the power module number (**1** through **4**).
- **system:switch[*x*]**—Specify a JCS switch module as the command target. Replace ***x*** with the switch number (**1** or **2**).

If no command target is specified, all devices on the JCS1200 platform are listed.

-l *depth*—(Optional) List a hierarchy of devices (starting with the device specified as the command target). Replace ***depth*** with one of the following values:

- **2 | all | a**—List the full hierarchy of devices (starting at the command target level). You can enter **a** as an abbreviation for **all**.
- **1**—List the command target only.

Required Privilege Level operator

Related Documentation
- Displaying a List of Components on page 199

List of Sample Output list (All) on page 216

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

list (All)

```
system> list -l a

mm[1] primary
mm[2] standby
power[1]
power[2]
```



```
power[3]
power[4]
blower[1]
blower[2]
blower[3]
blower[4]
switch[1]
switch[2]
blade[1] bcgcpu1
         sp
         cpu[1]
blade[3] bcgcpu3
         sp
         cpu[1]
blade[4] bcgcpu4
         sp
         cpu[1]
blade[5] bcgcpu5
         sp
         cpu[1]
blade[6] bcgcpu6
         sp
         cpu[1]
mt[1]
mt[2]
tap
mux[1]
mux[2]
```

power

Syntax **power -T *target* (-on | -off | -cycle | -state)**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Power on or power off a specified Routing Engine (blade) or JCS switch module. Alternatively, display the power setting for a specified Routing Engine or switch module.

Options **-T *target***—Specify the target of the **power** command. Valid targets for this command are:

- **system:blade[*x*]**—Specify a Routing Engine as the command target. Replace ***x*** with the Routing Engine slot number (**1** through **12**).
- **system:switch[*x*]**—Specify a JCS switch module as the command target. Replace ***x*** with the switch number (**1** or **2**).

-on—Turn on the specified Routing Engine or JCS switch module.

-off—Turn off the specified Routing Engine or JCS switch module.

-cycle—Cycle power for the specified Routing Engine or JCS switch module. If the Routing Engine or JCS switch module is off, it will turn on. If the Routing Engine or JCS switch module is on, it will turn off.

-state—Display the current power state (**on** or **off**) for the specified Routing Engine or JCS switch module.

Required Privilege Level supervisor

Related Documentation
- reset on page 221

List of Sample Output
power (On) on page 218
power (Cycle) on page 218
power (State) on page 218

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

power (On)

```
system> power –T system:switch[1] —on

OK
```

power (Cycle)

```
system> power –T system:switch[1] —cycle

Off
```

power (State)

```
system> power –T system:blade[3] —state
```


On

read

Syntax **read -config chassis -T system:mm[*x*]**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Restore the JCS management module configuration from an image previously saved to the JCS chassis with the **write** command. This command is useful for restoring a backup copy of the JCS management module configuration.

Options **-config chassis**—Specify the location within the chassis from which the configuration is restored.

-T system:mm[*x*]—Specify the management module as the target of the command (the configuration to be saved). Replace ***x*** with a value of **1** or **2**.

-config file (-i, -l, -p)—Specify the location outside the chassis and the name of the file from which the configuration is restored.

-i—Specify the IP address of the TFTP server where the configuration file is located.

-l—Specify the file name of the configuration file to read(the default filename is asm.cfg).

-p—Specify the quote-delimited passphrase that is required when saving to a file with encryption enabled (passphrases have a maximum of 1600 chars).

Required Privilege Level supervisor

Related Documentation
- write on page 227

List of Sample Output read on page 220

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

read

```
system> read —config chassis –T system:mm[1]
OK
Configuration restore from the chassis was successful.
Restart the MM for the new settings to take effect.
```

When you enter this command, the amm.cfg file will be loaded from the TFTP server that corresponds with the IP address you entered.

```
system> read -T mm[1] -config file -i 172.17.59.183 -l amm.cfg
```


reset

Syntax **reset -T *target***

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Reset a specified Routing Engine (blade), JCS switch module, or JCS management module.

Options **-T *target***—Specify the target of the **reset** command. Valid targets for this command are:

- **system:blade[*x*]**—Specify a Routing Engine as the command target. Replace ***x*** with the Routing Engine slot number (**1** through **12**).
- **system:switch[*x*]**—Specify a JCS switch module as the command target. Replace ***x*** with the switch number (**1** or **2**).
- **system:mm[*x*]**—Specify a JCS management module as the command target. Replace ***x*** with the primary management module number (**1** or **2**).

Required Privilege Level supervisor

Related Documentation
- power on page 218

List of Sample Output reset (Switch) on page 221

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

reset (Switch)

```
system> reset –T system:switch[2]
OK
```

shutdown

Syntax **shutdown -f -T system:blade[*x*]**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Shut down the operating system on the Routing Engine (blade).

Options **-T system:blade[*x*]**—Specify a Routing Engine as the target of the command (the Routing Engine to be shut down). Replace ***x*** with a value of **1** through **12**.

-f—Force the operating system on the Routing Engine to shut down.

Required Privilege Level supervisor

Related Documentation
- power on page 218

List of Sample Output shutdown on page 222

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

shutdown

```
system> shutdown -f -T system:blade[6]
OK
```


temps

Syntax **temps -T *target***

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS1200 platform only) Show temperature information (in degrees Fahrenheit) for components in the JCS chassis. This information is useful for viewing current temperature values and temperature threshold settings.

Options **-T *target***—Specify the target of the **temps** command. Valid targets for this command are:

- **system:blade[*x*]**—Specify a Routing Engine as the command target. Replace ***x*** with the Routing Engine slot number (**1** through **12**).
- **system:switch[*x*]**—Specify a JCS switch module as the command target. Replace ***x*** with the switch number (**1** or **2**).
- **system:mm[*x*]**—Specify a JCS management module as the command target. Replace ***x*** with the primary management module number (**1** or **2**).

Required Privilege Level operator (display)

Related Documentation
- Displaying Temperature Information on page 200

List of Sample Output
temps (Routing Engine) on page 223
temps (JCS Management Module) on page 224

Output Fields Table 29 on page 223 lists the output fields for the **temps** command. Output fields are listed in the approximate order in which they appear.

Table 29: temps Output Fields

Field Name	Field Description
Value	Current temperature (in degrees Fahrenheit) of the component.
Warning	Temperature at which a warning message occurs.
Reset	Temperature at which the component will reset.
Hysteresis	The amount the temperature must decrease below the Warning threshold before the warning is cleared.

Sample Output

temps (Routing Engine)

```
system> temps -T system:blade[3]
Component      Value     Warning     Reset     Hysteresis
CPU1           38.00     85.00       95.00     (7.00)
CPU2           35.00     85.00       95.00     (7.00)
```

temps (JCS Management Module)

```
system> temps -T system:mm[2]
Component      Value     Warning      Reset     Hysteresis
MM Ambient     43.00     60.00        55.00     (5.00)
```

volts

Syntax **volts -T *target***

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS1200 platform only) Show voltage information for components in the JCS chassis. This information is useful for viewing current voltage values and voltage threshold settings.

Options **-T *target***—Specify the target of the **volts** command. Valid targets for this command are:

- **system:blade[*x*]**—Specify a Routing Engine as the command target. Replace ***x*** with the Routing Engine slot number (**1** through **12**).
- **system:switch[*x*]**—Specify a JCS switch module as the command target. Replace ***x*** with the switch number (**1** or **2**).
- **system:mm[*x*]**—Specify a JCS management module as the command target. Replace ***x*** with the primary management module number (**1** or **2**).

Required Privilege Level operator (display)

Related Documentation
- Displaying Voltage Information on page 201

List of Sample Output
volts (JCS Management Module) on page 225
volts (Routing Engine) on page 226

Output Fields Table 30 on page 225 lists the output fields for the **volts** command. Output fields are listed in the approximate order in which they appear.

Table 30: volts Output Fields

Field Name	Field Description
Source	Total voltage available from the voltage source.
Value	Current voltage of the component.
Warning	Voltage at which a warning message occurs.
Reset	Voltage at which the component will reset.
Hysteresis	The amount the voltage must decrease below the Warning threshold before the warning is cleared.

Sample Output

volts (JCS Management Module)

```
system> volts -T system:mm[1]
```

```
Source     Value     Warning           Reset             Hysteresis
+5v        +4.84   (+4.50,+5.25)     (+4.85,+5.15)     (+0.35,+0.10)
+3.3v      +3.26   (+3.00,+3.47)     (+3.20,+3.40)     (+0.20,+0.07)
+12v       +12.03   (+10.80,+12.60)   (+11.64,+12.36)   (+0.84,+0.24)
-5v        -4.90   (-5.50,-4.75)     (-5.15,-4.85)     (+0.35,+0.10)
+2.5v      +2.48   (+2.25,+2.63)     (+2.42,+2.58)     (+0.17,+0.05)
+1.8v      +1.76   (+1.62,+1.89)     (+1.74,+1.86)     (+0.12,+0.03)
```

Sample Output

volts (Routing Engine)

```
system> volts -T system:blade[5]

Source           Value     Warning
1.8 V Sense      +1.79     (+1.61,+1.97)
1.8VSB Sense     +1.83     (+1.61,+1.97)
12V Sense        +12.33    (+10.79,+13.21)
12VSB Sense      +12.30    (+10.74,+13.19)
3.3V Sense       +3.31     (+2.96,+3.62)
5V Sense         +5.06     (+4.39,+5.48)
```

write

Syntax **write -config chassis -T system:mm[*x*]**

Release Information Command supported by Junos OS Release 9.1 and later.

Description (JCS management module CLI) Save the management module configuration to the chassis of the JCS1200 platform (in the midplane NVRAM). This command is useful for creating a backup copy of the JCS management module configuration.

Options **-config chassis**—Specify the location within the chassis where the configuration is saved.

-T system:mm[*x*]—Specify the JCS management module as the target of the command (the configuration to be saved). Replace ***x*** with a value of **1** or **2**.

-config file (-i, -l, -p)—Specify the name of the configuration file and location where it is saved outside the chassis.

-i—Specify the IP address of TFTP server to save the configuration file to.

-l—Specify an optional filename to save the configuration file as (the default filename is asm.cfg).

-p—Specify the quote-delimited passphrase that is required when saving to a file with encryption enabled (passphrases have a maximum of 1600 chars).

Required Privilege Level supervisor

Related Documentation
- read on page 220

List of Sample Output write on page 227

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

write

```
system> write —config chassis –T system:mm[1]

OK
Configuration settings were successfully saved to the chassis.
```

When you enter this command, the configuration file will be named “amm.cfg” and saved on the TFTP server at 172.17.59.183.

```
system> write -T mm[1] -config file -i 172.17.59.183 -l amm.cfg
```

CHAPTER 16

Managing the Junos OS

Logging In to a PSD from the RSD

As a Root System Domain (RSD) administrator, if you have the appropriate access privileges, you can log in to a Protected System Domain (PSD) from the Junos OS command-line interface (CLI) on the RSD:

user@rsd> **request routing-engine login (psd *n*| rsd) (re0 | re1)**

The PSD being accessed must be specified under the RSD configuration.

In the following example, the RSD administrator logs in to the master Routing Engine on PSD1:

```
{master}

user@rsd> request routing-engine login psd 1 re0
€login: regress
Password:

--- JUNOS 9.1-20080321.0 built 2008-03-21 05:43:06 UTC
% cli
user@psd1>
```

Related Documentation

- RSD Administration View on page 18

Junos OS Verification Tasks

Table 31 on page 230 lists tasks that are commonly used to verify information that is specific to RSDs and PSDs.

Table 31: Commands Used to Verify PSD and RSD Status

Items to Check	Description	Task
Hardware ownership	Display information about hardware that is owned by the RSD, owned by the PSD, or shared by both.	"Displaying Hardware Information" on page 230
Configured PSDs	Display PSDs configured under the RSD.	"Displaying Configured PSDs" on page 233
Routing Engine information	Display Routing Engine information.	"Displaying Routing Engine Information" on page 234
Ethernet switch statistics	Display information about the receive and transmit packets traveling between PSDs and the respective RSD.	"Displaying Ethernet Switch Statistics" on page 236
Shared interfaces	Display information about shared interfaces.	"Displaying Shared Interface Information" on page 237

Related Documentation

- Configuring an RSD and Creating PSDs on page 82
- Configuring Shared Interfaces on the RSD on page 91
- Configuring Shared Interfaces on a PSD on page 93
- JCS Management Module Verification Tasks on page 193

Displaying Hardware Information

Purpose On the RSD, you can use the **show chassis hardware** command to display all hardware on the T Series router (without reference to which FPCs belong to a particular PSD).

On the PSD, you can display information about the Routing Engines, FPCs, and PICs that are assigned to the PSD and about hardware that is shared with the RSD, such as Switch Interface Boards (SIBs), the Switch Processor Mezzanine Board (SPMB), Power Entry Modules (PEMs), and fans.

Action Display hardware information using the **show chassis hardware** command.

On the RSD The following example provides output from the **show chassis hardware** command issued from the RSD.

```
user@rsd> show chassis hardware
```

```
Hardware inventory:
Item             Version  Part number  Serial number     Description
Chassis                                S19068            T640
Midplane         REV 04   710-002726   AX5666            T640 Backplane
FPM GBUS         REV 02   710-002901   HE3251            T640 FPM Board
FPM Display      REV 02   710-002897   HE7860            FPM Display
CIP              REV 05   710-002895   HC0474            T Series CIP
PEM 1            Rev 03   740-002595   MH15367           Power Entry Module
SCG 0            REV 04   710-003423   HF6042            T640 Sonet Clock Gen.
SCG 1            REV 11   710-003423   HW7765            T640 Sonet Clock Gen.
Routing Engine 0 REV 04   740-014082   1000660098        RE-A-2000
Routing Engine 1
CB 0             REV 06   710-007655   WE9377            Control Board (CB-T)
CB 1             REV 06   710-007655   WE9379            Control Board (CB-T)
FPC 0            REV 01   710-013560   JE4851            E2-FPC Type 3
  CPU            REV 05   710-010169   HX8637            FPC CPU-Enhanced
  PIC 0          REV 05   750-007141   HG2427            10x 1GE(LAN), 1000 BASE

    Xcvr 1       REV 01   740-011613   P9F15ZN           SFP-SX
    Xcvr 2       REV 01   740-011613   P9F11CC           SFP-SX
    Xcvr 3       REV 01   740-011613   P9F1AM1           SFP-SX
  PIC 1          REV 01   750-004695   HD5978            1x Tunnel
  PIC 2          REV 03   750-003336   HJ9956            4x OC-48 SONET, SMSR
  MMB 0          REV 04   710-010171   HX7130            MMB-5M3-288mbit
  MMB 1          REV 04   710-010171   HX9460            MMB-5M3-288mbit
FPC 1            REV 02   710-005553   HJ9012            FPC Type 2
  CPU            REV 06   710-001726   HF6882            FPC CPU
  PIC 0          REV 03   750-001900   AA9622            1x OC-48 SONET, SMIR
  PIC 1          REV 02   750-007219   AZ1337            2x OC-12 ATM-II IQ, MM
  PIC 2          REV 11   750-003737   NA2450            4x G/E, 1000 BASE-SX
  PIC 3          REV 05   750-001850   WD3132            1x Tunnel
  MMB 1          REV 01   710-005555   AZ2106            MMB-288mbit
  PPB 0          REV 02   710-003758   HC0895            PPB Type 2
  PPB 1          REV 02   710-003758   HC0954            PPB Type 2
FPC 2            REV 04   710-013558   JP3361            E2-FPC Type 2
  CPU            REV 02   710-013563   JN4128            FPC CPU-Enhanced
  PIC 0          REV 07   750-010618   CZ6647            4x G/E SFP, 1000 BASE
    Xcvr 0       REV 01   740-011613   P8E2SSM           SFP-SX
    Xcvr 1       REV 01   740-011782   P8C29XQ           SFP-SX
    Xcvr 2       REV 01   740-011782   P86218N           SFP-SX
    Xcvr 3       REV 01   740-011613   P8E2SSW           SFP-SX
  PIC 1          REV 11   750-007745   CH6343            4x OC-3 SONET, SMIR
  PIC 2          REV 16   750-008155   NB8516            2x G/E IQ, 1000 BASE
    Xcvr 0       REV 01   740-007326   P11WLS9           SFP-SX
    Xcvr 1       REV 01   740-011613   PAM2Y9G           SFP-SX
  MMB 1          REV 05   710-010171   JP5579            MMB-5M3-288mbit
FPC 4            REV 02   710-002385   HC0619            FPC Type 2
  CPU            REV 06   710-001726   HB1916            FPC CPU
  PIC 0          REV 02   750-002510   BD5129            2x G/E, 1000 BASE-SX
  PIC 1          REV 01   750-001900   AA9638            1x OC-48 SONET, SMIR
  PIC 2          REV 13   750-001901   HB4004            4x OC-12 SONET, SMIR
  PIC 3          REV 07   750-003737   HW5514            4x G/E, 1000 BASE-SX
  MMB 1          REV 03   710-004047   HE3195            MMB-288mbit
  ICBM           REV 04   710-003384   HC0377            FPC ICBM
  PPB 0          REV 02   710-003758   HC0585            PPB Type 2
  PPB 1          REV 02   710-003758   HC0574            PPB Type 2
FPC 5            REV 01   710-010233   HM4187            E-FPC Type 1
  CPU            REV 01   710-010169   HS9939            FPC CPU-Enhanced
  PIC 0          REV 04   750-001894   HA9485            1x G/E, 1000 BASE-SX
  PIC 1          REV 08   750-001072   AB1688            1x G/E, 1000 BASE-SX
  PIC 2          REV 03   750-000603   AC2769            4x OC-3 SONET, SMIR
```

```
  PIC 3          REV 21   750-005634   WD3292           1x CHOC12 IQ SONET, SMIR

  MMB 1          REV 01   710-010171   HR0833           MMB-288mbit
FPC 6            REV 01   710-013558   JE4842           E2-FPC Type 2
  CPU            REV 05   710-010169   JE4403           FPC CPU-Enhanced
  PIC 0          REV 11   750-003737   NA2443           4x G/E, 1000 BASE-SX
  PIC 1          REV 07   750-001900   AT1593           1x OC-48 SONET, SMSR
  PIC 2          REV 08   750-012063   CY3670           2x G/E IQ, 1000 BASE
    Xcvr 1       REV 01   740-011782   P8Q25X3          SFP-SX
  PIC 3          REV 13   750-001901   HB3085           4x OC-12 SONET, SMIR
  MMB 1          REV 04   710-010171   JC1211           MMB-5M3-288mbit
FPC 7            REV 05   710-010157   HR5838           E-FPC Type 2
  CPU            REV 01   710-010169   HN3431           FPC CPU-Enhanced
  PIC 0          REV 07   750-010618   WE2402           4x G/E SFP, 1000 BASE
    Xcvr 0       REV 01   740-011613   P8E2VZ7          SFP-SX
    Xcvr 1       0        NON-JNPR     AM06333AW4       SFP-SX
    Xcvr 2       REV 01   740-011782   P9M0TSP          SFP-SX
    Xcvr 3       REV 01   740-011613   P9F11Y0          SFP-SX
  PIC 3          REV 11   750-001901   HC4722           4x OC-12 SONET, SMIR
  MMB 1          REV 01   710-010171   HN6495           MMB-288mbit
SPMB 0           REV 10   710-003229   WE9582           T Series Switch CPU
SPMB 1           REV 10   710-003229   WE9587           T Series Switch CPU
SIB 0            REV 05   750-005486   HV8445           SIB-I8-F16
SIB 1            REV 05   750-005486   HW2650           SIB-I8-F16
SIB 2            REV 05   750-005486   HW7041           SIB-I8-F16
SIB 3            REV 05   750-005486   HV4274           SIB-I8-F16
SIB 4            REV 05   750-005486   HV8464           SIB-I8-F16
Fan Tray 0                                               Front Top Fan Tray
Fan Tray 1                                               Front Bottom Fan Tray
Fan Tray 2                                               Rear Fan Tray
```

On the PSD The following example provides output from the **show chassis hardware** command issued from a PSD.

```
user@psd1> show chassis hardware
rsd-re0:
--------------------------------------------------------------------------
Hardware inventory:
Item             Version  Part number  Serial number     Description
Chassis                                S19068            T640
Midplane         REV 04   710-002726   AX5666            T640 Backplane
FPM GBUS         REV 02   710-002901   HE3251            T640 FPM Board
FPM Display      REV 02   710-002897   HE7860            FPM Display
CIP              REV 05   710-002895   HC0474            T Series CIP
PEM 1            Rev 03   740-002595   MH15367           Power Entry Module
SCG 0            REV 04   710-003423   HF6042            T640 Sonet Clock Gen.
SCG 1            REV 11   710-003423   HW7765            T640 Sonet Clock Gen.
Routing Engine 0 REV 04   740-014082   1000660098        RE-A-2000
Routing Engine 1
CB 0             REV 06   710-007655   WE9377            Control Board (CB-T)
CB 1             REV 06   710-007655   WE9379            Control Board (CB-T)
FPC 1            REV 02   710-005553   HJ9012            FPC Type 2
  CPU            REV 06   710-001726   HF6882            FPC CPU
  PIC 0          REV 03   750-001900   AA9622            1x OC-48 SONET, SMIR
  PIC 1          REV 02   750-007219   AZ1337            2x OC-12 ATM-II IQ, MM
  PIC 2          REV 11   750-003737   NA2450            4x G/E, 1000 BASE-SX
  PIC 3          REV 05   750-001850   WD3132            1x Tunnel
  MMB 1          REV 01   710-005555   AZ2106            MMB-288mbit
  PPB 0          REV 02   710-003758   HC0895            PPB Type 2
  PPB 1          REV 02   710-003758   HC0954            PPB Type 2
FPC 2            REV 04   710-013558   JP3361            E2-FPC Type 2
```

```
  CPU            REV 02   710-013563   JN4128           FPC CPU-Enhanced
  PIC 0          REV 07   750-010618   CZ6647           4x G/E SFP, 1000 BASE
    Xcvr 0       REV 01   740-011613   P8E2SSM          SFP-SX
    Xcvr 1       REV 01   740-011782   P8C29XQ          SFP-SX
    Xcvr 2       REV 01   740-011782   P86218N          SFP-SX
    Xcvr 3       REV 01   740-011613   P8E2SSW          SFP-SX
  PIC 1          REV 11   750-007745   CH6343           4x OC-3 SONET, SMIR
  PIC 2          REV 16   750-008155   NB8516           2x G/E IQ, 1000 BASE
    Xcvr 0       REV 01   740-007326   P11WLS9          SFP-SX
    Xcvr 1       REV 01   740-011613   PAM2Y9G          SFP-SX
  MMB 1          REV 05   710-010171   JP5579           MMB-5M3-288mbit
FPC 4            REV 02   710-002385   HC0619           FPC Type 2
  CPU            REV 06   710-001726   HB1916           FPC CPU
  PIC 0          REV 02   750-002510   BD5129           2x G/E, 1000 BASE-SX
  PIC 1          REV 01   750-001900   AA9638           1x OC-48 SONET, SMIR
  PIC 2          REV 13   750-001901   HB4004           4x OC-12 SONET, SMIR
  PIC 3          REV 07   750-003737   HW5514           4x G/E, 1000 BASE-SX
  MMB 1          REV 03   710-004047   HE3195           MMB-288mbit
  ICBM           REV 04   710-003384   HC0377           FPC ICBM
  PPB 0          REV 02   710-003758   HC0585           PPB Type 2
  PPB 1          REV 02   710-003758   HC0574           PPB Type 2
SPMB 0           REV 10   710-003229   WE9582           T Series Switch CPU
SPMB 1           REV 10   710-003229   WE9587           T Series Switch CPU
SIB 0            REV 05   750-005486   HV8445           SIB-I8-F16
SIB 1            REV 05   750-005486   HW2650           SIB-I8-F16
SIB 2            REV 05   750-005486   HW7041           SIB-I8-F16
SIB 3            REV 05   750-005486   HV4274           SIB-I8-F16
SIB 4            REV 05   750-005486   HV8464           SIB-I8-F16
Fan Tray 0                                               Front Top Fan Tray
Fan Tray 1                                               Front Bottom Fan Tray
Fan Tray 2                                               Rear Fan Tray

psd1-re0:
--------------------------------------------------------------------------
Hardware inventory:
Item             Version  Part number  Serial number     Description
Chassis                   740-023156   SNJCSJCSAC00      JCS1200 AC Chassis
Routing Engine 0 REV 01   740-023157   SNBLJCSAC006      RE-JCS1200-1x2330
Routing Engine 1 REV 01   740-023157   SNBLJCSAC005      RE-JCS1200-1x2330
```

Meaning On the RSD, information about all the FPCs in the chassis (which are located in slots 1, 2, and 4 through 7) is displayed.

On the PSD, at the beginning of the output, the **rsd-re0** field displays all of the information pertaining to the components on the T Series router that are assigned to or shared by the PSD. For example, only information about the FPCs in slots 1, 2, and 4 is displayed. At the end of the output, the **psd1-re0**: field provides information about the JCS1200 chassis and the Routing Engines assigned to PSD1.

Related Documentation

- RSD Administration View on page 18
- PSD Administration View on page 19

Displaying Configured PSDs

Purpose The RSD administrator can use the **show chassis psd** command to view which PSDs are configured within the RSD.

Action From the RSD, issue the **show chassis psd** command as shown in the following example:

```
{master}

user@rsd> show chassis psd
PSD  Description   State        Uptime
1                  Online        5 days, 19 hours, 16 minutes, 16 seconds
2                  Online        5 days, 18 hours, 12 minutes, 11 seconds
```

Meaning Two PSDs are configured under the RSD: PSD1 and PSD2. Both are online.

Related Documentation

- RSD Administration View on page 18

Displaying Routing Engine Information

Purpose Display information about the Routing Engines that are part of the RSD or PSD.

Action Display information about the Routing Engines that are part of the RSD or PSD using the **show chassis routing-engine** command.

On the RSD When the **show chassis routing-engine** command is issued on the RSD, the **Slot** field indicates the slot on the T Series router that holds the Routing Engine. In the following example, the master Routing Engine is in slot **0**, whereas the backup Routing Engine is in slot **1**.

```
user@rsd1> show chassis routing-engine
Routing Engine status:
  Slot 0:
    Current state                  Master
    Election priority              Master (default)
    Temperature                 58 degrees C / 136 degrees F
    CPU temperature             69 degrees C / 156 degrees F
    DRAM                     14336 MB
    Memory utilization          11 percent
    CPU utilization:
      User                       0 percent
      Background                 0 percent
      Kernel                     2 percent
      Interrupt                  0 percent
      Idle                      97 percent
    Model                          RE-A-2000
    Serial ID                      1000688682
    Start time                     2008-08-20 12:03:50 PDT
    Uptime                         3 hours, 45 minutes, 5 seconds
    Last reboot reason             Router rebooted after a normal shutdown.
    Load averages:                 1 minute   5 minute  15 minute
                                       0.89       0.21       0.07
Routing Engine status:
  Slot 1:
    Current state                  Backup
    Election priority              Backup (default)
    Temperature                 55 degrees C / 131 degrees F
    CPU temperature             63 degrees C / 145 degrees F
    DRAM                     14336 MB
    Memory utilization           9 percent
    CPU utilization:
      User                       0 percent
```

```
    Background                0 percent
    Kernel                    0 percent
    Interrupt                 0 percent
    Idle                     99 percent
  Model                       RE-A-2000
  Serial ID                   1000688746
  Start time                  2008-08-07 18:37:53 PDT
  Uptime                      12 days, 21 hours, 10 minutes, 57 seconds
  Last reboot reason          0x1:power cycle/failure
```

On the PSD When the **show chassis routing-engine** command is issued on the PSD, the **Physical Slot** field indicates the slot on the JCS platform that holds the Routing Engine. In the following example, **psd2** owns the Routing Engines in slots **5** and **6** in the JCS chassis. The master Routing Engine is in slot 6, whereas the backup Routing Engine is in slot 5.

```
user@psd2> show chassis routing-engine
Routing Engine status:
  Slot 0:
    Physical Slot                6
    Current state                Master
    Election priority            Master (default)
    DRAM                     13312 MB
    Memory utilization          11 percent
    CPU utilization:
      User                       0 percent
      Background                 0 percent
      Kernel                     0 percent
      Interrupt                  0 percent
      Idle                      99 percent
    Model                        RE-JCS1200-1x2330
    Serial ID                    SNBLJCSAC006
    Start time                   2008-03-13 06:36:07 PDT
    Uptime                       3 hours, 54 minutes, 21 seconds
Routing Engine status:
  Slot 1:
    Physical Slot                5
    Current state                Backup
    Election priority            Backup (default)
    DRAM                     13312 MB
    Memory utilization          11 percent
    CPU utilization:
      User                       0 percent
      Background                 0 percent
      Kernel                     0 percent
      Interrupt                  1 percent
      Idle                      99 percent
    Model                        RE-JCS1200-1x2330
    Serial ID                    SNBLJCSAC005
    Start time                   2008-03-12 23:39:21 PDT
    Uptime                       10 hours, 50 minutes, 58 seconds
    Load averages:               1 minute   5 minute  15 minute
                                     0.00       0.00       0.00
```

Related Documentation

- Configuring an RSD and Creating PSDs on page 82

Displaying Ethernet Switch Statistics

Purpose On the PSD, display information about receive and transmit packets traveling between the RSD and the PSDs configured under it.

Action Display information about receive and transmit packets traveling between all PSDs and the RSD using the **show chassis ethernet-switch** command. In the following sample output:

- **INT6** provides the internal connection between the master Routing Engine in slot 6 and the JCS switch module.
- **EXT1** provides the connection between each JCS switch module (**switch[1]** and **switch[2]**) and the RSD.
- **EXT6** provides the connection between each JCS switch module (**switch[1]** and **switch[2]**) and the management ports on each Routing Engine in the JCS chassis.

```
user@psd2>show chassis ethernet-switch statistics
Statistics for switch[1] port INT6 connected to fpx0:
  TX Octets                 2414932908
  TX Unicast Packets        234884638
  TX Multicast Packets      2179608
  TX Broadcast Packets      30225643
  Tx Discards               0
  TX Errors                 0
  RX Octets                 3670528590
  RX Unicast Packets        27854646
  RX Multicast Packets      19553
  RX Broadcast Packets      2236775
  RX Discards               5555
  RX Errors                 0
  RX Unknown Protocol       0
  Link State Changes        227
Statistics for switch[1] port EXT1 connected to RSD 1:
  TX Octets                 3469030805
  TX Unicast Packets        27012653
  TX Multicast Packets      553853
  TX Broadcast Packets      5436256
  Tx Discards               0
  TX Errors                 0
  RX Octets                 3442186319
  RX Unicast Packets        38311288
  RX Multicast Packets      96
  RX Broadcast Packets      8627909
  RX Discards               9
  RX Errors                 54
  RX Unknown Protocol       0
  Link State Changes        121
Statistics for switch[1] port EXT6 connected to external management:
  TX Octets                 642418689
  TX Unicast Packets        6759043
  TX Multicast Packets      19307
  TX Broadcast Packets      4187
  Tx Discards               0
  TX Errors                 0
  RX Octets                 4028111190
  RX Unicast Packets        209472631
```

```
  RX Multicast Packets      3583331
  RX Broadcast Packets      9789758
  RX Discards               9452
  RX Errors                 96
  RX Unknown Protocol       0
  Link State Changes        13
Statistics for switch[2] port INT6 connected to fpx1:
  TX Octets                 1335573763
  TX Unicast Packets        190297345
  TX Multicast Packets      6419377
  TX Broadcast Packets      40882825
  Tx Discards               0
  TX Errors                 0
  RX Octets                 394133602
  RX Unicast Packets        14595361
  RX Multicast Packets      448
  RX Broadcast Packets      1990327
  RX Discards               6331
  RX Errors                 0
  RX Unknown Protocol       0
  Link State Changes        221
Statistics for switch[2] port EXT1 connected to RSD 1:
  TX Octets                 3365990587
  TX Unicast Packets        11876677
  TX Multicast Packets      554792
  TX Broadcast Packets      5387881
  Tx Discards               0
  TX Errors                 0
  RX Octets                 590077798
  RX Unicast Packets        262909
  RX Multicast Packets      93
  RX Broadcast Packets      8922149
  RX Discards               10
  RX Errors                 38
  RX Unknown Protocol       0
  Link State Changes        71
Statistics for switch[2] port EXT6 connected to external management:
  TX Octets                 90557831
  TX Unicast Packets        904602
  TX Multicast Packets      68
  TX Broadcast Packets      373
  Tx Discards               0
  TX Errors                 2
  RX Octets                 1149145016
  RX Unicast Packets        220539292
  RX Multicast Packets      9194525
  RX Broadcast Packets      20307789
  RX Discards               38969195
  RX Errors                 3081169
  RX Unknown Protocol       0
  Link State Changes        11
```

Related Documentation

- Connections Between JCS1200 and T Series Chassis on page 11

Displaying Shared Interface Information

Purpose Display information about shared interfaces.

Action Using the **show interfaces so-*fpc/pic/slot*** or **show interfaces ge-*fpc/pic/slot*** command, display logical interfaces configured on a shared physical interface.

The following fields in the output from the command display information about shared interfaces:

- **Shared-interface**—Located under the **Physical interface:** section of the output, this field indicates whether the routing domain is the owner or non-owner of the shared interface. If the routing domain is the RSD, the value is **Owner**. If the routing domain is a PSD under the RSD, the value is **Non-owner**.
- **Shared interface**—Located under the **Logical interface:** section of the output, this section includes these fields:
  - **shared with**—(RSD only) Provides the identity of the PSD that owns the shared interface; for example, **psd3**.
  - **peer interface**—(PSD only) Lists the logical tunnel interface that peers with the logical interface; for example, **ut-2/1/0.2**.
  - **tunnel token**—Specifies the receive (RX) and transmit (TX) tunnel tokens. For example, **Rx: 5.519, Tx: 13.514**.

NOTE: When you issue this command on the PSD for SONET interfaces, the following information about the physical interface is *not* provided:

- Media status
- Frame Relay LMI counters
- SONET mode

On the RSD (SONET Interface) In the following sample output, **rsd1** is the owner of the physical SONET interface **so-7/2/0** and the logical SONET interface **so-7/2/0.0** is shared by **psd5**.

```
user@rsd1> show interfaces so-7/2/0
Physical interface: so-7/2/0, Enabled, Physical link is Down
  Interface index: 128, SNMP ifIndex: 109
  Link-level type: Frame-Relay, MTU: 4474, Clocking: Internal, SONET mode,
  Speed: OC192, Loopback: None, FCS: 16, Payload scrambler: Enabled
  Device flags   : Present Running Down
  Interface flags: Hardware-Down Point-To-Point SNMP-Traps Internal: 0x4000
  Shared-interface  : Owner
  Link flags     : No-Keepalives DTE
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  LMI: Input: 0 (never), Output: 0 (never)
  DTE statistics:
    Enquiries sent                      : 0
    Full enquiries sent                 : 0
    Enquiry responses received          : 0
    Full enquiry responses received     : 0
  DCE statistics:
    Enquiries received                  : 0
    Full enquiries received             : 0
```

```
    Enquiry responses sent               : 0
    Full enquiry responses sent          : 0
  Common statistics:
    Unknown messages received            : 0
    Asynchronous updates received        : 0
    Out-of-sequence packets received     : 0
    Keepalive responses timedout         : 0
  CoS queues     : 8 supported, 8 maximum usable queues
  Last flapped   : 2008-08-11 10:51:51 PDT (1w1d 04:47 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  SONET alarms   : LOL, PLL
  SONET defects  : LOL, PLL, LOF, SEF, AIS-L, AIS-P

  Logical interface so-7/2/0.0 (Index 67) (SNMP ifIndex 117)
    Flags: Device-Down Point-To-Point SNMP-Traps 0x4000 Encapsulation: FR-NLPID
    Shared interface:
      Shared with: psd5
      Tunnel token: Rx: 2.517, Tx: 1.517
    Input packets : 0
    Output packets: 0
    DLCI 700
      Flags: Active
      Total down time: 00:01:09 sec, Last down: 284:58:21 ago
        Input packets : 0
        Output packets: 0
  DLCI statistics:
    Active DLCI  :1  Inactive DLCI  :0
```

On the PSD (SONET Interface)

The following sample output shows that **so-0/3/0** is not owned by the PSD. The logical SONET interface **so-0/3/0.0** is configured on a shared physical interface and **ut-1/0/0.0** is its peer tunnel interface.

```
user@psd1> show interfaces so-0/3/0
Physical interface: so-0/3/0, Enabled, Physical link is Up
  Interface index: 151, SNMP ifIndex: 19353
  Link-level type: Frame-Relay, MTU: 4474, Clocking: Internal, Speed: OC192,
  Loopback: None, FCS: 16, Payload scrambler: Enabled
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Shared-interface  : Non-Owner
  Link flags     : No-Keepalives DTE
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  CoS queues     : 8 supported, 8 maximum usable queues
  Last flapped   : Never
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)

  Logical interface so-0/3/0.0 (Index 68) (SNMP ifIndex 19352)
    Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: FR-NLPID
    Shared interface:
      Peer interface: ut-1/0/0.0
      Tunnel token: Rx: 2.518, Tx: 1.518
    Input packets : 9
    Output packets: 10
    Protocol inet, MTU: 4470
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 16.16.0.0/30, Local: 16.16.0.1, Broadcast: 16.16.0.3
    DLCI 16
      Flags: Active
```

```
      Total down time: 00:00:00 sec, Last down: 00:00:55 ago
        Input packets : 9
        Output packets: 10
  DLCI statistics:
    Active DLCI  :1  Inactive DLCI  :0
```

On the RSD (Gigabit Ethernet Interface)

In the following sample output, **rsd1** is the owner of the physical Gigabit Ethernet interface **so-7/2/0**, and the logical Gigabit interface **so-7/2/0.0** is shared by **psd5**.

```
user@rsd1> show interfaces ge-7/2/0
Physical interface: ge-7/2/0, Enabled, Physical link is Up
  Interface index: 143, SNMP ifIndex: 187
  Link-level type: Ethernet, MTU: 1518, Speed: 10Gbps, BPDU Error: None,
  MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled,
  Flow control: Enabled
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Shared-interface : Owner
  CoS queues     : 8 supported, 8 maximum usable queues
  Current address: 00:17:cb:25:48:7e, Hardware address: 00:17:cb:25:48:7e
  Last flapped   : 2008-12-08 12:19:25 PST (01:17:11 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  Active alarms  : None
  Active defects : None

  Logical interface ge-7/2/0.0 (Index 69) (SNMP ifIndex 236)
    Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.10 ]  Encapsulation: ENET2
    Shared-interface:
      Shared with: psd5
      Tunnel token: Rx: 1.520, Tx: 2.530
    Input packets : 0
    Output packets: 0
    Protocol multiservice, MTU: Unlimited
      Flags: None
```

On the PSD (Gigabit Ethernet Interface)

The following sample output shows that **ge-0/3/0** is not owned by the PSD. The logical SONET interface **ge-0/3/0.0** is configured on a shared physical interface and **ut-1/0/0.0** is its peer tunnel interface.

```
user@psd1> show interfaces ge-0/3/0
Physical interface: ge-0/3/0 Enabled, Physical link is Down
  Interface index: 172, SNMP ifIndex: 152
  Link-level type: Ethernet, MTU: 1518, Speed: 1000mbps, BPDU Error: None,
  MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled,
  Flow control: Enabled, Auto-negotiation: Enabled, Remote fault: Online
  Device flags   : Present Running
  Interface flags: Hardware-Down SNMP-Traps Internal: 0x4000
  Shared-interface : Non-Owner
  CoS queues     : 8 supported, 8 maximum usable queues
  Current address: 00:17:cb:25:48:40, Hardware address: 00:17:cb:25:48:40
  Last flapped   : Never
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  Active alarms  : None
  Active defects : None

  Logical interface ge-0/3/0.0 (Index 72) (SNMP ifIndex 1220)
```

```
  Flags: Link-Layer-Down Device-Down SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.101 ]

  Encapsulation: ENET2
  Shared-interface:
    Peer interface: ut-1/0/0.0
    Tunnel token: Rx: 14.538
  Input packets : 13
  Output packets: 7774
  Output Filters: filter-safari
  Protocol inet, MTU: 1500
    Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
     Destination: 173.16.254.0/30, Local: 173.16.254.1, Broadcast: 173.16.254.3

  Protocol inet6, MTU: 1500
    Flags: None
    Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
      Destination: 1000::173:16:0:0/96, Local: 1000::173:16:254:1
    Addresses, Flags: Dest-route-down Is-Preferred
      Destination: fe80::/64, Local: fe80::217:cb00:6525:4840
  Protocol multiservice, MTU: Unlimited
    Flags: None
```

Related Documentation

- Configuring Shared Interfaces on the RSD on page 91
- Configuring Shared Interfaces on a PSD on page 93

Displaying Inter-PSD Forwarding Information

Purpose Display information about inter-PSD forwarding.

Action Using the **show interfaces xt-*fpc/pic/slot*** command, display logical interfaces configured on the cross-connect interface. In the following example, the interface type is **Inter-PSD-tunnel** and there is one logical interface (**xt-5/0/0.1**).

```
user@psd2> show interfaces xt-5/0/0
Physical interface: xt-5/0/0, Enabled, Physical link is Up
  Interface index: 136, SNMP ifIndex: 644
  Type: Inter-PSD-tunnel, Link-level type: Inter-PSD-tunnel, MTU: Unlimited,
  Speed: 12800mbps
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link type      : Full-Duplex
  Link flags     : None
  Physical info  : 13
  Last flapped   : 2009-01-30 18:24:07 PST (19:14:07 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 67128 bps (116 pps)

  Logical interface xt-5/0/0.1 (Index 71) (SNMP ifIndex 645)
    Flags: Point-To-Point SNMP-Traps 0x4000 DLCI 1 Encapsulation: FR-NLPID
    Input packets : 0
    Output packets: 7841
    Protocol inet, MTU: Unlimited
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 10.0.0.2, Local: 10.0.0.1
```

Related Documentation

- Configuring Inter-PSD Forwarding on a PSD on page 104

PART 4

Troubleshooting

CHAPTER 17

Troubleshooting Procedures

Troubleshooting a Routing Engine on the JCS1200 Platform

Problem You cannot run the Junos OS on a Routing Engine on the JCS1200 platform and you cannot reload the software using the Junos OS CLI.

Solution Manually load the Junos OS on the Routing Engine in the JCS chassis using the media tray.

NOTE: This procedure requires that you issue commands on the JCS management module CLI and to interactively respond to prompts from the Junos OS through a console port session on the Routing Engine.

CAUTION: When you manually reload the Junos OS, the hardware disk and CompactFlash card are erased.

To manually load the Junos OS on a specific Routing Engine in the JCS chassis:

1. Obtain the Junos OS package from the Juniper Networks support Web site and transfer the software onto a USB device. For more information, contact your Juniper Networks support representative.
2. Insert the USB device with the Junos OS into either USB port on the media tray on the JCS chassis.
3. To select the Routing Engine, either press the CD button on the Routing Engine or issue the following command using the JCS management module CLI. In this example, the Routing Engine to be reloaded is in slot 1 on the JCS chassis.

   ```
   system> mt -b 1
   ```
4. To restart the Routing Engine and begin loading the software, issue the following command:

```
system> reset -T blade[1]
```

5. Type **y** and press Enter when the system issues the following prompt during the console session on the Routing Engine:

   ```
   WARNING: The installation will erase the contents of your disks. Do you wish
   to continue (y/n)?
   ```

6. When the system issues the following prompt on the console port session:

   ```
   Eject the installation media and Hit [Enter] to reboot?
   ```

   a. Using the JCS management module, issue the following command to deselect the media tray:

      ```
      system> mt -b 0
      ```

   b. On the console port session on the Routing Engine, press Enter to reboot the system.

7. When the system has rebooted, log in as **root** with no password:

   ```
   Amnesiac (ttyd0)

   Login: root
   ```

8. You can now load an existing configuration file onto the Routing Engine or configure the system with basic system properties.

Related Documentation

- Configuring a PSD with a Single Routing Engine on page 83
- Configuring a PSD with Redundant Routing Engines on page 85

Restarting a Routing Engine on the JCS1200 Platform

Problem A Routing Engine on the JCS1200 Platform is not responding.

Solution Manually restart the Routing Engine.

- From the PSD, you can use the **restart chassis-control** command (or the **restart jcs-control** command) in the Junos OS CLI to restart the Routing Engine. For example:

  ```
  user@host> restart chassis-control gracefully
  ```

- From the JCS management module, you can use the **reset** command in the JCS management module CLI to restart the Routing Engine. For example:

  ```
  system> reset -T blade[1]
  ```

PART 5

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