



**JUNOS® Software**

## **Protected System Domain Configuration Guide**

*Release 9.3*

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# About This Guide

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## Objectives

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This guide is designed to provide an overview of the JCS 1200 platform and the concept of Protected System Domains (PSDs). The JCS 1200 platform, which contains up to 12 Routing Engines (or 6 redundant Routing Engine pairs) running JUNOS software, is connected to up to three T-series routing platforms, including any combination of T320 routers, T640 routing nodes, and T1600 routing nodes.

The JUNOS software running on a pair of redundant Routing Engines on a T-series routing platform is considered a Root System Domain (RSD). In the RSD configuration, you create a PSD by assigning one or more Flexible PIC Concentrators (FPCs) on a T-series routing platform to a Routing Engine (or redundant Routing Engine pair) on the JCS 1200 platform. Each PSD has the same capabilities and functionality as a physical router, with its own control plane, forwarding plane, and administration.

RSDs and PSDs can run different versions of JUNOS software. Each RSD and PSD must be running JUNOS Release 9.2 or later.

Different PSDs can share interfaces on a single Physical Interface Card (PIC) owned by the RSD. The RSD and PSDs must be running JUNOS Software Release 9.3 or later. With JUNOS 9.3, shared interfaces can only be configured on SONET PICs installed on Enhanced Services (ES) FPCs. Because ES FPCs are not supported on the T320 router, only a T640 or T1600 routing node can be configured as an RSD with shared interfaces. In addition, each PSD requires a tunnel PIC on which an uplink tunnel interface (*ut-fpc/pic/slot*) is configured to peer with the shared interface on the RSD.



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**NOTE:** This guide documents Release 9.3 of the JUNOS software. For additional information about the JUNOS software—either corrections to or information that might have been omitted from this guide—see the software release notes at <http://www.juniper.net/>.

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## Audience

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This guide is designed for network administrators who are configuring and monitoring a Juniper Networks T-series routing platform and JCS 1200 platform.

To use this guide, you need a broad understanding of networks in general, the Internet in particular, networking principles, and network configuration. You must also be familiar with one or more of the following Internet routing protocols:

- Border Gateway Protocol (BGP)
- Distance Vector Multicast Routing Protocol (DVMRP)
- Intermediate System-to-Intermediate System (IS-IS)
- Internet Control Message Protocol (ICMP) router discovery
- Internet Group Management Protocol (IGMP)
- Multiprotocol Label Switching (MPLS)
- Open Shortest Path First (OSPF)
- Protocol-Independent Multicast (PIM)
- Resource Reservation Protocol (RSVP)
- Routing Information Protocol (RIP)
- Simple Network Management Protocol (SNMP)

Personnel operating the equipment must be trained and competent; must not conduct themselves in a careless, willfully negligent, or hostile manner; and must abide by the instructions provided by the documentation.

## Supported Routing Platforms

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For the features described in this manual, the JUNOS software currently supports the following routing platforms:

- T320 routers, T640 routing nodes, and T1600 routing nodes
- JCS 1200 platform

## Using the Indexes

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This guide contains two indexes: a complete index of all index entries, and an index of statements and commands only.

The complete index points to pages in the statement summary chapters. The index entry for each configuration statement contains at least two entries:

- The first entry points to the statement summary section.
- The second entry, *usage guidelines*, points to the section in a configuration guidelines chapter that describes how to use the statement.

## Using the Examples in This Manual

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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. 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 *JUNOS CLI User Guide*.

## Documentation Conventions

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Table 1 on page xxiii 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.

## List of Technical Publications

Table 2 on page xxiii lists the software and hardware guides and release notes for Juniper Networks J-series, M-series, MX-series, and T-series routing platforms and describes the contents of each document. Table 3 on page xxviii lists the books included in the *Network Operations Guide* series. Table 4 on page xxviii lists the manuals and release notes supporting JUNOS software with enhanced services. All documents are available at <http://www.juniper.net/techpubs/>.

Table 5 on page xxix lists additional books on Juniper Networks solutions that you can order through your bookstore. A complete list of such books is available at <http://www.juniper.net/books>.

**Table 2: Technical Documentation for Supported Routing Platforms**

Book	Description
<b>JUNOS Software for Supported Routing Platforms</b>	
<i>Access Privilege</i>	Explains how to configure access privileges in user classes by using permission flags and regular expressions. Lists the permission flags along with their associated command-line interface (CLI) operational mode commands and configuration statements.
<i>Class of Service</i>	Provides an overview of the class-of-service (CoS) functions of the JUNOS software and describes how to configure CoS features, including configuring multiple forwarding classes for transmitting packets, defining which packets are placed into each output queue, scheduling the transmission service level for each queue, and managing congestion through the random early detection (RED) algorithm.
<i>CLI User Guide</i>	Describes how to use the JUNOS command-line interface (CLI) to configure, monitor, and manage Juniper Networks routing platforms. This material was formerly covered in the <i>JUNOS System Basics Configuration Guide</i> .

**Table 2: Technical Documentation for Supported Routing Platforms** (*continued*)

Book	Description
<i>Feature Guide</i>	Provides a detailed explanation and configuration examples for several of the most complex features in the JUNOS software.
<i>High Availability</i>	Provides an overview of hardware and software resources that ensure a high level of continuous routing platform operation and describes how to configure high availability (HA) features such as nonstop active routing (NSR) and graceful Routing Engine switchover (GRES).
<i>MPLS Applications</i>	Provides an overview of traffic engineering concepts and describes how to configure traffic engineering protocols.
<i>Multicast Protocols</i>	Provides an overview of multicast concepts and describes how to configure multicast routing protocols.
<i>Multiplay Solutions</i>	Describes how you can deploy IPTV and voice over IP (VoIP) services in your network.
<i>MX-series Layer 2 Configuration Guide</i>	Provides an overview of the Layer 2 functions of the MX-series routers, including configuring bridging domains, MAC address and VLAN learning and forwarding, and spanning-tree protocols. It also details the routing instance types used by Layer 2 applications. All of this material was formerly covered in the <i>JUNOS Routing Protocols Configuration Guide</i> .
<i>MX-series Layer 2 Solutions Guide</i>	Describes common configuration scenarios for the Layer 2 features supported on the MX-series routers, including basic bridged VLANs with normalized VLAN tags, aggregated Ethernet links, bridge domains, Multiple Spanning Tree Protocol (MSTP), and integrated routing and bridging (IRB).
<i>Network Interfaces</i>	Provides an overview of the network interface functions of the JUNOS software and describes how to configure the network interfaces on the routing platform.
<i>Network Management</i>	Provides an overview of network management concepts and describes how to configure various network management features, such as SNMP and accounting options.
<i>Policy Framework</i>	Provides an overview of policy concepts and describes how to configure routing policy, firewall filters, and forwarding options.
<i>Protected System Domain</i>	Provides an overview of the JCS 1200 platform and the concept of Protected System Domains (PSDs). The JCS 1200 platform, which contains up to six redundant pairs of Routing Engines running JUNOS software, is connected to a T320 router or to a T640 or T1600 routing node. To configure a PSD, you assign any number of Flexible PIC concentrators (FPCs) in the T-series routing platform to a pair of Routing Engines on the JCS 1200 platform. Each PSD has the same capabilities and functionality as a physical router, with its own control plane, forwarding plane, and administration.
<i>Routing Protocols</i>	Provides an overview of routing concepts and describes how to configure routing instances, and unicast routing protocols.



**Table 2: Technical Documentation for Supported Routing Platforms** (continued)

Book	Description
<i>Secure Configuration Guide for Common Criteria and JUNOS-FIPS</i>	Provides an overview of secure Common Criteria and JUNOS-FIPS protocols for the JUNOS software and describes how to install and configure secure Common Criteria and JUNOS-FIPS on a routing platform.
<i>Services Interfaces</i>	Provides an overview of the services interfaces functions of the JUNOS software and describes how to configure the services interfaces on the router.
<i>Software Installation and Upgrade Guide</i>	Describes the JUNOS software components and packaging and explains how to initially configure, reinstall, and upgrade the JUNOS system software. This material was formerly covered in the <i>JUNOS System Basics Configuration Guide</i> .
<i>Subscriber Access</i>	Provides an overview of the subscriber access features of the JUNOS software and describes how to configure subscriber access support on the router, including dynamic profiles, class of service, AAA, and access methods.
<i>System Basics</i>	Describes Juniper Networks routing platforms and explains how to configure basic system parameters, supported protocols and software processes, authentication, and a variety of utilities for managing your router on the network.
<i>VPNs</i>	Provides an overview and describes how to configure Layer 2 and Layer 3 virtual private networks (VPNs), virtual private LAN service (VPLS), and Layer 2 circuits. Provides configuration examples.
<b>JUNOS References</b>	
<i>Hierarchy and RFC Reference</i>	Describes the JUNOS configuration mode commands. Provides a hierarchy reference that displays each level of a configuration hierarchy, and includes all possible configuration statements that can be used at that level. This material was formerly covered in the <i>JUNOS System Basics Configuration Guide</i> .
<i>Interfaces Command Reference</i>	Describes the JUNOS software operational mode commands you use to monitor and troubleshoot interfaces.
<i>Routing Protocols and Policies Command Reference</i>	Describes the JUNOS software operational mode commands you use to monitor and troubleshoot routing policies and protocols, including firewall filters.
<i>System Basics and Services Command Reference</i>	Describes the JUNOS software operational mode commands you use to monitor and troubleshoot system basics, including commands for real-time monitoring and route (or path) tracing, system software management, and chassis management. Also describes commands for monitoring and troubleshooting services such as class of service (CoS), IP Security (IPsec), stateful firewalls, flow collection, and flow monitoring.
<i>System Log Messages Reference</i>	Describes how to access and interpret system log messages generated by JUNOS software modules and provides a reference page for each message.
<b>J-Web User Guide</b>	

**Table 2: Technical Documentation for Supported Routing Platforms** (*continued*)

Book	Description
<i>J-Web Interface User Guide</i>	Describes how to use the J-Web graphical user interface (GUI) to configure, monitor, and manage Juniper Networks routing platforms.
<b>JUNOS API and Scripting Documentation</b>	
<i>JUNOScript API Guide</i>	Describes how to use the JUNOScript application programming interface (API) to monitor and configure Juniper Networks routing platforms.
<i>JUNOS XML API Configuration Reference</i>	Provides reference pages for the configuration tag elements in the JUNOS XML API.
<i>JUNOS XML API Operational Reference</i>	Provides reference pages for the operational tag elements in the JUNOS XML API.
<i>NETCONF API Guide</i>	Describes how to use the NETCONF API to monitor and configure Juniper Networks routing platforms.
<i>JUNOS Configuration and Diagnostic Automation Guide</i>	Describes how to use the commit script and self-diagnosis features of the JUNOS software. This guide explains how to enforce custom configuration rules defined in scripts, how to use commit script macros to provide simplified aliases for frequently used configuration statements, and how to configure diagnostic event policies.
<b>Hardware Documentation</b>	
<i>Hardware Guide</i>	Describes how to install, maintain, and troubleshoot routing platforms and components. Each platform has its own hardware guide.
<i>PIC Guide</i>	Describes the routing platform's Physical Interface Cards (PICs). Each platform has its own PIC guide.
<i>DPC Guide</i>	Describes the Dense Port Concentrators (DPCs) for all MX-series routers.
<b>JUNOScope Documentation</b>	
<i>JUNOScope Software User Guide</i>	Describes the JUNOScope software graphical user interface (GUI), how to install and administer the software, and how to use the software to manage routing platform configuration files and monitor routing platform operations.
<b>Advanced Insight Solutions (AIS) Documentation</b>	
<i>Advanced Insight Solutions Guide</i>	Describes the Advanced Insight Manager (AIM) application, which provides a gateway between JUNOS devices and Juniper Support Systems (JSS) for case management and intelligence updates. Explains how to run AI-Scripts on Juniper Networks devices.
<b>J-series Routing Platform Documentation</b>	

**Table 2: Technical Documentation for Supported Routing Platforms** (continued)

Book	Description
<i>Getting Started Guide</i>	Provides an overview, basic instructions, and specifications for J-series routing platforms. The guide explains how to prepare your site for installation, unpack and install the router and its components, install licenses, and establish basic connectivity. Use the <i>Getting Started Guide</i> for your router model.
<i>Basic LAN and WAN Access Configuration Guide</i>	Explains how to configure the interfaces on J-series Services Routers for basic IP routing with standard routing protocols, ISDN backup, and digital subscriber line (DSL) connections.
<i>Advanced WAN Access Configuration Guide</i>	Explains how to configure J-series Services Routers in virtual private networks (VPNs) and multicast networks, configure data link switching (DLSw) services, and apply routing techniques such as policies, stateless and stateful firewall filters, IP Security (IPsec) tunnels, and class-of-service (CoS) classification for safer, more efficient routing.
<i>Administration Guide</i>	Shows how to manage users and operations, monitor network performance, upgrade software, and diagnose common problems on J-series Services Routers.
<b>Release Notes</b>	
<i>JUNOS Release Notes</i>	Summarize new features and known problems for a particular software release, provide corrections and updates to published JUNOS, JUNOScript, and NETCONF manuals, provide information that might have been omitted from the manuals, and describe upgrade and downgrade procedures.
<i>Hardware Release Notes</i>	Describe the available documentation for the routing platform and summarize known problems with the hardware and accompanying software. Each platform has its own release notes.
<i>JUNOScope Release Notes</i>	Contain corrections and updates to the published JUNOScope manual, provide information that might have been omitted from the manual, and describe upgrade and downgrade procedures.
<i>AIS Release Notes</i>	Summarize AIS new features and guidelines, identify known and resolved problems, provide information that might have been omitted from the manuals, and provide initial setup, upgrade, and downgrade procedures.
<i>AIS AI-Scripts Release Notes</i>	Summarize AI-Scripts new features, identify known and resolved problems, provide information that might have been omitted from the manuals, and provide instructions for automatic and manual installation, including deleting and rolling back.
<i>J-series Services Router Release Notes</i>	Briefly describe Services Router features, identify known hardware problems, and provide upgrade and downgrade instructions.

**Table 3: JUNOS Software Network Operations Guides**

Book	Description
<i>Baseline</i>	Describes the most basic tasks for running a network using Juniper Networks products. Tasks include upgrading and reinstalling JUNOS software, gathering basic system management information, verifying your network topology, and searching log messages.
<i>Interfaces</i>	Describes tasks for monitoring interfaces. Tasks include using loopback testing and locating alarms.
<i>MPLS</i>	Describes tasks for configuring, monitoring, and troubleshooting an example MPLS network. Tasks include verifying the correct configuration of the MPLS and RSVP protocols, displaying the status and statistics of MPLS running on all routing platforms in the network, and using the layered MPLS troubleshooting model to investigate problems with an MPLS network.
<i>MPLS Log Reference</i>	Describes MPLS status and error messages that appear in the output of the <code>show mpls lsp extensive</code> command. The guide also describes how and when to configure Constrained Shortest Path First (CSPF) and RSVP trace options, and how to examine a CSPF or RSVP failure in a sample network.
<i>MPLS Fast Reroute</i>	Describes operational information helpful in monitoring and troubleshooting an MPLS network configured with fast reroute (FRR) and load balancing.
<i>Hardware</i>	Describes tasks for monitoring M-series and T-series routing platforms.

To configure and operate a J-series Services Router running JUNOS software with enhanced services, you must also use the configuration statements and operational mode commands documented in JUNOS configuration guides and command references. To configure and operate a WX Integrated Services Module, you must also use WX documentation.

**Table 4: JUNOS Software with Enhanced Services Documentation**

Book	Description
<b>All Platforms</b>	
<i>JUNOS Software Interfaces and Routing Configuration Guide</i>	Explains how to configure J-series interfaces for basic IP routing with standard routing protocols, ISDN service, firewall filters (access control lists), and class-of-service (CoS) traffic classification.
<i>JUNOS Software Security Configuration Guide</i>	Explains how to configure and manage security services such as stateful firewall policies, IP Security (IPsec) virtual private networks (VPNs), firewall screens, Network Address Translation (NAT), Public Key Cryptography, and Application Layer Gateways (ALGs).

**Table 4: JUNOS Software with Enhanced Services Documentation (continued)**

Book	Description
<i>JUNOS Software Administration Guide</i>	Shows how to monitor J-series devices and routing operations, firewall and security services, system alarms and events, and network performance. This guide also shows how to administer user authentication and access, upgrade software, and diagnose common problems.
<i>JUNOS Software CLI Reference</i>	Provides the complete JUNOS software with enhanced services configuration hierarchy and describes the configuration statements and operational mode commands not documented in the standard JUNOS manuals.
<b>J-series Only</b>	
<i>JUNOS Software with Enhanced Services Design and Implementation Guide</i>	Provides guidelines and examples for designing and implementing IPsec VPNs, firewalls, and routing on J-series Services Routers running JUNOS software with enhanced services.
<i>JUNOS Software with Enhanced Services Quick Start</i>	Explains how to quickly set up a J-series Services Router. This document contains router declarations of conformity.
<i>JUNOS Software with Enhanced Services J-series Services Router Hardware Guide</i>	Provides an overview, basic instructions, and specifications for J-series Services Routers. This guide explains how to prepare a site, unpack and install the router, replace router hardware, and establish basic router connectivity. This guide contains hardware descriptions and specifications.
<i>JUNOS Software with Enhanced Services Migration Guide</i>	Provides instructions for migrating an SSG device running ScreenOS software or a J-series Services Router running the JUNOS software to JUNOS software with enhanced services.
<i>WXC Integrated Services Module Installation and Configuration Guide</i>	Explains how to install and initially configure a WXC Integrated Services Module in a J-series Services Router for application acceleration.
<i>JUNOS Software with Enhanced Services for J-series Services Router Release Notes</i>	Summarizes new features and known problems for a particular release of JUNOS software with enhanced services on J-series Services Routers, including J-Web interface features and problems. The release notes also contain corrections and updates to the manuals and software upgrade and downgrade instructions for JUNOS software with enhanced services.

**Table 5: Additional Books Available Through <http://www.juniper.net/books>**

Book	Description
<i>Interdomain Multicast Routing</i>	Provides background and in-depth analysis of multicast routing using Protocol Independent Multicast sparse mode (PIM SM) and Multicast Source Discovery Protocol (MSDP); details any-source and source-specific multicast delivery models; explores multiprotocol BGP (MBGP) and multicast IS-IS; explains Internet Gateway Management Protocol (IGMP) versions 1, 2, and 3; lists packet formats for IGMP, PIM, and MSDP; and provides a complete glossary of multicast terms.

**Table 5: Additional Books Available Through <http://www.juniper.net/books> (continued)**

Book	Description
<i>JUNOS Cookbook</i>	Provides detailed examples of common JUNOS software configuration tasks, such as basic router configuration and file management, security and access control, logging, routing policy, firewalls, routing protocols, MPLS, and VPNs.
<i>MPLS-Enabled Applications</i>	Provides an overview of Multiprotocol Label Switching (MPLS) applications (such as Layer 3 virtual private networks [VPNs], Layer 2 VPNs, virtual private LAN service [VPLS], and pseudowires), explains how to apply MPLS, examines the scaling requirements of equipment at different points in the network, and covers the following topics: point-to-multipoint label switched paths (LSPs), DiffServ-aware traffic engineering, class of service, interdomain traffic engineering, path computation, route target filtering, multicast support for Layer 3 VPNs, and management and troubleshooting of MPLS networks.
<i>OSPF and IS-IS: Choosing an IGP for Large-Scale Networks</i>	Explores the full range of characteristics and capabilities for the two major link-state routing protocols: Open Shortest Path First (OSPF) and IS-IS. Explains architecture, packet types, and addressing; demonstrates how to improve scalability; shows how to design large-scale networks for maximum security and reliability; details protocol extensions for MPLS-based traffic engineering, IPv6, and multipoint-to-multipoint routing; and covers troubleshooting for OSPF and IS-IS networks.
<i>Routing Policy and Protocols for Multivendor IP Networks</i>	Provides a brief history of the Internet, explains IP addressing and routing (Routing Information Protocol [RIP], OSPF, IS-IS, and Border Gateway Protocol [BGP]), explores ISP peering and routing policies, and displays configurations for both Juniper Networks and other vendors' routers.
<i>The Complete IS-IS Protocol</i>	Provides the insight and practical solutions necessary to understand the IS-IS protocol and how it works by using a multivendor, real-world approach.

## Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can send your comments to [techpubs-comments@juniper.net](mailto:techpubs-comments@juniper.net), or fill out the documentation feedback form at <https://www.juniper.net/cgi-bin/docbugreport/>. If you are using e-mail, be sure to include the following information with your comments:

- Document name
- Document part number
- Page number
- Software release version (not required for *Network Operations Guides [NOGs]*)

## Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or JNASC support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the JTAC User Guide located at <http://www.juniper.net/customers/support/downloads/710059.pdf>.
- Product warranties—For product warranty information, visit <http://www.juniper.net/support/warranty/>.
- JTAC Hours of Operation —The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

### Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: <http://www.juniper.net/customers/support/>
- Search for known bugs: <http://www2.juniper.net/kb/>
- 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 located at <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**

# **Product Overview**

- Product Overview on page 3
- System Components on page 13
- System Views on page 21
- Configuration Overview on page 27



## Chapter 1

# Product Overview

- JCS 1200 Platform Overview on page 3
- Control and Forwarding Planes in Separate Chassis on page 4
- Protected System Domain Overview on page 5
- Shared Interfaces Overview on page 6
- Benefits of Protected System Domains and Shared Interfaces on page 9

### JCS 1200 Platform Overview

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The Juniper Control System (JCS) 1200 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 JCS 1200 chassis houses up to six redundant Routing Engine pairs or up to 12 single Routing Engines running JUNOS software. Matched with one or more Flexible PIC Concentrators (FPCs) on a T-series routing platform, 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, routing tables, interfaces, and secure access. Up to three T-series routing platforms can be connected to the JCS chassis. By physically separating the control plane from the forwarding plane, you can achieve the following results:

- Increased efficiency and investment protection—A single T-series routing platform used with the JCS 1200 platform supports up to eight PSDs. With multiple (up to 3) T-series chassis connected to the JCS 1200 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 software. Each RSD and PSD must be running JUNOS Release 9.2 or later.

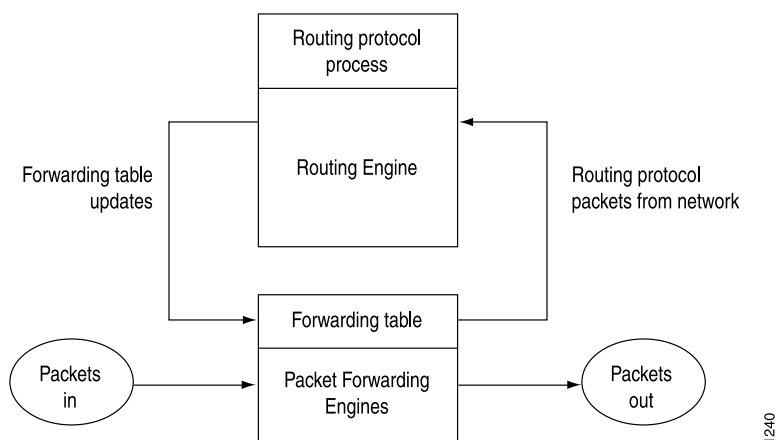
- Related Topics**
- Control and Forwarding Planes in Separate Chassis on page 4
  - Protected System Domain Overview on page 5
  - Shared Interfaces Overview on page 6

## Control and Forwarding Planes in Separate Chassis

The physical separation of the control plane from the forwarding plane in separate chassis is an extension of the existing Juniper Networks router architecture, which separates routing and control functions from packet forwarding operations. The separation of functionality within a router chassis eliminates bottlenecks and permits the router to maintain a high level of performance.

The control plane refers to the capabilities of the Routing Engine. The creation of routing and forwarding tables, maintenance of adjacencies, filtering, policies, and system monitoring are handled by the control plane. In contrast, the forwarding plane of the router consists of the interfaces, the Packet Forwarding Engines, and the switch fabric. See Figure 1 on page 4.

**Figure 1: Router Architecture**



The Routing Engine constructs and maintains one or more routing tables and derives a table of active routes, called the forwarding table, that is copied to the Packet Forwarding Engine.

The Packet Forwarding Engine uses ASICs to perform Layer 2 and Layer 3 packet switching, route lookups, and packet forwarding. For T-series routers, the Packet Forwarding Engine is implemented in ASICs that are physically located on the Flexible PIC Concentrator (FPCs) and Physical Interface Card (PICs). The Packet Forwarding Engine receives incoming packets from the PICs installed on the FPC and forwards them through the switch planes to the appropriate destination port.

The Routing Engine and Packet Forwarding Engine perform their 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.

With Routing Engines located in a separate chassis, the JCS 1200 platform provides a greatly expanded control plane capacity without sacrificing any forwarding slots in the T-series routing platform. All memory-intensive processing occurs on the Routing Engines, whereas the FPCs on the T-series routing platform are dedicated to efficient high-speed forwarding.

- Related Topics**
- JCS 1200 Platform Overview on page 3
  - Protected System Domain Overview on page 5
  - Shared Interfaces Overview on page 6

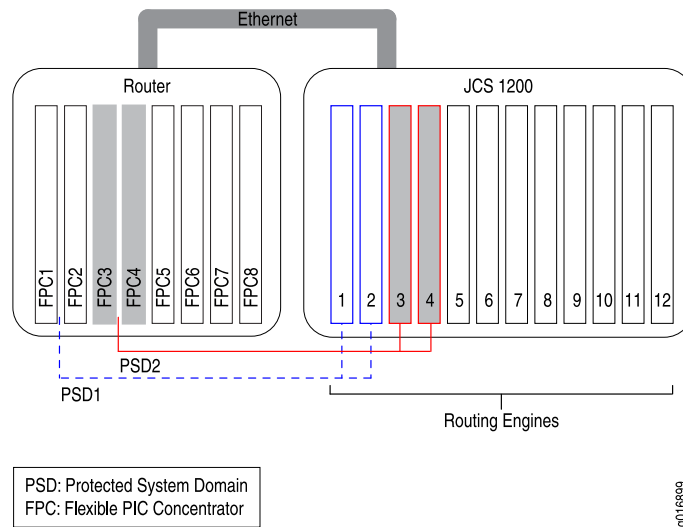
## Protected System Domain Overview

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The concept of virtual hardware routers, or Protected System Domains (PSDs), is an extension of the existing JUNOS software feature of logical systems. A logical system partitions a single, physical router into multiple logical devices that perform independent routing tasks. Logical systems reduce complexity by performing a subset of the actions of the main router and by having their own unique routing tables, interfaces, policies, and routing instances. A set of logical systems within a single router can handle the functions previously performed by several small routers.

In contrast, a PSD has its own control plane as well as forwarding plane. A PSD functions exactly as a separate physical router, running a separate configuration file, administering its own domain, and requiring unique authentication in order to access it. By providing a highly scalable control plane with a cost-efficient forwarding plane on a single platform, the JCS 1200 chassis interconnected with up to three T-series routing chassis obviates the need to deploy numerous physical routers.

A PSD is a redundant Routing Engine pair (or single Routing Engine) on the JCS 1200 platform matched with one or more FPCs on a T-series routing platform. 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. In Figure 2 on page 6, 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 routing platform and the Routing Engines in slots 3 and 4 on the JCS 1200 chassis.

**Figure 2: Protected System Domain**

A PSD detects and manages only its own Routing Engines in the JCS 1200 and the assigned FPCs and PICs in the T-series router. In addition, failures on one PSD do not affect other PSDs.

- Related Topics**
- Control and Forwarding Planes in Separate Chassis on page 4
  - JCS 1200 Platform Overview on page 3
  - Shared Interfaces Overview on page 6

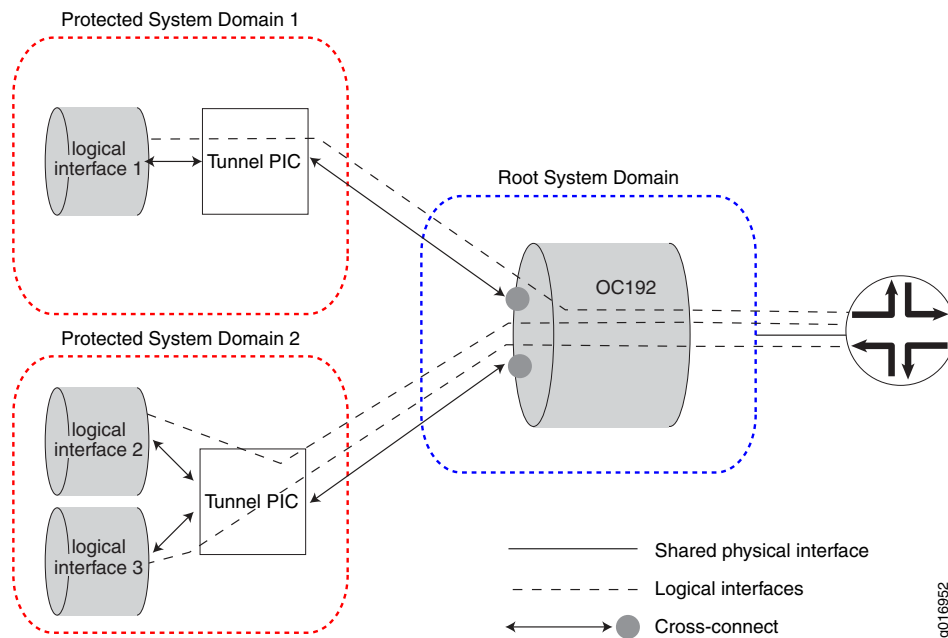
## Shared Interfaces Overview

A shared interface is a physical interface that is owned by the Root System Domain (RSD), with logical interfaces under it assigned to different Protected System Domains (PSDs).

- Shared Interfaces Basics on page 6
- Traffic Flow on Shared Interfaces on page 7
- Supported Platforms and PICs on page 8

### Shared Interfaces Basics

Any Flexible PIC Concentrator (FPC) that has not been assigned to a specific PSD can be used to host shared interfaces. With JUNOS Release 9.3, only SONET Physical Interface Cards (PICs) can be configured as shared interfaces. On the RSD, multiple logical interfaces are configured on the physical SONET interface and each individual logical interface is assigned to a different PSD. On the PSD, each assigned logical SONET 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 3 on page 7.

**Figure 3: 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.

**Traffic Flow on Shared Interfaces**

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

The physical shared interface must be configured on both the RSD and the PSD with Frame Relay encapsulation. 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.



**NOTE:** Point-to-multipoint Frame Relay is not supported.

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.

## **Supported Platforms and PICs**

Shared interfaces are owned by the RSD. With JUNOS Release 9.3, shared interfaces can only be configured on SONET PICs installed on Enhanced Services (ES) FPCs. Because ES FPCs are not supported on the T320 router, only a T640 or T1600 routing node can be configured as an RSD with shared interfaces.

With JUNOS Release 9.3, the following SONET PICs support shared interfaces:

- 4-port OC48 SONET, SFP
- 1-port OC192 SONET, XFP
- 4-port OC192 SONET, XFP
- 1-port OC768 SONET, SR

To configure shared interfaces, each PSD requires a single tunnel PIC. With JUNOS Release 9.3, interfaces that are configured to peer with shared interfaces are supported only on tunnel PICs that are mounted on Type 3 Enhanced Scaling FPCs (FPC3-ES) and on any Type 4 FPC (FPC4).

### **Related Topics**

- Control and Forwarding Planes in Separate Chassis on page 4
- JCS 1200 Platform Overview on page 3
- Protected System Domain Overview on page 5



## Benefits of Protected System Domains and Shared Interfaces

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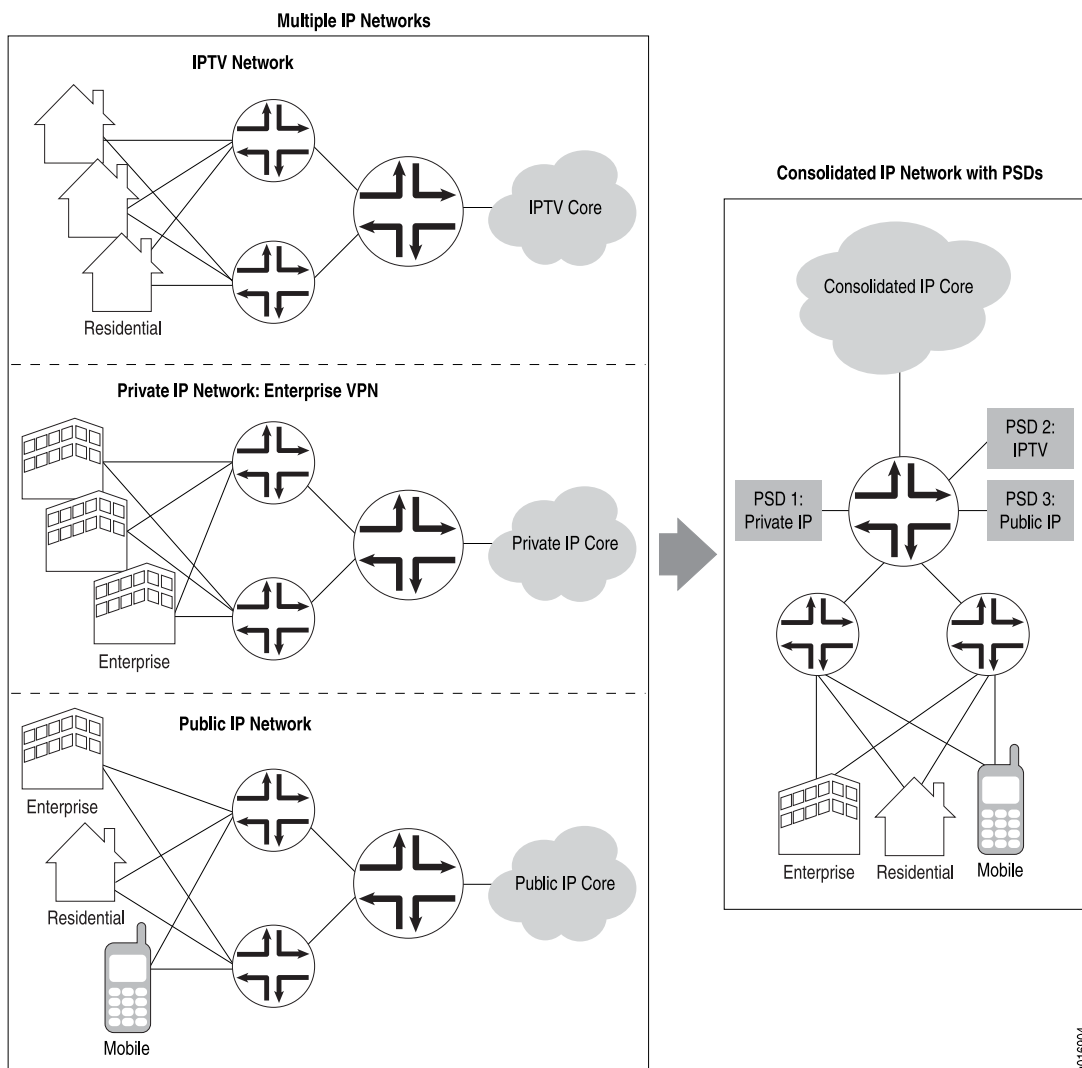
The benefits of Protected System Domains (PSDs) and shared interfaces are described in the following sections:

- Network Consolidation on page 9
- Enhanced Security and Administration on page 10
- Cost Efficiency on page 10
- Faster Deployment of New Services on page 11

### **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 4 on page 10, 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 routing node is required to support all three services.

**Figure 4: Network Consolidation**

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## 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. To configure shared interfaces, each RSD and PSD must be running JUNOS 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 version of JUNOS software. Each RSD and PSD must be running JUNOS Release 9.2 or later.

- Related Topics**
- Example: Configuring a JCS 1200 Platform and a Single T-series Router on page 111
  - Example: Configuring a JCS 1200 Platform and Multiple T-series Routers on page 116
  - Example: Configuring Shared Interfaces on page 125
  - Example: Consolidating a Layer 2 VPN Network on page 136



## Chapter 2

# System Components

- JCS 1200 Platform Hardware Components on page 13
- JCS 1200 Platform Software Components on page 15
- Root System Domain Components on page 16
- Protected System Domain Components on page 16
- Connections Between JCS 1200 and T-series Platforms on page 17

### JCS 1200 Platform Hardware Components

---

JCS 1200 platform hardware components include:

- Default Hardware Configuration on page 13
- Routing Engines on page 13
- Management Module on page 14
- Switch Module on page 14
- Media Tray on page 14
- Power Supply Modules on page 15
- Fan Modules on page 15

#### ***Default Hardware Configuration***

The default configuration for the JCS 1200 platform includes:

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

#### ***Routing Engines***

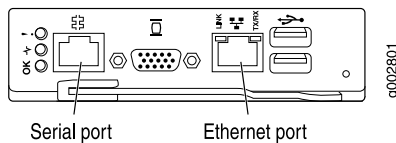
The JCS chassis provides 12 slots (bays) for Routing Engines. A Routing Engine is a hot-swappable, independent server with its own processors, memory, storage, network controllers, operating system, and applications. The Routing Engine is installed in a slot in the JCS chassis and shares power, fans,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

other Routing Engines. Routing Engines in the JCS 1200 platform have the latest JUNOS software 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 5 on page 14.

**Figure 5: 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.

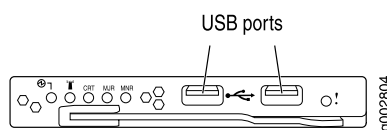
## Switch Module

The JCS switch module connects Routing Engines on the JCS 1200 platform to a T-series routing platform 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 software is preloaded onto each Routing Engine. The media tray USB ports are used to copy new JUNOS software packages onto Routing Engines. See Figure 6 on page 14. 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 6: 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 JCS 1200 platform comes with four hot-swappable fan modules for cooling redundancy. The fan module speeds vary depending on the ambient air temperature within the JCS 1200 platform.

If the ambient temperature is 25°C (77°F) or below, the JCS 1200 platform fan modules will run at their minimum rotational speed. If the ambient temperature is above 25°C (77°F), the fan modules will run faster, increasing their speed as required to control internal JCS 1200 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 JCS 1200 platform. To maintain cooling redundancy, replace a failed fan module as soon as possible.

**Related Topics** ■ JCS 1200 Platform Software Components on page 15

## JCS 1200 Platform Software Components

---

Use the following user interfaces to configure and monitor the JCS 1200 platform:

- JCS Management Module Command-Line Interface on page 15
- JCS Switch Module Script on page 16

### JCS Management Module Command-Line Interface

The JCS management module command-line interface (CLI) is the software interface you use to access and configure the JCS 1200 platform.

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 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, commands you enter with the JCS management module CLI are activated as soon as you enter the command.

**Related Topics** ■ Logging In to the JCS Management Module CLI on page 34

## **JCS Switch Module Script**

The JCS switch module includes a menu-based interface that runs on the JCS 1200 platform. However, instead of using menus to configure the switch, Juniper Networks provides a script you can use for configuring the switch.

**Related Topics** ■ Configuring the JCS Switch Module on page 51

## **Root System Domain Components**

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The Root System Domain (RSD) is the JUNOS software running on a pair of redundant Routing Engines on a T-series routing platform connected to the switch fabric on the JCS 1200 platform. The configuration on these Routing Engines provides:

- The RSD identification
- The parameters used to create PSDs, including:
  - A Routing Engine or redundant Routing Engine pair on the JCS 1200 platform
  - One or more FPCs on the T-series routing platform

Because you can connect up to three T-series routing platforms to the JCS 1200 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.

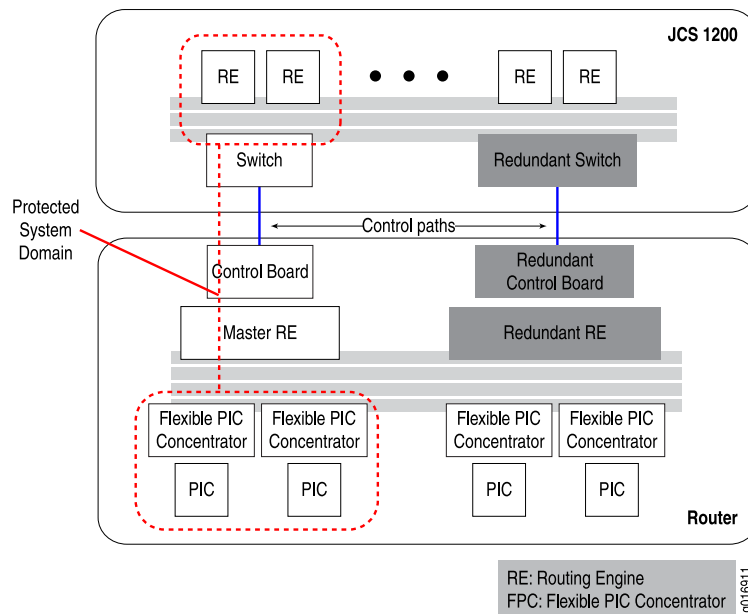
**Related Topics** ■ Configuring an RSD and Creating PSDs on page 84

## **Protected System Domain Components**

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Figure 7 on page 17 provides a simplified look at the physical components of a Protected System Domain (PSD). In this example, a pair of redundant Routing Engines in the JCS 1200 chassis are connected through one JCS switch module to two FPCs on the T-series routing platform.



**Figure 7: PSD Components**

With redundant JCS switch modules, each Routing Engine can be connected to both JCS switch modules. See “Connections Between JCS 1200 and T-series Platforms” on page 17.

Once a PSD is created in the Root System Domain (RSD) configuration file, you connect to the console port on the master Routing Engine for the specified PSD. Then, using the JUNOS software preinstalled on the master Routing Engine, you configure basic configuration information so that the PSD is on the network and so that you can log in to it through its network management port.

When these steps are completed, you can load an existing configuration from another router onto the PSD, merge a portion of a configuration file, or create the configuration directly on the PSD.

- Related Topics**
- Configuring a PSD with a Single Routing Engine on page 87
  - Configuring a PSD with Redundant Routing Engines on page 90

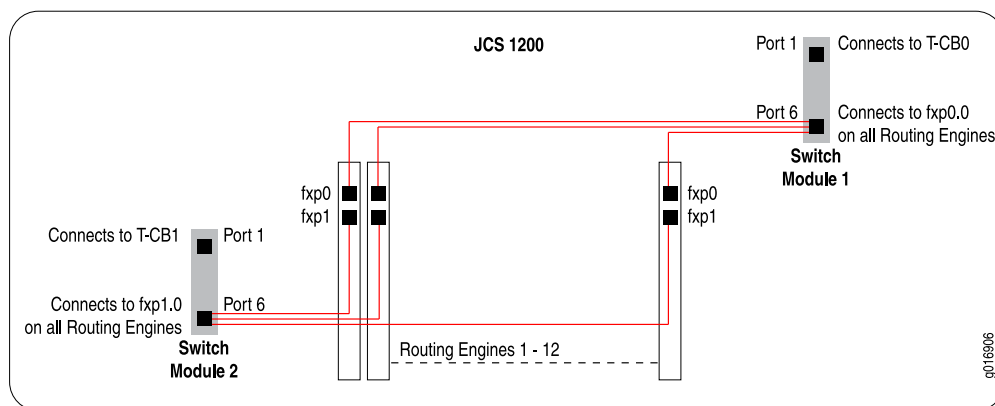
## Connections Between JCS 1200 and T-series Platforms

The JCS 1200 and T-series routing platforms 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 8 on page 18, 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.

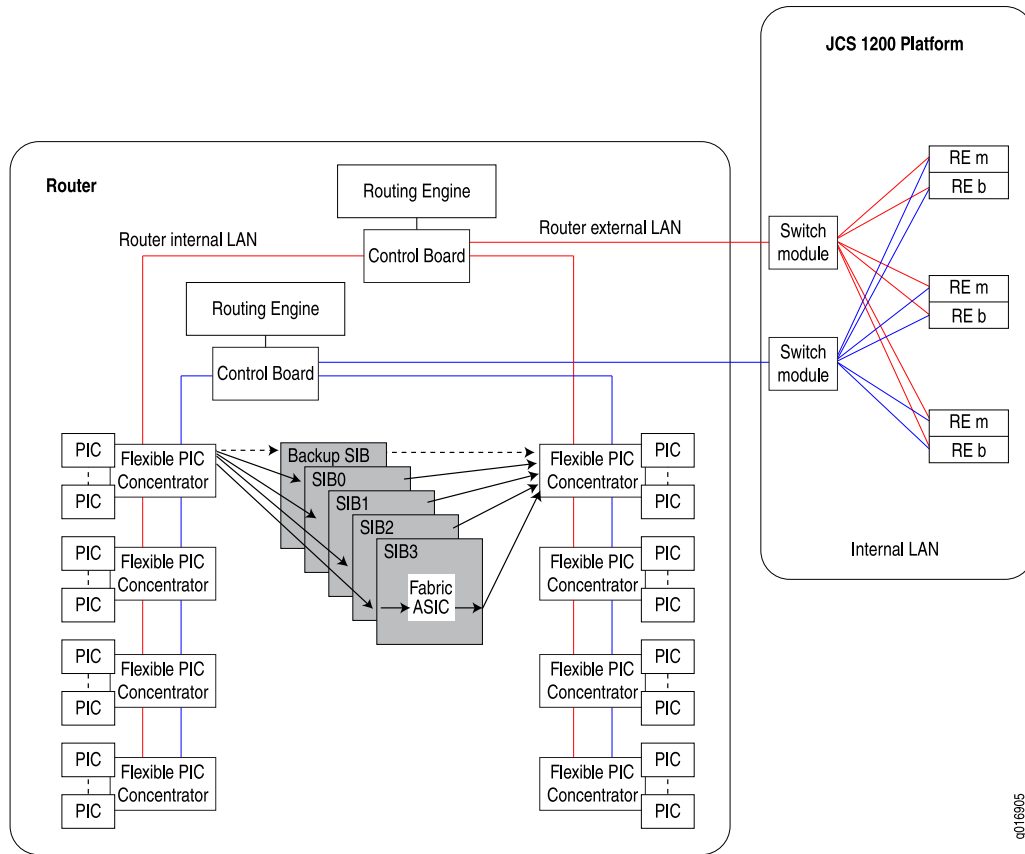
When there are two JCS switch modules, each Routing Engine can be configured with two Ethernet management ports. One port (fxp0.0) is connected to port 6 on the JCS switch module in bay 1, whereas the other port (fxp1.0) is connected to port 6 on the JCS switch module in bay 2. Each connection is a dedicated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

**Figure 8: 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 9 on page 19 provides a more detailed look at the connections between the two platforms. RE m indicates a master Routing Engine on the JCS 1200 platform, whereas RE b represents a backup Routing Engine.

**Figure 9: Connections Between JCS 1200 and T-series Platforms**

- Related Topics**
- Configuring a PSD with a Single Routing Engine on page 87
  - Configuring a PSD with Redundant Routing Engines on page 90



## Chapter 3

# System Views

- System Views Overview on page 21
- JCS Administration View on page 21
- RSD Administration View on page 23
- PSD Administration View on page 24

### System Views Overview

---

Configuring and managing the Juniper Control System (JCS) 1200 platform and connected T-series routing platforms 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 JCS 1200 platform components, including the JCS switch module and blade (or Routing Engine) parameters.
- Through the JUNOS software running on the Routing Engine pair in the T-series routing platform (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 software 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 Topics**
- JCS Administration View on page 21
  - RSD Administration View on page 23
  - PSD Administration View on page 24

### 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 JCS 1200 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 22
- How Command Targets and User Permissions Impact Views on page 22

## ***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 Topics**

- RSD Administration View on page 23
- PSD Administration View on page 24
- Setting the JCS Management Module Command Target on page 36
- Configuring JCS 1200 Platform User Accounts on page 42

## RSD Administration View

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The Root System Domain (RSD) view is controlled by the administrators and users of the JUNOS software running on the Routing Engines on the T-series routing platform. RSD administration view considerations include:

- Access Privileges on page 23
- System Information on page 23
- Management Tasks on page 23

### Access Privileges

The RSD administrator creates the PSDs through the JUNOS software 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 routing platform.

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 an 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 routing platform, 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 routing platform and for any FPCs that are part of a PSD.



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

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#### Related Topics

- JCS Administration View on page 21
- PSD Administration View on page 24
- Logging In to a PSD from the RSD on page 195
- JUNOS Verification Tasks on page 195

## PSD Administration View

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

- Access Privileges on page 24
- System Information on page 24
- Management Tasks on page 24

### 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 an 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 JCS 1200 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 Topics**
- JCS Administration View on page 21
  - RSD Administration View on page 23



- Logging In to a PSD from the RSD on page 195
- JUNOS Verification Tasks on page 195



## Chapter 4

# Configuration Overview

- Before You Configure an RSD and Create PSDs on page 27
- Configuration Roadmap on page 28

### Before You Configure an RSD and Create PSDs

---

Before connecting the JCS 1200 platform to any T-series routing platform, 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



**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.

- 
- Related Topics**
- Configuration Roadmap on page 28
  - Configuring SNMP Traps on page 48

## Configuration Roadmap

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To configure the JCS 1200 platform and a T-series routing platform, you need to perform the tasks in the order described in the following sections:

- Step One: Configure the JCS 1200 Platform on page 28
- Step Two: Configure the T-series Routing Platform on page 28
- Step Three: Configure Basic System Properties on a New PSD on page 29
- Step Four: Configure Shared Interfaces on page 29

### **Step One: Configure the JCS 1200 Platform**

To configure the JCS management module, log in to the JCS management CLI and:

1. Restore the default configuration on the JCS management module.
2. Configure the JCS management module Ethernet management interface.
3. Configure the JCS switch module Ethernet management interface.
4. Create JCS management module user accounts.
5. Add 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).
6. Configure the NTP server.
7. Configure the time zone.
8. Configure the system name and contact information.
9. Configure Routing Engine (blade) names.
10. Configure Secure Shell (SSH) access.
11. Configure Simple Network Management Protocol (SNMP) traps.
12. Configure the JCS switch module.

### **Step Two: Configure the T-series Routing Platform**

Log in to the master Routing Engine on the T-series routing platform to configure it as a Root System Domain (RSD) and to create Protected System Domains (PSDs) under the RSD. Through the JUNOS software 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” on page 29.

5. Assign an ID number to the JCS 1200 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 JCS 1200 platform to the PSD.

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

Repeat Step 2 through Step 6 for each PSD to be configured under the RSD.

Then 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 JCS 1200 for the PSD you want to configure and, using the JUNOS software 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**

You configured shared interfaces on both the Root System Domain (RSD) and the Protected System Domain (PSD).

#### **On the RSD**

On the Root System Domain (RSD):

1. Configure the physical SONET interface with Frame Relay encapsulation.
2. Configure logical SONET interfaces under the physical interface.
3. For each logical SONET interface:
  - Configure a data-link connection identifier (DLCI).
  - Specify the Protected System Domain (PSD) that owns the shared interface.

**On the PSD**

On the Protected System Domain (PSD):

1. Configure the physical SONET interface (as specified in the RSD configuration).
2. Configure Frame Relay encapsulation on the physical SONET interface to match the RSD configuration.
3. Configure the maximum transmission unit (MTU) size on the physical SONET interface 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 SONET interface as a shared interface.
5. Configure the logical SONET interfaces that belong to the PSD (as specified in the RSD configuration).
6. On each logical SONET interface:
  - a. Configure the same DLCI that has been specified in the RSD configuration
  - b. Specify the logical tunnel interface that is peered with the logical SONET interface.

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

- c. Configure the protocol family and IP address of the logical SONET 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 interface.

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

- Related Topics**
- Configuring the JCS Management Module on page 39
  - Configuring an RSD and Creating PSDs on page 84
  - Configuring a PSD with a Single Routing Engine on page 87
  - Configuring a PSD with Redundant Routing Engines on page 90

## **Part 2**

# **Configuring the JCS 1200 Platform**

- Using the JCS Management Module CLI on page 33
- Configuring the JCS 1200 Platform on page 39
- Summary of JCS Management Module Configuration Commands on page 53





## Chapter 5

# Using the JCS Management Module CLI

- Overview of JCS Management Module CLI Commands on page 33
- Logging In to the JCS Management Module CLI on page 34
- Getting Help on JCS Commands on page 35
- Setting the JCS Management Module Command Target on page 36
- Exiting the JCS Management Module CLI on page 38

### Overview of JCS Management Module CLI Commands

---

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 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.

- Related Topics**
- Getting Help on JCS Commands on page 35
  - Setting the JCS Management Module Command Target on page 36
  - Exiting the JCS Management Module CLI on page 38

## 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: **PASSWORD**

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

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

- Related Topics**
- Overview of JCS Management Module CLI Commands on page 33
  - Getting Help on JCS Commands on page 35
  - Setting the JCS Management Module Command Target on page 36

- Exiting the JCS Management Module CLI on page 38
- Configuring JCS 1200 Platform User Accounts on page 42

## 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 receipients
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 6 on page 36 shows syntax conventions used in `help` command output.

**Table 6: 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

#### Related Topics

- Overview of JCS Management Module CLI Commands on page 33
- Logging In to the JCS Management Module CLI on page 34
- Setting the JCS Management Module Command Target on page 36
- Exiting the JCS Management Module CLI on page 38
- `help` on page 64

## 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 7 on page 37 lists command targets you typically use to configure and monitor the JCS 1200 platform.

**Table 7: Target Paths for JCS Modules**

Item	Target Path	Description
JCS 1200 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.

- Related Topics**
- Overview of JCS Management Module CLI Commands on page 33
  - Logging In to the JCS Management Module CLI on page 34
  - Getting Help on JCS Commands on page 35
  - Exiting the JCS Management Module CLI on page 38
  - env on page 62

## Exiting the JCS Management Module CLI

---

When you have finished entering JCS management module CLI commands, use the `exit` command to exit the CLI and terminate the session.

```
system> exit
```

```
username:
```

- Related Topics**
- Overview of JCS Management Module CLI Commands on page 33
  - Logging In to the JCS Management Module CLI on page 34
  - Getting Help on JCS Commands on page 35
  - Setting the JCS Management Module Command Target on page 36
  - `exit` on page 63

## Chapter 6

# Configuring the JCS 1200 Platform

- Configuring the JCS Management Module on page 39
- Configuring SSH Access on page 46
- Configuring SNMP Traps on page 48
- Configuring the JCS Switch Module on page 51

## Configuring the JCS Management Module

---

You configure the JCS management module to set Ethernet port access, create user accounts, and specify how Routing Engines on the JCS chassis are mapped to Protected System Domains (PSDs).

You only need to configure the active JCS management module. The JCS management module configuration is automatically synchronized between the active and standby management modules.

Tasks to configure the JCS management module are:

- Restoring the Default JCS Management Module Configuration on page 40
- Configuring the JCS Management Module Ethernet Interface on page 41
- Configuring the Switch Module Ethernet Interface on page 41
- Configuring JCS 1200 Platform User Accounts on page 42
- Configuring the Blade Bay Data on page 43
- Configuring the NTP Server on page 44
- Configuring the Time Zone on page 45
- Configuring the System Name and Contact Information on page 45
- Configuring Blade Name Information on page 46

## 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 on for the first time, use the default username and password:

Username: **USERID**

Password: **PASSWORD**

The 0 in **PASSWORD** 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 JCS 1200 Platform User Accounts

You configure user accounts on the JCS management module to control access to the module. The JCS 1200 platform supports the following types of security roles for user accounts:

- Supervisor

This role has full read and write access to the JCS 1200 platform. Users can configure the JCS management module, the JCS switch module, and Routing Engines (blades) on the JCS 1200 platform. You must configure at least one user to have a Supervisor role.

- Operator

This role has read-only access to the JCS. 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 3 has **Operator** access (read-only).

## Configuring the 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 JCS 1200 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 software 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 8 on page 43 for details.

*Vn-JCSn-SDn-PSDn-REPn-REBn-PRDplatform-type*

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

**Table 8: Format Requirements for Blade Bay Data**

Item	Description
V	Version number of the blade bay data. The accepted value is <b>01</b> .
JCS	JCS identifier. The range of values is <b>01</b> through <b>03</b> . The value for this parameter must match the value set through the <code>control-system-id</code> statement configured through the JUNOS command-line interface (CLI).
SD	RSD identifier. The range of values is <b>01</b> through <b>03</b> . The value for this parameter must match the value set through the <code>root-domain-id</code> statement configured through the JUNOS command-line interface (CLI).
PSD	PSD identifier. Each identifier must be unique. The value range is <b>01-31</b> . The value for this parameter must match the value set through the <code>protected-system-domains</code> statement configured through the JUNOS command-line interface (CLI).
REP	Slot identifier of the primary Routing Engine. The value range is <b>01-12</b> . In the absence of any JUNOS 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 through the <code>control-slot-numbers</code> statement configured through the JUNOS command-line interface (CLI).

**Table 8: Format Requirements for Blade Bay Data** *(continued)*

Item	Description
REB	Slot identifier of the backup Routing Engine. Typically, the value range is 01-12. Use 00 if no backup Routing Engine is installed. In the absence of any JUNOS 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 or T320.

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 routing node.

3. Repeat this procedure for each Routing Engine on the JCS 1200 platform.

## Configuring the NTP Server

To synchronize the JCS 1200 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 JCS 1200 platform on the network), the physical location of the JCS 1200 platform, and a contact person for the JCS 1200 platform. Typically, the contact is someone who has Supervisor access to the JCS 1200 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 Blade Name Information

JCS configuration should include a name for each Routing Engine (blade) included with the JCS 1200 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 Topics**
- Configuring SSH Access on page 46
  - Configuring SNMP Traps on page 48
  - Configuring the JCS Switch Module on page 51
  - baydata on page 56
  - clear on page 58
  - clock on page 59
  - config on page 60
  - env on page 62
  - ifconfig (JCS Management Module) on page 65
  - ifconfig (JCS Switch Module) on page 67
  - ntp on page 72
  - users on page 78

## 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 JCS 1200 platform.

Tasks to configure SSH include:

- Generating the Host Key on page 47
- Adding the User Public Key on page 47

## 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_key` 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 Topics

- Configuring the JCS Management Module on page 39
- Configuring SNMP Traps on page 48
- Configuring the JCS Switch Module on page 51
- **env** on page 62
- **displaylog** on page 170
- **sshcfg** on page 76
- **users** on page 78

## 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 49
- Configuring Alert Entries for SNMP Traps on page 49
- Configuring Monitored Alerts for SNMP Traps on page 50



## 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`.

## 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 Topics**
- Configuring the JCS Management Module on page 39
  - Configuring SSH Access on page 46
  - Configuring the JCS Switch Module on page 51
  - `alertentries` on page 54
  - `env` on page 62
  - `monalerts` on page 69
  - `snmp` on page 74

## Configuring the JCS Switch Module

---

The JCS switch module in the JCS chassis connects JCS Routing Engines to a T-series routing platform. 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 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 Topics**

- Configuring the JCS Management Module on page 39
- Configuring SNMP Traps on page 48
- Configuring SSH Access on page 46



## Chapter 7

# Summary of JCS Management Module Configuration Commands



**NOTE:** The JCS management module CLI provides a large number of commands and command options. This section describes only the subset of commands and command options that we recommend for configuring the JCS 1200 platform in a Juniper Networks environment.

---

## alertentries

<b>Syntax</b>	<code>alertentries -T system:mm[x] -recipient-number &lt;-f filter-type&gt; &lt;-n recipient-name&gt; &lt;-status (on   off)&gt; &lt;-t snmp&gt;</code>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS management module CLI) Display or configure the recipients of SNMP alerts generated by the JCS management module.
<b>Options</b>	<p><code>-T system:mm[x]</code>—Specify a JCS management module as the command target. Replace <i>x</i> with the primary management module number (1 or 2).</p> <p><code>-recipient-number</code>—Create or specify an alert recipient. Each alert recipient you create must have a unique number (1 through 12).</p> <p><code>-f filter-type</code>—(Optional) Filter the type of alerts received by the alert recipient. Replace <i>filter-type</i> with a value of <b>critical</b> (receive critical alerts only) or <b>none</b> (no filtering, receive all alerts).</p> <p><code>-n recipient-name</code>—(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 (&lt;) and greater than (&gt;) symbols.</p> <p><code>-status (on   off)</code>—(Optional) Set alert status for the specified alert recipient. When the status is <b>on</b>, the recipient receives alarm notifications. When the status is <b>off</b>, the recipient does not receive alarm notifications.</p> <p><code>-t snmp</code>—(Optional) Sets SNMP as the alert notification method for the specified alert recipient.</p>
<b>Required Privilege Level</b>	operator (display) supervisor (display or configure)
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Configuring SNMP Traps on page 48</li> <li>■ monalerts on page 69</li> <li>■ snmp on page 74</li> </ul>
<b>List of Sample Output</b>	<p><code>alertentries (Display)</code> on page 55</p> <p><code>alertentries (Configure)</code> on page 55</p>
<b>Output Fields</b>	Table 9 on page 54 lists the output fields for the <b>alertentries</b> command. Output fields are listed in the approximate order in which they appear.

**Table 9: alertentries Output Fields**

Field Name	Field Description
-status	Alert status for the specified recipient. Alert status is <b>on</b> or <b>off</b> .
-n	Name of the specified alert recipient.

**Table 9: alertentries Output Fields** *(continued)*

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

**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

---

<b>Syntax</b>	<code>baydata &lt;-b n&gt; (-clear   -data "data-definition")</code>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS management module CLI) Display, configure, or remove informational data (blade bay data) associated with Routing Engine blades.
<b>Options</b>	<p><code>-b n</code>—(Optional) Specify a specific Routing Engine. Replace <i>n</i> 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.</p> <p><code>-clear</code>—Remove the blade bay data definition.</p> <p><code>-data "data-definition"</code>—Set the blade bay data. Blade bay data is an ASCII text string with the following format: <i>Vn-JCSn-SDn-PSDn-REPn-REBn-PRDplatform-type</i>. Enclose the text string in double quotation marks (" ").</p> <ul style="list-style-type: none"> <li>■ <i>Vn</i>—Version number of the blade bay data. Replace <i>n</i> with a version number. The accepted value is 01.</li> <li>■ <i>JCSn</i>—JCS identifier. Replace <i>n</i> with the ID number of the JCS. The range of values is 01 through 03.</li> <li>■ <i>SDn</i>—RSD identifier. Replace <i>n</i> with the ID number of the RSD. The range of values is 01 through 03.</li> <li>■ <i>PSDn</i>—PSD identifier. Replace <i>n</i> with the ID number of the PSD. The range is 01 through 31.</li> <li>■ <i>REPn</i>—Slot number of the primary Routing Engine in a primary, backup Routing Engine pair. Replace <i>n</i> with the slot number of the Routing Engine. The range is 01 through 12.</li> <li>■ <i>REBn</i>—Slot number of the backup Routing Engine in a primary, backup Routing Engine pair. Replace <i>n</i> with the slot number of the Routing Engine. The range is 01 through 12.</li> <li>■ <i>PRDplatform-type</i>—Routing platform type. Replace <i>platform-type</i> with one of the following values: T1600, T640, or T320.</li> </ul>
<b>Required Privilege Level</b>	supervisor
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Configuring the Blade Bay Data on page 43</li> <li>■ control-slot-numbers</li> <li>■ control-system-id</li> <li>■ root-domain-id</li> </ul>



- List of Sample Output**
- baydata (Display) on page 57
  - baydata (Configure a Routing Engine) on page 57
  - baydata (Clear a Routing Engine) on page 57
  - baydata (Clear All Routing Engines) on page 57

**Output Fields** Table 10 on page 57 lists the output fields for the **baydata** command. Output fields are listed in the approximate order in which they appear.

**Table 10: 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.

**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 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 Topics**

- Restoring the Default JCS Management Module Configuration on page 40
- power on page 182

**List of Sample Output** clear on page 58

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

**clear** `system> clear -config -T system:mm[1]`

**clock**

<b>Syntax</b>	<code>clock &lt;-d date&gt; &lt;-dst dst-mode&gt; &lt;-g offset&gt; &lt;-t time&gt; -T system:mm[x]</code>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS management module CLI) Display or configure the JCS management module clock settings.
<b>Options</b>	<p><code>-d date</code>—(Optional) Current calendar date in <i>mm/dd/yyyy</i> format.</p> <p><code>-dst dst-mode</code>—(Optional) Daylight saving mode for the clock. Choices include:</p> <ul style="list-style-type: none"> <li>■ <code>off</code>—Daylight saving time is off (Standard time).</li> <li>■ <code>uc</code>—United States and Canada</li> <li>■ <code>others</code>—Nonstandard daylight saving time (outside the United States and Canada)</li> </ul> <p><code>-g offset</code>—(Optional) UTC (GMT) offset in hours. Replace <i>offset</i> with a value from -12 to +12.</p> <p><code>-t time</code>—(Optional) Current time in 24-hour <i>hh:mm:ss</i> format.</p> <p><code>-T system:mm[x]</code>—Specify the JCS management module as the target of the command. Replace <i>x</i> with a value of 1 or 2.</p>
<b>Required Privilege Level</b>	operator (display) supervisor (display or configure)
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Configuring the Time Zone on page 45</li> </ul>
<b>List of Sample Output</b>	<p><code>clock</code> (Display) on page 59</p> <p><code>clock</code> (Configure) on page 59</p>
<b>Output Fields</b>	When you enter this command, you are provide with feedback on the status of your request.
<b>clock (Display)</b>	<pre>system&gt; clock -T system:mm[1] 03/31/2008 16:27:11 GMT+5:00 dst uc</pre>
<b>clock (Configure)</b>	<pre>system&gt; clock -d 04/01/2008 -t 22:12:04 dst uc -T system:mm[1] OK</pre>

## config

---

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

**Release Information** Command supported by JUNOS Release 9.1 and later.

**Description** (JCS management module CLI) Display configuration information or configure a device on the JCS 1200 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-name"`—(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 Topics**

- Configuring the System Name and Contact Information on page 45
- Configuring Blade Name Information on page 46

**List of Sample Output**

config (Display) on page 61  
 config (Configure a JCS Management Module) on page 61  
 config (Configure a Routing Engine) on page 61

**Output Fields** Table 11 on page 61 lists the output fields for the `config` command. Output fields are listed in the approximate order in which they appear.

**Table 11: 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

- 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**

---

<b>Syntax</b>	<code>env -T target</code>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(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.
<b>Options</b>	<p><code>-T target</code>—Specify the target of the command. Command targets include:</p> <ul style="list-style-type: none"> <li>■ <code>system</code>—JCS 1200 platform. This is the default command target.</li> <li>■ <code>system:mm[x]</code>—JCS management module. Replace <code>x</code> with a value of 1 or 2.</li> <li>■ <code>system:switch[x]</code>—JCS switch module. Replace <code>x</code> with a value of 1 or 2.</li> <li>■ <code>system:blade[x]</code>—JCS Routing Engine (blade). Replace <code>x</code> with a value of 1 through 12.</li> <li>■ <code>system:power[x]</code>—JCS power supply. Replace <code>x</code> with a value of 1 through 4.</li> <li>■ <code>system:blower[x]</code>—JCS fan (blower). Replace <code>x</code> with a value of 1 through 4.</li> <li>■ <code>system:mt[x]</code>—JCS media tray. Replace <code>x</code> with a value of 1 or 2.</li> </ul>
<b>Required Privilege Level</b>	operator
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Setting the JCS Management Module Command Target on page 36</li> </ul>
<b>List of Sample Output</b>	<code>env</code> (JCS Management Module) on page 62
<b>Output Fields</b>	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.
<b>env (JCS Management Module)</b>	<pre>system&gt; env -T system:mm[1] OK system:mm[1]&gt;</pre>

## exit

---

<b>Syntax</b>	exit -T system:mm[x]
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS management module CLI) Terminate the current CLI session.
<b>Options</b>	-T system:mm[x]—Specify a JCS management module as the target of the command. Replace x with a value of 1 or 2.
<b>Required Privilege Level</b>	operator
<b>Related Topics</b>	■ Exiting the JCS Management Module CLI on page 38
<b>List of Sample Output</b>	exit on page 63
<b>Output Fields</b>	When you enter this command, no feedback is provided. Instead, the user login prompt appears.
<b>exit</b>	system> exit -T system:mm[1] username:

## help

---

**Syntax** [help | ?]

<command [-help | -h | ?]>

**Release Information** Command supported by JUNOS 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 Topics** ■ Getting Help on JCS Commands on page 35

**List of Sample Output** help on page 64

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

```

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 receipients
            baydata - View/edit Blade Bay Data string
            ...

```



## ifconfig (JCS Management Module)

<b>Syntax</b>	<code>ifconfig -T system:mm[x] (-eth0   -eth1) &lt;enabled   disabled&gt; &lt;-c static&gt; &lt;-g gateway-address&gt; &lt;-i static-ip-address&gt; &lt;-s subnet-mask&gt;</code>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS management module CLI) Configure or display the JCS management module Ethernet interface.
<b>Options</b>	<p><code>-T system:mm[x]</code>—Specify a JCS management module as the command target. Replace <i>x</i> with the primary management module number (1 or 2). The JCS management module is the only valid target available for this command.</p> <p><code>-eth0   -eth1</code>—Specify Ethernet channel 0 or Ethernet channel 1.</p> <p><code>enabled   disabled</code>—(Optional) Enable or disable the Ethernet interface on the JCS management module.</p> <p><code>-c static</code>—(Optional) Specify static IP configuration.</p> <p><code>-g gateway-address</code>—(Optional) Gateway IP address of the Ethernet interface on the JCS management module.</p> <p><code>-i static-ip-address</code>—(Optional) Static IP address of the Ethernet interface on the JCS management module.</p> <p><code>-s subnet-mask</code>—(Optional) Subnet mask of the Ethernet interface on the JCS management module.</p>
<b>Required Privilege Level</b>	operator (display) supervisor (display or configure)
<b>Related Topics</b>	■ Configuring the JCS Management Module Ethernet Interface on page 41
<b>List of Sample Output</b>	ifconfig (Display) on page 66 ifconfig (Configure) on page 66
<b>Output Fields</b>	Table 12 on page 65 lists the output fields for the <code>ifconfig</code> command. Output fields are listed in the approximate order in which they appear.

**Table 12: 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 12: ifconfig Output Fields** (*continued*)

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

**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 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.
<div> <b>NOTE:</b> For redundancy, you must configure the Ethernet interface for both JCS switch modules.</div>	
<div>-c static—(Optional) Specify static IP configuration.</div> <div>-em (enabled   disabled)—(Optional) Enable or disable external management of all ports on the JCS switch module.</div> <div>-ep (enabled   disabled)—(Optional) Enable or disable external ports on the JCS switch module.</div> <div>-g gateway-address—(Optional) Gateway IP address of the Ethernet interface on the JCS switch module.</div> <div>-i static- ip-address—(Optional) Static IP address of the Ethernet interface on the JCS switch module.</div> <div>-s subnet-mask—(Optional) Subnet mask of the Ethernet interface on the JCS switch module.</div>	
Required Privilege Level	operator (display) supervisor (display or configure)
Related Topics	■ Configuring the Switch Module Ethernet Interface on page 41
List of Sample Output	ifconfig (Display) on page 68 ifconfig (Configure) on page 68

**Output Fields** Table 13 on page 68 lists the output fields for the `ifconfig` command. Output fields are listed in the approximate order in which they appear.


**Table 13: 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 ( <i>static</i> ) for the Ethernet interface on the JCS switch module.

**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

<b>Syntax</b>	<code>monalerts -T system:mm[x] &lt;-ca (enabled   disabled)&gt; &lt;-ec (enabled   disabled)&gt; &lt;-ia (enabled   disabled)&gt; &lt;-wa (enabled   disabled)&gt;</code>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS management module CLI) Display or configure alerts monitored by the JCS management module.
<b>Options</b>	<p><code>-T system:mm[x]</code>—Specify a JCS management module as the command target. Replace <code>x</code> with the primary management module number (1 or 2).</p> <p><code>-ca (enabled   disabled)</code>—(Optional) Enable or disable monitoring of all critical alerts.</p> <p><code>-ec (enabled   disabled)</code>—(Optional) Enable or disable enhanced legacy alert categories. When enhanced legacy alert categories are enabled, alerts can be configured using the <code>monalerts</code> command.</p>
<hr/> <div>  <b>NOTE:</b> Make sure enhanced legacy alerts are enabled for the JCS 1200 platform.         </div> <hr/>	
	<p><code>-ia (enabled   disabled)</code>—(Optional) Enable or disable monitoring of all informational alerts.</p> <p><code>-wa (enabled   disabled)</code>—(Optional) Enable or disable monitoring of all warning alerts.</p>
<b>Required Privilege Level</b>	operator (display) supervisor (display or configure)
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Configuring SNMP Traps on page 48</li> <li>■ <code>alertentries</code> on page 54</li> <li>■ <code>snmp</code> on page 74</li> </ul>
<b>List of Sample Output</b>	<p><code>monalerts</code> (Display) on page 70</p> <p><code>monalerts</code> (Configure) on page 70</p>
<b>Output Fields</b>	Table 14 on page 69 lists the output fields for the <code>monalerts</code> command. Output fields are listed in the approximate order in which they appear.

**Table 14: monalerts Output Fields**

Field Name	Field Description
<code>-ca</code>	Status (enabled or disabled) of critical alert monitoring.
<code>-ec</code>	Status (enabled or disabled) of enhanced legacy alert categories. When enabled, legacy alert categories can be configured with the <code>monalerts</code> command.

**Table 14: monalerts Output Fields** *(continued)*

Field Name	Field Description
-ia	Status (enabled or disabled) of informational alert monitoring.
-wa	Status (enabled or disabled) of warning alert monitoring.

**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**

---

<b>Syntax</b>	<code>mt -T system &lt;-b n&gt;</code>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(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 software from a USB device to a Routing Engine installed in the JCS chassis.
<b>Options</b>	<p><code>-T system</code>—Display the media tray owner.</p> <p><code>-b n</code>—(Optional) Configure which Routing Engine controls (owns) the media tray. Replace <i>n</i> with a value of <b>1</b> through <b>12</b> to indicate the slot number of the Routing Engine to which you want to assign control of the media tray.</p>
<b>Required Privilege Level</b>	operator (display) supervisor (display or configure)
<b>Related Topics</b>	■ Troubleshooting a Routing Engine on the JCS 1200 Platform on page 209
<b>List of Sample Output</b>	mt (Configure) on page 71 mt (Display) on page 71
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.
<b>mt (Configure)</b>	<pre>system:mm[1]&gt; mt -T system -b 12 OK</pre>
<b>mt (Display)</b>	<pre>system:mm[1]&gt; mt -T system -b 12</pre>

**ntp**

<b>Syntax</b>	<code>ntp -T system:mm[x] &lt;-en (enabled   disabled)&gt; &lt;-i ip-address   hostname&gt; &lt;-f update-frequency&gt; &lt;-synch&gt;</code>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS management module CLI) Configure or display the JCS management module network time protocol (NTP) settings.
<b>Options</b>	<p><code>-T system:mm[x]</code>—Specify a JCS management module as the command target. Replace <i>x</i> with the primary management module number (1 or 2). The JCS management module is the only valid target available for this command.</p> <p><code>-en (enabled   disabled)</code>—(Optional) Enable or disable NTP for the JCS management module.</p> <p><code>-i ip-address   hostname</code>—(Optional) IP address or hostname of the NTP server.</p> <p><code>-f update-frequency</code>—(Optional) Update frequency (in minutes). The JCS management module clock is automatically updated at the frequency specified. Replace <i>update-frequency</i> with a value from 1 through 45000.</p> <p><code>-synch</code>—(Optional) Synchronize the JCS management module clock with the NTP server.</p>
<b>Required Privilege Level</b>	operator (display) supervisor (display or configure)
<b>Related Topics</b>	■ Configuring the NTP Server on page 44
<b>List of Sample Output</b>	ntp (Display) on page 73 ntp (Configure) on page 73
<b>Output Fields</b>	Table 15 on page 72 lists the output fields for the <b>ntp</b> command. Output fields are listed in the approximate order in which they appear.

**Table 15: 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.



**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**

<b>Syntax</b>	<code>snmp -T system:mm[x] &lt;-cax community-type&gt; &lt;-cx community-name&gt; &lt;-cxin (ip-address   hostname)&gt; &lt;-cn contact-name&gt; &lt;-l location&gt;</code>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS 1200 platform only) Display or configure SNMP settings on the JCS management module.
<b>Options</b>	<p><code>-T system:mm[x]</code>—Specify the JCS management module as the target of the command. Replace <i>x</i> with a value of <b>1</b> or <b>2</b>.</p> <p><code>-cax community-type</code>—(Optional) Specify an SNMPv3 view type for the community. View types can be <b>get</b>, <b>set</b>, or <b>trap</b>. Replace <i>x</i> with a value of <b>1</b> through <b>3</b> to represent the community number.</p> <p><code>-cx community-name</code>—(Optional) Specify a descriptive name for the community. Replace <i>x</i> with a value of <b>1</b> through <b>3</b> to represent the community number.</p> <p><code>-cxin (ip-address   hostname)</code>—(Optional) Specify an IP address or hostname for the community. Replace <i>x</i> with a value of <b>1</b> through <b>3</b> to represent the community number. Replace <i>n</i> with a value of <b>1</b> through <b>3</b> to represent the host ranking (first, second, or third). You can specify up to three hosts for each community.</p> <p><code>-cn contact-name</code>—(Optional) Specify a contact name for the SNMP community host server.</p> <p><code>-l location</code>—(Optional) Specify a location for the SNMP community host server.</p>
<b>Required Privilege Level</b>	operator (display) supervisor (display or configure)
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Configuring SNMP Traps on page 48</li> <li>■ alertentries on page 54</li> <li>■ monalerts on page 69</li> </ul>
<b>List of Sample Output</b>	<p><code>snmp</code> (Display) on page 75</p> <p><code>snmp</code> (Configure) on page 75</p>
<b>Output Fields</b>	Table 16 on page 74 lists the output fields for the <code>snmp</code> command. Output fields are listed in the approximate order in which they appear.

**Table 16: snmp Output Fields**

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

**Table 16: snmp Output Fields** *(continued)*

Field Name	Field Description
<i>cx</i>	Descriptive name for the community
<i>cxin</i>	IP address and ranking of the community host
<i>cn</i>	Contact name for the SNMP community host server
<i>-l</i>	Location of the SNMP community host server

**snmp (Display)**    system> snmp -T system:mm[1]  
To be provided.

**snmp (Configure)**    system> snmp -T system:mm[1] -cal trap -cl Traps -c3i1 192.168.171.100  
OK

**sshcfg**

<b>Syntax</b>	<code>sshcfg -T system:mm[x] &lt;-cstatus (enabled   disabled)&gt; &lt;-hk (rsa   dsa   gen)&gt; &lt;-v1 (on   off)&gt;</code>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS 1200 platform only) Display or configure SSH access on the JCS management module.
<b>Options</b>	<p><code>-T system:mm[x]</code>—Specify the JCS management module as the target of the command. Replace x with a value of 1 or 2.</p> <p><code>-cstatus (enabled   disabled)</code>—(Optional) Enable or disable the SSH server on the JCS management module.</p> <p><code>-hk gen</code>—(Optional) Generate a host key for the JCS management module.</p> <p><code>-hk (rsa   dsa)</code>—(Optional) Display RSA or DSA host key information for the JCS management module.</p> <p><code>-v1 (on   off)</code>—(Optional) Enable or disable SSH v1 on the JCS management module. (SSH v2 is always enabled.)</p>
<b>Required Privilege Level</b>	operator (display) supervisor (display or configure)
<b>Related Topics</b>	■ <a href="#">Configuring SSH Access on page 46</a>
<b>List of Sample Output</b>	<code>sshcfg</code> (Display) on page 77 <code>sshcfg</code> (Configure) on page 77
<b>Output Fields</b>	Table 17 on page 76 lists the output fields for the <code>sshcfg</code> command. Output fields are listed in the approximate order in which they appear.

**Table 17: 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.
ssh-dss	DSS fingerprint for the SSH server. This fingerprint is used to verify the authenticity of the server.

**Table 17: sshcfg Output Fields** *(continued)*

Field Name	Field Description
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.

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

<b>Syntax</b>	<code>users &lt;user-number&gt; (-n user-name -p user-password -a user-authority   -clear)</code>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS 1200 platform only) Display, configure, or clear user accounts on the JCS management module.
<b>Options</b>	<p><b>-user-number</b>—(Optional) Unique number assigned to the user. Replace <i>user-number</i> with a value from 1 through 12. If a user number is not specified, the command applies to all users.</p> <p><b>-n user-name</b>—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> <p><b>-p user-password</b>—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.</p> <p><b>-a user-authority</b>—Command authority assigned to the user. Valid values are <b>super</b> (supervisor) or <b>operator</b>. A supervisor has full read and write access. An operator has read access only.</p> <p><b>-clear</b>—Remove a user account.</p>
<b>Required Privilege Level</b>	supervisor
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Configuring JCS 1200 Platform User Accounts on page 42</li> </ul>
<b>List of Sample Output</b>	<p>users (Display All Users) on page 79</p> <p>users (Configure a User Account) on page 79</p> <p>users (Clear a User Account) on page 79</p> <p>users (Clear All User Accounts) on page 79</p>
<b>Output Fields</b>	Table 18 on page 78 lists the output fields for the <b>users</b> command. Output fields are listed in the approximate order in which they appear.

**Table 18: users Output Fields**

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

Table 18: users Output Fields (continued)

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

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





## **Part 3**

# **Configuring the JUNOS Software**

- Configuring an RSD and Creating PSDs on page 83
- Configuring Basic System Properties on a New PSD on page 87
- Configuring Shared Interfaces on page 93
- Summary of JUNOS Configuration Statements on page 101



## Chapter 8

# Configuring an RSD and Creating PSDs

- System Domains Configuration Hierarchy on page 83
- Configuring an RSD and Creating PSDs on page 84

### System Domains Configuration Hierarchy

---

Using the JUNOS 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 {
  root-domain-id root-domain-id;
  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 ];
  }
}
```

- Related Topics**
- Protected System Domain Overview on page 5
  - Configuring an RSD and Creating PSDs on page 84

## 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 routing platform and Routing Engines from the JCS 1200 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** on page 56.

1. Log in to the master Routing Engine on the T-series routing platform.
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** *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 psdn]** 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 Software Release 9.2, supported values for *slot-numbers* are 0 through 7.

- **control-system-id** *control-system-id*—Assign an ID to the JCS 1200 platform. The value for *control-system-id* can be 1 through 3.

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 JCS 1200 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 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** on page 56.

- Related Topics**
- Protected System Domain Overview on page 5
  - System Domains Configuration Hierarchy on page 83
  - Example: Configuring a JCS 1200 Platform and a Single T-series Router on page 111
  - Example: Configuring a JCS 1200 Platform and Multiple T-series Routers on page 116



## Chapter 9

# Configuring Basic System Properties on a New PSD

- Configuring a PSD with a Single Routing Engine on page 87
- Configuring a PSD with Redundant Routing Engines on page 90

### 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 software command-line interface (CLI):

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

4. Enter JUNOS software 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. Optionally, display the configuration statements:

```
[edit]
root# show
system {
  host-name host-name;
  domain-name domain-name;
  backup-router address;
  root-authentication {
    (encrypted-password "password" | public-key);
```



```

ssh-rsa "public-key";
ssh-dsa "public-key";
}
name-server {
  address;
}
interfaces {
  fxp0 {
    unit 0 {
      family inet {
        address address;
      }
    }
  }
  fxp1 {
    unit 0 {
      family inet {
        address address;
      }
    }
  }
}
}

```

12. 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 software defaults are now set on the routing platform.

If you want to configure additional JUNOS software 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.

13. Exit from the JUNOS software configuration mode.

```

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

```

14. 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 JCS 1200 platform. When the cable is unplugged from the Routing Engine, the user is not logged out of the console session.

- Related Topics**
- Protected System Domain Components on page 16
  - Configuring an RSD and Creating PSDs on page 84
  - Configuring a PSD with Redundant Routing Engines on page 90

## Configuring a PSD with Redundant Routing Engines

To initially configure a PSD with redundant Routing Engines:

1. See “Configuring a PSD with a Single Routing Engine” on page 87 and follow Step 1 through Step 4 to initially configure the backup Routing Engine.
2. Instead of Step 5 and Step 7 in “Configuring a PSD with a Single Routing Engine” on page 87, 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
```

3. Configure the routing platform's domain name:

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

4. 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
```

5. 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]
```

6. 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
```

7. Save the configuration change on both Routing Engines:

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

8. Continue with Step 8 through Step 11 in “Configuring a PSD with a Single Routing Engine” on page 87.
9. 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 JCS 1200 platform. When the cable is unplugged from the Routing Engine, the user is not logged out of the console session.

---

- Related Topics**
- Protected System Domain Components on page 16
  - Configuring an RSD and Creating PSDs on page 84
  - Configuring a PSD with a Single Routing Engine on page 87

## Chapter 10

# Configuring Shared Interfaces

- Interfaces Hierarchy on page 93
- Configuring Shared Interfaces on page 94

### 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`] hierarchy level and `interface-shared-with` at the [edit interfaces `so-fpc/pic/slot unit logical-unit-number`] hierarchy level. For detailed information about all other configuration statements under the [edit interfaces] hierarchy, see the *JUNOS Network Interfaces Configuration Guide*.

```
interfaces {
  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;
      }
    }
  }
  ut-fpc/pic/slot {
    unit logical-unit-number {
      peer-interface interface-name;
    }
  }
}
```

#### Related Topics

- Shared Interfaces Overview on page 6
- Configuring Shared Interfaces on the RSD on page 95
- Configuring Shared Interfaces on a PSD on page 96

## Configuring Shared Interfaces

---

- Before You Configure Shared Interfaces on page 94
- Configuring Shared Interfaces on the RSD on page 95
- Configuring Shared Interfaces on a PSD on page 96
- Configuring Firewall Filters on Shared Interfaces on page 98
- Configuring CoS Features on Shared Interfaces on page 99

### Before You Configure Shared Interfaces

Before you configure shared interfaces, remember that on the Root System Domain (RSD), you configure the physical SONET 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 SONET 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:

- Frame Relay encapsulation must be configured on the physical SONET interface in both the RSD and PSD.
- The same maximum transmission unit (MTU) size must be used on the physical SONET interface 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 SONET interface (`so-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.
- The same data-link connection identifier (DLCI) must be specified on the logical SONET interface 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 configuration and in the PSD configuration.

#### Related Topics

- Shared Interfaces Overview on page 6
- Interfaces Hierarchy on page 93
- Configuring Shared Interfaces on the RSD on page 95
- Configuring Shared Interfaces on a PSD on page 96
- Example: Configuring Shared Interfaces on page 125

## Configuring Shared Interfaces on the RSD

To configure shared interfaces on the RSD:

1. Configure the physical SONET interface using the `so-fpc/pic/slot` statement at the `[edit interfaces]` hierarchy level.
2. Configure Frame Relay encapsulation using the `encapsulation frame-relay` statement at the `[edit interfaces so-fpc/pic/slot]` hierarchy level.
3. Configure logical SONET interfaces under the physical interface using the `unit logical-unit-number` statement at the `[edit interfaces so-fpc/pic/slot]` hierarchy level.
4. For each logical SONET interface, including the following statements at the `[edit interfaces so-fpc/pic/slot.logical-unit-number]` hierarchy level:
  - `dlci dlci-identifier`—Assign a data-link connection identifier (DLCI) for the point-to-point Frame Relay connection between the RSD and the PSD.
  - `interface-shared-with psdn`—Assign 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;
    }
  }
}

```

- Related Topics**
- Shared Interfaces Overview on page 6
  - Before You Configure Shared Interfaces on page 94
  - Interfaces Hierarchy on page 93
  - Configuring Shared Interfaces on a PSD on page 96
  - Example: Configuring Shared Interfaces on page 125

## Configuring Shared Interfaces on a PSD

To configure shared interfaces on a PSD:

1. Configure the physical SONET interface with Frame Relay encapsulation using the `so-fpc/pic/slot` statement at the `[edit interfaces]` hierarchy level.
2. Identify the physical SONET interface as a shared interface using the `shared-interface` statement at the `[edit interfaces so-fpc/pic/slot]` hierarchy level.
3. Configure logical SONET interfaces under the physical interface using the `unit logical-unit-number` statement at the `[edit interfaces so-fpc/pic/slot]` hierarchy level. The values for `logical-unit-number` must match the values set in the RSD configuration.
4. For each logical SONET interface, include the following statements at the `[edit interfaces so-fpc/pic/slot unit logical-unit-number]` hierarchy level:
  - a. `dlci dlci-identifier`—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.
  - b. `peer-interface interface-name`—Configure the logical tunnel peer interface that is bound to the logical SONET interface.
  - c. `family family`—Configure the protocol family for the logical SONET interface.
5. Configure the IP address of the logical SONET interface using the `address address` statement at the `[edit interfaces so-fpc/pic/slot unit logical-unit-number family family]` hierarchy level.
6. Configure the physical tunnel interface using the `ut-fpc/pic/slot` statement at the `[edit interfaces]` hierarchy level.
7. Configure the logical tunnel interfaces using the `unit logical-unit-number` statement at the `[ut-fpc/pic/slot]` hierarchy level.
8. For each logical tunnel interface, specify the logical peer interface on the SONET PIC using the `peer-interface` statement at the `[ut-fpc/pic/slot unit logical-unit-number]` hierarchy level.

**PSD1** In the following example, the logical SONET interface `so-0/0/0.0` is peered with the 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;
        }
    }
}

```

**PSD2** In the following example, the logical SONET interface **so-0/0/0.2** is peered with the 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;
        }
    }
}

```

- Related Topics**
- Shared Interfaces Overview on page 6
  - Before You Configure Shared Interfaces on page 94
  - Interfaces Hierarchy on page 93
  - Configuring Shared Interfaces on the RSD on page 95
  - Example: Configuring Shared Interfaces on page 125

## 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 and the filter is applied to the entire logical interface (as opposed to a protocol family under the interface.) With JUNOS Release 9.3, only output filters are supported.

To configure a firewall filter, 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.

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 *JUNOS Policy Framework Configuration Guide*.

- Related Topics**
- Shared Interfaces Overview on page 6
  - Configuring Shared Interfaces on the RSD on page 95
  - Configuring Shared Interfaces on a PSD on page 96
  - Configuring CoS Features on Shared Interfaces on page 99

## 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 on the RSD. If you issue this 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 Class of Service Configuration Guide*.

- Related Topics**
- Shared Interfaces Overview on page 6
  - Configuring Shared Interfaces on the RSD on page 95
  - Configuring Shared Interfaces on a PSD on page 96
  - Configuring Firewall Filters on Shared Interfaces on page 98

## Chapter 11

# Summary of JUNOS Configuration Statements

### control-plane-bandwidth-percent

---

<b>Syntax</b>	control-plane-bandwidth-percent <i>percent</i>
<b>Hierarchy Level</b>	[edit chassis system-domains protected-system-domain psdn]
<b>Release Information</b>	Statement introduced in JUNOS Release 9.2.
<b>Description</b>	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.
<b>Options</b>	<i>percent</i> —Percentage of bandwidth. The range of values is 1 to 100.
<b>Usage Guidelines</b>	See “Configuring an RSD and Creating PSDs” on page 84.
<b>Required Privilege Level</b>	view-level—To view this statement in the configuration. control-level—To add this statement to the configuration.
<b>Related Topics</b>	■ Configuring an RSD and Creating PSDs on page 84

## control-slot-numbers

---

<b>Syntax</b>	control-slot-numbers [ <i>slot-numbers</i> ];
<b>Hierarchy Level</b>	[edit chassis system-domains protected-system-domains psdn]
<b>Release Information</b>	Statement introduced in JUNOS Release 9.1.
<b>Description</b>	Configure the slot numbers for the Routing Engines on the JCS 1200 platform that are part of the specified Protected System Domain (PSD).
<b>Options</b>	<i>slot-numbers</i> —Slot numbers for the Routing Engines on the JCS 1200 platform to be assigned to the PSD. <b>Range:</b> 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 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.

---

<b>Usage Guidelines</b>	See “Configuring an RSD and Creating PSDs” on page 84.
<b>Required Privilege Level</b>	view-level—To view this statement in the configuration. control-level—To add this statement to the configuration.
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Configuring an RSD and Creating PSDs on page 84</li> <li>■ baydata on page 56</li> </ul>

## control-system-id

---

<b>Syntax</b>	<code>control-system-id</code> <i>control-system-id</i> ;
<b>Hierarchy Level</b>	[edit chassis system-domains protected-system-domains psdn]
<b>Release Information</b>	Statement introduced in JUNOS Release 9.1.
<b>Description</b>	Configure the JCS 1200 platform identification.
<b>Options</b>	<i>control-system-id</i> —ID value for the JCS 1200 platform. <b>Range:</b> 1 through 3
<b>Usage Guidelines</b>	See “Configuring an RSD and Creating PSDs” on page 84.
<b>Required Privilege Level</b>	view-level—To view this statement in the configuration. control-level—To add this statement to the configuration.
<b>Related Topics</b>	<ul style="list-style-type: none"><li>■ Configuring an RSD and Creating PSDs on page 84</li><li>■ baydata on page 56</li></ul>

## description

---

<b>Syntax</b>	<code>description <i>description</i>;</code>
<b>Hierarchy Level</b>	[edit chassis system-domains protected-system-domains psd <i>n</i> ]
<b>Release Information</b>	Statement introduced in JUNOS Release 9.1.
<b>Description</b>	Provide a description for the specified Protected System Domain (PSD).
<b>Options</b>	<i>description</i> —Description for the PSD.
<b>Usage Guidelines</b>	See “Configuring an RSD and Creating PSDs” on page 84
<b>Required Privilege Level</b>	view-level—To view this statement in the configuration. control-level—To add this statement to the configuration.
<b>Related Topics</b>	■ Configuring an RSD and Creating PSDs on page 84

## fpcs

---

<b>Syntax</b>	<code>fpcs [ <i>slot-numbers</i> ];</code>
<b>Hierarchy Level</b>	[edit chassis system-domains protected-system-domains psd <i>n</i> ]
<b>Release Information</b>	Statement introduced in JUNOS Release 9.1.
<b>Description</b>	Assign Flexible PIC Concentrators (FPCs) to a Protected System Domain (PSD).
<b>Options</b>	<i>slot-numbers</i> —Slot numbers for the FPCs to be assigned to the PSD. <b>Range:</b> For JUNOS Release 9.2, supported values are 0 through 7.
<b>Usage Guidelines</b>	See “Configuring an RSD and Creating PSDs” on page 84.
<b>Required Privilege Level</b>	view-level—To view this statement in the configuration. control-level—To add this statement to the configuration.
<b>Related Topics</b>	■ Configuring an RSD and Creating PSDs on page 84



## interface-shared-with

---

<b>Syntax</b>	interface-shared-with psdn;
<b>Hierarchy Level</b>	[edit interfaces <i>so-fpc/pic/slot</i> unit <i>logical-unit-number</i> ]
<b>Release Information</b>	Statement introduced in JUNOS Release 9.3.
<b>Description</b>	Assign a logical interface under a shared physical interface to a Protected System Domain (PSD).
<b>Options</b>	<i>n</i> —PSD identification as a numeric value. <b>Range:</b> 1 through 31.
<b>Usage Guidelines</b>	<ul style="list-style-type: none"> <li>■ Configuring Shared Interfaces on the RSD on page 95</li> <li>■ Configuring Shared Interfaces on a PSD on page 96</li> </ul>
<b>Required Privilege Level</b>	view-level—To view this statement in the configuration. control-level—To add this statement to the configuration.
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ shared-interface</li> </ul>

## protected-system-domains

---

<b>Syntax</b>	protected-system-domains psdn { control-plane-bandwidth-percent <i>percent</i> description <i>description</i> ; fpcs [ <i>slot-numbers</i> ]; control-system-id <i>control-system-id</i> ; control-slot-numbers [ <i>slot-numbers</i> ]; }
<b>Hierarchy Level</b>	[edit chassis system-domains]
<b>Release Information</b>	Statement introduced in JUNOS Release 9.1.
<b>Description</b>	Configure the Protected System Domain (PSD) identification.
<b>Options</b>	psdn—PSD identification as a numeric value. <b>Range:</b> The range values is 1 through 31.  The remaining statements are described separately.
<b>Usage Guidelines</b>	See “Configuring an RSD and Creating PSDs” on page 84.
<b>Required Privilege Level</b>	view-level—To view this statement in the configuration. control-level—To add this statement to the configuration.
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Configuring an RSD and Creating PSDs on page 84</li> </ul>

## root-domain-id

---

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

**Hierarchy Level** [edit chassis system-domains]

**Release Information** Statement introduced in JUNOS Release 9.1.

**Description** Configure the Root System Domain (RSD) ID.

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



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

---

**Usage Guidelines** See “Configuring an RSD and Creating PSDs” on page 84.

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

**Related Topics**

- Configuring an RSD and Creating PSDs on page 84
- baydata on page 56

## shared-interface

---

<b>Syntax</b>	shared-interface;
<b>Hierarchy Level</b>	[edit interfaces <i>so-fpc/pic/slot</i> ]
<b>Release Information</b>	Statement introduced in JUNOS Release 9.3.
<b>Description</b>	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).
<b>Options</b>	This statement has no options.
<b>Usage Guidelines</b>	<ul style="list-style-type: none"><li>■ Configuring Shared Interfaces on the RSD on page 95</li><li>■ Configuring Shared Interfaces on a PSD on page 96</li></ul>
<b>Required Privilege Level</b>	view-level—To view this statement in the configuration. control-level—To add this statement to the configuration.
<b>Related Topics</b>	<ul style="list-style-type: none"><li>■ interface-shared-with</li></ul>

## system-domains

---

**Syntax**    system-domains {  
                   root-domain-id *root-domain-id*;  
                   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* ];  
                   }  
                 }

**Hierarchy Level**    [edit chassis]

**Release Information**    Statement introduced in JUNOS Release 9.1.

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

**Options**    All statements are described separately.

**Usage Guidelines**    See “Configuring an RSD and Creating PSDs” on page 84.

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

**Related Topics**    ■    Configuring an RSD and Creating PSDs on page 84

## **Part 4**

# **Configuration Examples**

- Configuration Examples on page 111



## Chapter 12

# Configuration Examples

- Example: Configuring a JCS 1200 Platform and a Single T-series Router on page 111
- Example: Configuring a JCS 1200 Platform and Multiple T-series Routers on page 116
- Example: Configuring Shared Interfaces on page 125
- Example: Consolidating a Layer 2 VPN Network on page 136

### Example: Configuring a JCS 1200 Platform and a Single T-series Router

---

In this configuration example, the JCS 1200 platform is connected to a single T640 routing node. The configuration is described in the following sections:

- Requirements on page 111
- Overview on page 111
- Configuration on page 112
- Verification on page 114

#### Requirements

This configuration example requires the following hardware and software components:

- JUNOS Release 9.1 or later
- JCS 1200 platform with Routing Engines in slots 1, 2, 3, and 4
- T640 routing node with FPCs in slots 0, 1, 2, and 3

#### Overview

This example configures the JCS 1200 platform and one connected T640 routing node. 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 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 routing node
- PSD2—Routing Engines in slots 3 and 4 on the JCS chassis and the FPC in slot 3 on the T640 routing node

## Configuration

First, configure the Routing Engines on the JCS 1200 platform using the management module CLI. Then, configure the T640 routing node using the JUNOS CLI.

### JCS 1200 Platform Configuration

**Step-by-Step Procedure** To configure the parameters required for the Routing Engines in the JCS chassis:

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

**Step-by-Step Procedure** To configure the RSD and create the PSDs on the T640 routing node:

1. At the [edit chassis system-domains] hierarchy level of the JUNOS 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 JCS 1200 platform.
  - c. Include the `control-slot-numbers 1 control-slot-numbers 2` statement to assign the Routing Engines in slot 1 and slot 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 JCS 1200 platform.
  - c. Include the `control-slot-numbers 3 control-slot-numbers 4` statement to assign the Routing Engines in slot 3 and slot 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 114
- Verifying PSD Hardware on page 114

### 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 routing node and the appropriate Routing Engines on the JCS 1200 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 Topics** ■ Configuring an RSD and Creating PSDs on page 84

## Example: Configuring a JCS 1200 Platform and Multiple T-series Routers

In this configuration example, the JCS 1200 platform is connected to multiple T-series routing platforms. The configuration is described in the following sections:

- Requirements on page 117
- Overview on page 117

- Configuration on page 117
- Verification on page 123

**Requirements**

This configuration example requires the following hardware and software components:

- JUNOS Release 9.2 or later
- JCS 1200 platform with Routing Engines in slots 1 through 12
- T320 router with FPCs in slots 0 through 7
- T640 routing node with FPCs in slots 0 through 7
- T1600 routing node with FPCs in slots 0 through 7

**Overview**

This example configures the JCS 1200 platform and three connected T-series routing platforms. For this example, you need to configure a Root System Domain (RSD) for each connected T-series routing platform. 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 JCS 1200 platform using the management module CLI. Then, configure each T-series routing platform using the JUNOS CLI.

**JCS 1200 Platform Configuration**

**Step-by-Step Procedure** To configure the parameters required for the Routing Engines in the JCS chassis:

1. Log into the JCS management module.
2. Refer to the data presented in Table 19 on page 117 for Routing Engine assignments.

**Table 19: 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	

**Table 19: JCS Chassis Routing Engine Assignments** *(continued)*

RSD ID	PSD ID	Primary Routing Engine	Backup Routing Engine	Routing Platform
3	5	09	10	T1600
	6	11	12	

- 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 belongs 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"
```

- Assign the Routing Engines in slots 5 (primary) and 6 (backup) to RSD2 and PSD3, which are associated with the T640 routing node. Assign the Routing Engines in slots 7 (primary) and 8 (backup) to RSD2 and PSD4, which also belongs to the T640 routing node.

```
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"
```

- Assign the Routing Engines in slots 9 (primary) and 10 (backup) to RSD3 and PSD5, which are associated with the T1600 routing node. Assign the Routing Engines in slots 11 (primary) and 12 (backup) to RSD3 and PSD6, which also belongs to the T1600 routing node.

```
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 into the T320 router.
2. Configure RSD1 and the parameters specified in Table 20 on page 119.

**Table 20: 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 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 JCS 1200 platform.
  - c. Include the `control-slot-numbers 1 control-slot-numbers 2` statement to assign the Routing Engines in slot 1 and slot 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 JCS 1200 platform.
  - c. Include the `control-slot-numbers 3 control-slot-numbers 4` statement to assign the Routing Engines in slot 3 and slot 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 Routing Node Configuration

**Step-by-Step Procedure** To configure the RSD and create the PSDs on the T640 routing node:

1. Log into the T640 router.
2. Configure RSD2 and the parameters specified in Table 21 on page 121.

**Table 21: 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 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 JCS 1200 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 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 JCS 1200 platform.
  - c. Include the `control-slot-numbers 7 control-slot-numbers 8` statement to assign the Routing Engines in slot 7 and slot 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 Routing Node Configuration

**Step-by-Step Procedure** To configure the RSD and create the PSDs on the T1600 routing node:

1. Log into the T1600 routing node.
2. Configure RSD3 and the parameters specified in Table 22 on page 122.

**Table 22: 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 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 JCS 1200 platform.
  - c. Include the `control-slot-numbers 9 control-slot-numbers 10` statement to assign the Routing Engines in slot 9 and slot 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 JCS 1200 platform.
  - c. Include the `control-slot-numbers 11 control-slot-numbers 12` statement to assign the Routing Engines in slot 11 and slot 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 ];
    }
  }
}
```

## Verification

- Verifying Configured PSDs on page 123
- Verifying PSD Ownership of FPCs on page 124
- Verifying PSD Ownership of Routing Engines on page 124

### Verifying Configured PSDs

**Purpose** Verify that the PSDs configured under each RSD are online.

**Action** 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 routing platform.

**Action** For each PSD, issue the **show chassis fpc** command. For example:

user@psd1> **show chassis fpc**

rsd-re0:

Slot	State	Temp (C)	CPU Utilization (%)	Memory Utilization (%)
			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 routing platform.

### 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	3328 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	3328 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 Topics** ■ [Configuring an RSD and Creating PSDs on page 84](#)

**Example: Configuring Shared Interfaces**

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 on page 125](#)
- [Overview on page 126](#)
- [Configuration on page 126](#)
- [Verification on page 132](#)

**Requirements**

This configuration example requires the following hardware and software components:

- JUNOS Release 9.3 or later
- JCS 1200 platform with Routing Engines in slots 5, 6, and 7
- T640 router with FPCs in slots 1 through 7

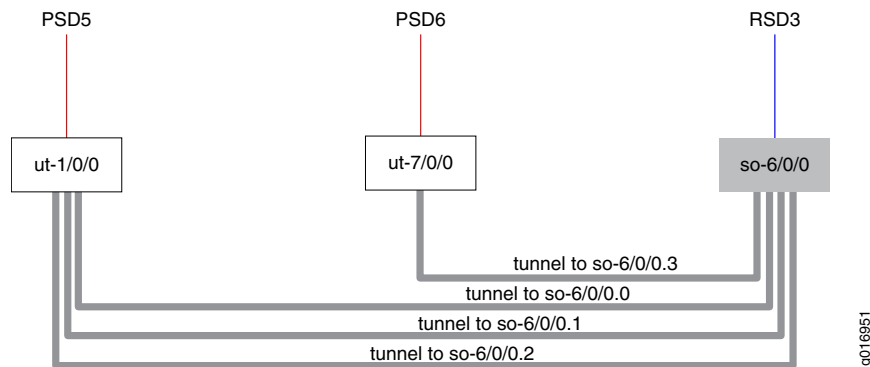
- Two Tunnel PICs—one installed on the FPC in slot 1 and the other installed on the FPC in slot 7
- One SONET PIC installed on the FPC in slot 6

## Overview

With this example configuration, Protected System Domain 5 (PSD5) and PSD6 can both transport packets using a single SONET PIC owned by Root System Domain 3 (RSD3).

As illustrated in Figure 10 on page 126, RSD3 owns the physical interface (**so-6/0/0**). PSD5 owns the logical interfaces **so-6/0/0.0**, **so-6/0/0.1**, and **so-6/0/0.2**. A cross-connect using the 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 10: Example: Shared Interfaces**



## Configuration

First, configure the Routing Engines on the JCS 1200 platform using the management module command-line interface (CLI). Then, configure each T-series routing platform using the JUNOS CLI.

### JCS 1200 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 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 JCS 1200 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 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 JCS 1200 platform.
  - c. Include the `control-slot-numbers 3 control-slot-numbers 4` statement to assign the Routing Engines in slot 3 and slot 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 psdn`—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

**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 on page 132
- Verifying Shared Interfaces on PSD5 on page 134
- Verifying Shared Interfaces on PSD6 on page 135

### 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 Topics**
- Configuring Shared Interfaces on the RSD on page 95
  - Configuring Shared Interfaces on a PSD on page 96

## 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 136
- Overview and Topology on page 136
- Configuration on page 137
- Verification on page 147

### Requirements

This example requires the following hardware and software components:

- JUNOS Release 9.1 or later
- One JCS 1200 platform with Routing Engines in slots 4, 5, and 6
- One T640 routing node with FPCs in slots 4 and 5

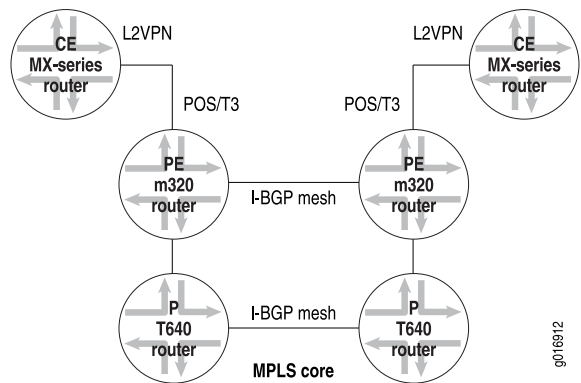
### Overview and Topology

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.



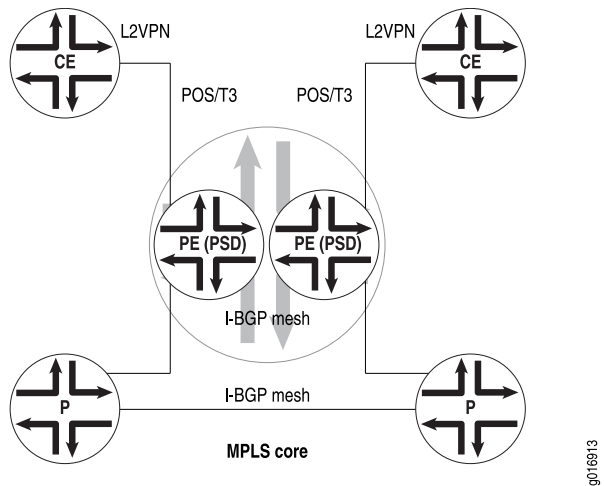
Figure 11 on page 137 illustrates a typical Layer 2 VPN topology, with T640 routers as P routers, M320 routers as PE routers, and MX-series Ethernet Services routers as CE routers. The service provider uses a separate PE router for each customer.

**Figure 11: Typical Layer 2 VPN Network Topology**



By replacing the two M320 routers with the JCS 1200 chassis interconnected with the T640 routing node, 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 12 on page 137.

**Figure 12: Consolidated Layer 2 VPN Network Topology**



**Configuration**

Table 23 on page 138 provides the chassis parameters required for the JCS 1200 platform and the T640 routing node for each PSD.

**Table 23: Chassis Parameters**

PSD	JCS 1200 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.

### JCS 1200 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 routing node.
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 Release 9.1 supports only the value of **01**.
- **JCS01**—JCS platform identifier of **01**. JUNOS 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 routing node.

- 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 routing node.

**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 routing node:

1. At the [edit chassis system-domains] hierarchy level of the JUNOS 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 JCS 1200 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 JCS 1200 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 routing node 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 routing node 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 148
- Verifying PSD Hardware on page 148

- Verifying PSD Routing Engine Information on page 149
- Verifying PSD Ethernet Switch Statistics on page 151

### 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&gt; 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                   3328 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                   3328 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                   3328 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                 397317669
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 Topics** ■ Configuring an RSD and Creating PSDs on page 84

## **Part 5**

# **Managing the JCS 1200 Platform**

- Managing the JCS 1200 Platform on page 157
- Summary of JCS Management Module Monitoring Commands on page 167



## Chapter 13

# Managing the JCS 1200 Platform

- JCS Management Module Verification Tasks on page 157
- Displaying Vital Product Data on page 158
- Clearing the Event Log on page 160
- Displaying the Event Log on page 160
- Displaying Power Domain Information on page 161
- Displaying System Component Status on page 162
- Displaying a List of Components on page 163
- Displaying Temperature Information on page 164
- Displaying Voltage Information on page 165

### JCS Management Module Verification Tasks

Table 24 on page 157 lists some JCS management module verification tasks useful for monitoring JCS operations.

**Table 24: 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 158
Event log	Display (or clear) the contents of the event log—including user access events.	“Clearing the Event Log” on page 160 “Displaying the Event Log” on page 160
Power domains	Display power domain information.	“Displaying Power Domain Information” on page 161
System component status	Display the status of all system components.	“Displaying System Component Status” on page 162
System configuration	Display the system configuration list.	“Displaying a List of Components” on page 163
Temperature	Display component temperature values and ranges.	“Displaying Temperature Information” on page 164

**Table 24: 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 165
<b>Related Topics</b> <ul style="list-style-type: none"> <li>■ Configuring the JCS Management Module on page 39</li> <li>■ JUNOS Verification Tasks on page 195</li> </ul>		

## 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 JCS 1200 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 JCS 1200 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 Topics**
- JCS 1200 Platform Hardware Components on page 13
  - info on page 177

## Clearing the Event Log

---

**Purpose** The event log stores events that occur on the JCS 1200 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 Topics**
- `clearlog` on page 169
  - `displaylog` on page 170

## Displaying the Event Log

---

**Purpose** The JCS software generates event log messages to record events that occur on the JCS 1200 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 JCS 1200 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 Topics**
- clearlog on page 169
  - displaylog on page 170

## 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 through 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 Topics** ■ [fuelg on page 172](#)

## Displaying System Component Status

**Purpose** You can display the current health status for the JCS 1200 platform to determine if a system components are operating property. For each component, health status can be:

- Ok
- Warning
- Critical

**Action** Display health status for the JCS 1200 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 JCS 1200 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 Topics** ■ health on page 174

## 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 Topics**
- JCS 1200 Platform Hardware Components on page 13
  - list on page 180

## 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 Topics** ■ temps on page 187

## 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 Topics** ■ volts on page 189



## Chapter 14

# Summary of JCS Management Module Monitoring Commands



**NOTE:** The JCS management module CLI provides a large number of commands and command options. This section describes only the subset of commands and command options that we recommend for monitoring the JCS 1200 platform in a Juniper Networks environment.

---

## boot

---

<b>Syntax</b>	boot -T system:blade[x]
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS management module CLI) Perform an immediate reset and restart of a specified Routing Engine (blade).
<b>Options</b>	-T system:blade[x]—Specify the Routing Engine to boot. Replace x with the Routing Engine slot number (1 through 12)
<b>Required Privilege Level</b>	supervisor
<b>Related Topics</b>	<ul style="list-style-type: none"><li>■ Getting Help on JCS Commands on page 35</li><li>■ power on page 182</li></ul>
<b>List of Sample Output</b>	boot on page 168
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.
<b>boot</b>	system> boot -T system:blade[10] OK



## clearlog

---

<b>Syntax</b>	clearlog -T system:mm[x]
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS management module CLI) Clear the JCS management module event log to remove existing events.
<b>Options</b>	-T system:mm[x]—Specify the management module as the target of the command. Replace x with a value of 1 or 2.
<b>Required Privilege Level</b>	supervisor
<b>Related Topics</b>	<ul style="list-style-type: none"><li>■ Clearing the Event Log on page 160</li><li>■ displaylog on page 170</li></ul>
<b>List of Sample Output</b>	clearlog on page 169
<b>Output Fields</b>	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.
<b>clearlog</b>	system> <b>clearlog -T system:mm[1]</b> OK

## displaylog

---

<b>Syntax</b>	displaylog -T system:mm[x] <-a> <-date <i>date-filter</i> > <-sev <i>severity-filter</i> > <-src <i>source-filter</i> >
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS management module CLI) Display the JCS management module event log entries.
<b>Options</b>	<p>-T <i>system:mm[x]</i>—Specify the management module as the target of the command. Replace <i>x</i> with a value of 1 or 2.</p> <p>-a—(Optional) Display all entries in the JCS management module event log. By default, the <b>displaylog</b> command displays only the first five entries in the log.</p> <p>-date <i>date-filter</i>—(Optional) Display all entries in the JCS management module event log that meet the date filter criteria. Replace <i>date-filter</i> with a list of dates in <i>mm/dd/yy</i> 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.</p> <p>-sev <i>severity-filter</i>—(Optional) Display all entries in the JCS management module event log that meet the severity filter criteria. Replace <i>severity-filter</i> with a list of severities. Use the pipe symbol ( ) to separate severities in the list. Severities you can specify include:</p> <ul style="list-style-type: none"> <li>■ I—information</li> <li>■ E—error</li> <li>■ W—warning</li> </ul> <p>For example, you can specify a -sev E W filter to show all error and warning events in the log.</p> <p>-src <i>source-filter</i>—(Optional) Display all entries in the JCS management module event log that meet the source filter criteria. Replace <i>source-filter</i> with a list of event sources. Use the pipe symbol ( ) to separate sources in the list. Sources you can specify include:</p> <ul style="list-style-type: none"> <li>■ blade_x—Routing Engine (blade). Replace <i>x</i> with a value of 01 through 12.</li> <li>■ blower_x—JCS fan (blower). Replace <i>x</i> with a value of 1 through 4.</li> <li>■ mm_x—JCS management module. Replace <i>x</i> with a value of 1 or 2.</li> <li>■ mt_x—JCS media tray. Replace <i>x</i> with a value of 1 or 2.</li> <li>■ power_x—JCS power supply. Replace <i>x</i> with a value of 1 through 4.</li> <li>■ switch_x—JCS switch module. Replace <i>x</i> with a value of 1 or 2.</li> </ul>
<b>Required Privilege Level</b>	supervisor
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Displaying the Event Log on page 160</li> <li>■ clearlog on page 169</li> </ul>

**List of Sample Output** displaylog (All Entries) on page 171  
displaylog (Filter by Severity) on page 171

**Output Fields** Table 25 on page 171 lists the output fields for the `displaylog` command. Output fields are listed in the approximate order in which they appear.

**Table 25: 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.

**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

<b>Syntax</b>	fuelg -T system:mm[x] <domain> <-qm (off   on)>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS management module CLI) Display or configure power domain information for power supplies on the JCS 1200 platform.
<b>Options</b>	<p>-T system:mm[x]—Specify the JCS management module as the target of the command. Replace x with a value of 1 or 2.</p> <p><i>domain</i>—(Optional) Display information for a specific power domain. Replace <i>domain</i> with <b>pd1</b> (power domain 1) or <b>pd2</b> (power domain 2). By default, power domain information is displayed for both power domains.</p> <p>The JCS 1200 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.</p> <p>-qm (on   off)—(Optional) Specify a thermal event response (quiet mode):</p> <ul style="list-style-type: none"> <li>■ off—Fans will increase speed to provide additional cooling.</li> <li>■ on—Fans will remain at fixed speed. Power is throttled (for components that support power throttling) to reduce power consumption and heat.</li> </ul>
<b>Required Privilege Level</b>	supervisor (configure) operator (display)
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Displaying Power Domain Information on page 161</li> </ul>
<b>List of Sample Output</b>	fuelg (Display) on page 173 fuelg (Configure) on page 173
<b>Output Fields</b>	Table 26 on page 172 lists the output fields for the <b>fuelg</b> command. Output fields are listed in the approximate order in which they appear.

**Table 26: 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 26: 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.

```

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

---

<b>Syntax</b>	<code>env -T target&lt;-l depth&gt; &lt;-f&gt;</code>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS management module CLI) Display the current health status of a device on the JCS 1200 platform.
<b>Options</b>	<p><code>-T target</code>—Specify the target of the command. Command targets include:</p> <ul style="list-style-type: none"> <li>■ <code>system:mm[x]</code>—JCS management module. Replace <code>x</code> with a value of 1 or 2.</li> <li>■ <code>system:switch[x]</code>—JCS switch module. Replace <code>x</code> with a value of 1 or 2.</li> <li>■ <code>system:blade[x]</code>—JCS Routing Engine (blade). Replace <code>x</code> with a value of 1 through 12.</li> <li>■ <code>system:power[x]</code>—JCS power supply. Replace <code>x</code> with a value of 1 through 4.</li> <li>■ <code>system:blower[x]</code>—JCS fan (blower). Replace <code>x</code> with a value of 1 through 4.</li> </ul> <p><code>-l depth</code>—(Optional) Display health status for a hierarchy of devices (starting with the device specified as the command target). Replace <code>depth</code> with one of the following values:</p> <ul style="list-style-type: none"> <li>■ <code>2   all   a</code>—Health status for the full hierarchy of devices (starting at the command target level). You can enter <code>a</code> as an abbreviation for <code>all</code>.</li> <li>■ <code>1</code>—Health status for the command target only.</li> </ul> <p><code>-f</code>—(Optional) Display health status and active alerts for the device specified as the command target.</p>
<b>Required Privilege Level</b>	operator
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Displaying System Component Status on page 162</li> </ul>
<b>List of Sample Output</b>	<p>health (All) on page 174</p> <p>health (Routing Engine) on page 175</p> <p>health (with Alerts) on page 175</p>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.
<b>health (All)</b>	<pre>system&gt; 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</pre>

```

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 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 Topics** ■ Getting Help on JCS Commands on page 35

**List of Sample Output** history on page 176  
history (Re-Entering a Command) on page 176

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

```

history 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 (Re-Entering a Command) system:mm[1]> !2

Enabled
-i1 192.168.70.29
-i2 0.0.0.0
-i3 0.0.0.0

```



**info**

<b>Syntax</b>	<code>info -T target</code>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS management module CLI) Display information about JCS hardware components and component configuration.
<b>Options</b>	<p><code>-T target</code>—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:</p> <ul style="list-style-type: none"> <li>■ <code>system:blade[x]</code>—Specify a Routing Engine as the command target. Replace <code>x</code> with the Routing Engine slot number (1 through 12)</li> <li>■ <code>system:blower[x]</code>—Specify a JCS fan module as the command target. Replace <code>x</code> with the fan module number (1 through 4).</li> <li>■ <code>system:mm[x]</code>—Specify a JCS management module as the command target. Replace <code>x</code> with the primary management module number (1 or 2).</li> <li>■ <code>system:mt[x]</code>—Specify a JCS media tray as the command target. Replace <code>x</code> with the media tray number (1 or 2).</li> <li>■ <code>system:mux[x]</code>—Specify a JCS MUX card as the command target. Replace <code>x</code> with the MUX card number (1 or 2).</li> <li>■ <code>system:power[x]</code>—Specify a JCS power module as the command target. Replace <code>x</code> with the power module number (1 through 4).</li> <li>■ <code>system:switch[x]</code>—Specify a JCS switch module as the command target. Replace <code>x</code> with the switch module number (1 or 2).</li> <li>■ <code>system:tap[x]</code>—Specify the JCS alarm panel as the command target.</li> </ul>
<b>Required Privilege Level</b>	operator
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Displaying Vital Product Data on page 158</li> </ul>
<b>List of Sample Output</b>	<p><code>info (System)</code> on page 178</p> <p><code>info (Management Module)</code> on page 178</p> <p><code>info (Routing Engine)</code> on page 179</p>
<b>Output Fields</b>	Table 27 on page 177 lists the output fields for the <code>info</code> command. Output fields are listed in the approximate order in which they appear.

**Table 27: 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.

**Table 27: info Output Fields** (*continued*)

Field Name	Field Description
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.

**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**

<b>Syntax</b>	<code>list -T <i>target</i> &lt;-l <i>depth</i>&gt;</code>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS management module CLI) List devices on the JCS 1200 platform. This information is useful for determining how many Routing Engines and JCS management modules are installed and which JCS management module is primary.
<b>Options</b>	<p><b>-T <i>target</i></b>—Specify a command target. Valid targets for this command include:</p> <ul style="list-style-type: none"> <li>■ <b>system:blade[x]</b>—Specify a Routing Engine as the command target. Replace <i>x</i> with the Routing Engine slot number (1 through 12)</li> <li>■ <b>system:blower[x]</b>—Specify a JCS fan (blower) as the command target.</li> <li>■ <b>system:mm[x]</b>—Specify a JCS management module as the command target. Replace <i>x</i> with the primary management module number (1 or 2).</li> <li>■ <b>system:power[x]</b>—Specify a JCS power module as the command target. Replace <i>x</i> with the power module number (1 through 4).</li> <li>■ <b>system:switch[x]</b>—Specify a JCS switch module as the command target. Replace <i>x</i> with the switch number (1 or 2).</li> </ul> <p>If no command target is specified, all devices on the JCS 1200 platform are listed.</p> <p><b>-l <i>depth</i></b>—(Optional) List a hierarchy of devices (starting with the device specified as the command target). Replace <i>depth</i> with one of the following values:</p> <ul style="list-style-type: none"> <li>■ <b>2   all   a</b>—List the full hierarchy of devices (starting at the command target level). You can enter <b>a</b> as an abbreviation for <b>all</b>.</li> <li>■ <b>1</b>—List the command target only.</li> </ul>
<b>Required Privilege Level</b>	operator
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Displaying a List of Components on page 163</li> </ul>
<b>List of Sample Output</b>	list (All) on page 180
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.
<b>list (All)</b>	<pre> system&gt; list -l a  mm[1] primary mm[2] standby power[1] power[2] power[3] power[4] blower[1] blower[2] </pre>

```
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**

---

<b>Syntax</b>	<code>power -T <i>target</i> (-on   -off   -cycle   -state)</code>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(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.
<b>Options</b>	<p><b>-T <i>target</i></b>—Specify the target of the <b>power</b> command. Valid targets for this command are:</p> <ul style="list-style-type: none"> <li>■ <b>system:blade[x]</b>—Specify a Routing Engine as the command target. Replace <i>x</i> with the Routing Engine slot number (1 through 12)</li> <li>■ <b>system:switch[x]</b>—Specify a JCS switch module as the command target. Replace <i>x</i> with the switch number (1 or 2).</li> </ul> <p><b>-on</b>—Turn on the specified Routing Engine or JCS switch module.</p> <p><b>-off</b>—Turn off the specified Routing Engine or JCS switch module.</p> <p><b>-cycle</b>—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.</p> <p><b>-state</b>—Display the current power state (<b>on</b> or <b>off</b>) for the specified Routing Engine or JCS switch module.</p>
<b>Required Privilege Level</b>	supervisor
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Getting Help on JCS Commands on page 35</li> <li>■ reset on page 185</li> </ul>
<b>List of Sample Output</b>	<p>power (on) on page 182</p> <p>power (cycle) on page 182</p> <p>power (state) on page 182</p>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.
<b>power (on)</b>	<pre>system&gt; power -T system:switch[1] -on OK</pre>
<b>power (cycle)</b>	<pre>system&gt; power -T system:switch[1] -cycle Off</pre>
<b>power (state)</b>	<pre>system&gt; power -T system:blade[3] -state</pre>

On

**read**

---

<b>Syntax</b>	<code>read -config chassis -T system:mm[x]</code>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS management module CLI) Restore the JCS management module configuration from an image previously saved to the JCS chassis with the <b>write</b> command. This command is useful for restoring a backup copy of the JCS management module configuration.
<b>Options</b>	<p><code>-config chassis</code>—Specify the location from which the configuration is restored.</p> <p><code>-T system:mm[x]</code>—Specify the management module as the target of the command (the configuration to be saved). Replace <code>x</code> with a value of <b>1</b> or <b>2</b>.</p>
<b>Required Privilege Level</b>	supervisor
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Getting Help on JCS Commands on page 35</li> <li>■ <b>write</b> on page 191</li> </ul>
<b>List of Sample Output</b>	<code>read -config chassis -T system:mm[1]</code> on page 184
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.
<b>read -config chassis -T system:mm[1]</b>	<pre>system&gt; 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.</pre>



**reset**

---

<b>Syntax</b>	<code>reset -T target</code>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS management module CLI) Reset a specified Routing Engine (blade), JCS switch module, or JCS management module.
<b>Options</b>	<p><code>-T target</code>—Specify the target of the <code>reset</code> command. Valid targets for this command are:</p> <ul style="list-style-type: none"> <li>■ <code>system:blade[x]</code>—Specify a Routing Engine as the command target. Replace <code>x</code> with the Routing Engine slot number (1 through 12).</li> <li>■ <code>system:switch[x]</code>—Specify a JCS switch module as the command target. Replace <code>x</code> with the switch number (1 or 2).</li> <li>■ <code>system:mm[x]</code>—Specify a JCS management module as the command target. Replace <code>x</code> with the primary management module number (1 or 2).</li> </ul>
<b>Required Privilege Level</b>	supervisor
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Getting Help on JCS Commands on page 35</li> <li>power on page 182</li> </ul>
<b>List of Sample Output</b>	<code>reset (switch)</code> on page 185
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.
<b>reset (switch)</b>	<pre>system&gt; reset -T system:switch[2] OK</pre>

## shutdown

---

<b>Syntax</b>	shutdown -f -T system:blade[x]
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS management module CLI) Shut down the operating system on the Routing Engine (blade).
<b>Options</b>	<p>-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.</p> <p>-f—Force the operating system on the Routing Engine to shut down.</p>
<b>Required Privilege Level</b>	supervisor
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Getting Help on JCS Commands on page 35</li> <li>■ power on page 182</li> </ul>
<b>List of Sample Output</b>	shutdown on page 186
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.
<b>shutdown</b>	<pre>system&gt; shutdown -f -T system:blade[6] OK</pre>

## temps

<b>Syntax</b>	<code>temps -T target</code>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS 1200 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.
<b>Options</b>	<p><code>-T target</code>—Specify the target of the <b>temps</b> command. Valid targets for this command are:</p> <ul style="list-style-type: none"> <li>■ <code>system:blade[x]</code>—Specify a Routing Engine as the command target. Replace <code>x</code> with the Routing Engine slot number (1 through 12).</li> <li>■ <code>system:switch[x]</code>—Specify a JCS switch module as the command target. Replace <code>x</code> with the switch number (1 or 2).</li> <li>■ <code>system:mm[x]</code>—Specify a JCS management module as the command target. Replace <code>x</code> with the primary management module number (1 or 2).</li> </ul>
<b>Required Privilege Level</b>	operator (display)
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Displaying Temperature Information on page 164</li> </ul>
<b>List of Sample Output</b>	<p><code>temps</code> (Routing Engine) on page 187</p> <p><code>temps</code>(JCS Management Module) on page 188</p>
<b>Output Fields</b>	Table 28 on page 187 lists the output fields for the <b>temps</b> command. Output fields are listed in the approximate order in which they appear.

**Table 28: 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.

**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**

<b>Syntax</b>	<code>volts -T target</code>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS 1200 platform only) Show voltage information for components in the JCS chassis. This information is useful for viewing current voltage values and voltage threshold settings.
<b>Options</b>	<p><code>-T target</code>—Specify the target of the <code>volts</code> command. Valid targets for this command are:</p> <ul style="list-style-type: none"> <li>■ <code>system:blade[x]</code>—Specify a Routing Engine as the command target. Replace <code>x</code> with the Routing Engine slot number (1 through 12).</li> <li>■ <code>system:switch[x]</code>—Specify a JCS switch module as the command target. Replace <code>x</code> with the switch number (1 or 2).</li> <li>■ <code>system:mm[x]</code>—Specify a JCS management module as the command target. Replace <code>x</code> with the primary management module number (1 or 2).</li> </ul>
<b>Required Privilege Level</b>	operator (display)
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Displaying Voltage Information on page 165</li> </ul>
<b>List of Sample Output</b>	<p><code>volts</code> (JCS Management Module) on page 189</p> <p><code>volts</code> (Routing Engine) on page 190</p>
<b>Output Fields</b>	Table 29 on page 189 lists the output fields for the <code>volts</code> command. Output fields are listed in the approximate order in which they appear.

**Table 29: 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.

<b>volts (JCS Management Module)</b>	<code>system&gt; volts -T system:mm[1]</code>				
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)

**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**

---

<b>Syntax</b>	<code>write -config chassis -T system:mm[x]</code>
<b>Release Information</b>	Command supported by JUNOS Release 9.1 and later.
<b>Description</b>	(JCS management module CLI) Save the management module configuration to the chassis of the JCS 1200 platform (in the midplane NVRAM). This command is useful for creating a backup copy of the JCS management module configuration.
<b>Options</b>	<p><code>-config chassis</code>—Specify the location where the configuration is saved.</p> <p><code>-T system:mm[x]</code>—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.</p>
<b>Required Privilege Level</b>	supervisor
<b>Related Topics</b>	<ul style="list-style-type: none"> <li>■ Getting Help on JCS Commands on page 35</li> <li>■ read on page 184</li> </ul>
<b>List of Sample Output</b>	<code>write -config chassis -T system:mm[1]</code> on page 191
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.
<b>write -config chassis -T system:mm[1]</b>	<pre>system&gt; write -config chassis -T system:mm[1] OK Configuration settings were successfully saved to the chassis.</pre>





## **Part 6**

# **Managing RSDs and PSDs**

- Managing RSDs and PSDs on page 195



## Chapter 15

# Managing RSDs and PSDs

- Logging In to a PSD from the RSD on page 195
- JUNOS Verification Tasks on page 195
- Displaying Hardware Information on page 196
- Displaying Configured PSDs on page 199
- Displaying Routing Engine Information on page 200
- Displaying Ethernet Switch Statistics on page 201
- Displaying Shared Interface Information on page 203

### 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 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 into 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 Topics** ■ RSD Administration View on page 23

### JUNOS Verification Tasks

---

Table 30 on page 196 lists tasks that are commonly used to verify information that is specific to RSDs and PSDs.

**Table 30: 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 196
Configured PSDs	Display PSDs configured under the RSD.	“Displaying Configured PSDs” on page 199
Routing Engine information	Display Routing Engine information.	“Displaying Routing Engine Information” on page 200
Ethernet switch statistics	Display information about the receive and transmit packets traveling between PSDs and the respective RSD.	“Displaying Ethernet Switch Statistics” on page 201
Shared interfaces	Display information about shared interfaces.	“Displaying Shared Interface Information” on page 203

- Related Topics**
- Configuring an RSD and Creating PSDs on page 84
  - Configuring Shared Interfaces on the RSD on page 95
  - Configuring Shared Interfaces on a PSD on page 96
  - JCS Management Module Verification Tasks on page 157

## Displaying Hardware Information

**Purpose** On the RSD, you can use the `show chassis hardware` command to display all hardware on the T-series routing platform (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 routing platform 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 JCS 1200 chassis and the Routing Engines assigned to PSD1.

- Related Topics**
- RSD Administration View on page 23
  - PSD Administration View on page 24

## 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 Topics** ■ RSD Administration View on page 23

## 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 routing platform 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                   3584 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                   3584 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                   3328 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                   3328 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 Topics** ■ Configuring an RSD and Creating PSDs on page 84

## 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 Topics** ■ Connections Between JCS 1200 and T-series Platforms on page 17

## Displaying Shared Interface Information

**Purpose** Display information about shared interfaces.

**Action** Using the show interfaces *so-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 SONET 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, the following information about the physical interface is *not* provided:

- Media status
  - Frame Relay LMI counters
  - SONET mode
- 

**On the RSD** 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: 0C192, 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** 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

```

- Related Topics**
- Configuring Shared Interfaces on the RSD on page 95
  - Configuring Shared Interfaces on a PSD on page 96



## **Part 7**

# **Appendix**

- Troubleshooting on page 209
- Glossary on page 211





## Appendix A

# Troubleshooting

- Troubleshooting a Routing Engine on the JCS 1200 Platform on page 209

### Troubleshooting a Routing Engine on the JCS 1200 Platform

---

**Problem** You cannot run the JUNOS software on a Routing Engine on the JCS 1200 platform and you cannot reload the software using the JUNOS CLI.

**Solution** Manually load the JUNOS software 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 software through a console port session on the Routing Engine.

---



**CAUTION:** When you manually reload the JUNOS software, the hardware disk and CompactFlash card are erased.

---

To manually load the JUNOS software on a specific Routing Engine in the JCS chassis:

1. Obtain the JUNOS software 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 software 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 Topics**
- Configuring a PSD with a Single Routing Engine on page 87
  - Configuring a PSD with Redundant Routing Engines on page 90

# 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.

## 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 JCS 1200 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 JCS 1200 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 8**

# **Indexes**

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- Index of Statements and Commands on page 221



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