

About This Guide

This preface provides the following guidelines for using the *JUNOS[™] Software for E-series[™] Routing Platforms Link Layer Configuration Guide*:

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Objectives

This guide provides the information you need to configure link-layer protocols.

An E-series router is shipped with the latest system software installed. If you need to install a future release or reinstall the system software, refer to the procedures in *JUNOS[™] System Basics Configuration Guide, Chapter 3, Installing JUNOS[™] Software*.



NOTE: If the information in the latest *JUNOS[™] Release Notes* differs from the information in this guide, follow the *JUNOS[™] Release Notes*.

Audience

This guide is intended for experienced system and network specialists working with E-series routers in an Internet access environment.

E-series Routers

Seven models of E-series routers are available:

- E120 router
- E320 router
- ERX-1440 router
- ERX-1410 router
- ERX-710 router
- ERX-705 router
- ERX-310 router

All models use the same software. For information about all models except the E120 router and the E320 router, see *ERX Hardware Guide, Chapter 1, ERX Overview*. For information about the E120 router and the E320 router, see *E120 and E320 Hardware Guide, Chapter 1, E120 and E320 Overview*.

In the E-series documentation, the term ERX-14xx models refers to both the ERX-1440 router and the ERX-1410 router. Similarly, the term ERX-7xx models refers to both the ERX-710 router and the ERX-705 router. The terms ERX-1440 router, ERX-1410 router, ERX-710 router, ERX-705 router, ERX-310 router, E120 router, and E320 router refer to the specific models.

Documentation Conventions

Table 1 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.

Table 2 defines text conventions used in this guide and the syntax conventions used primarily in the *JUNOSe Command Reference Guide*. For more information about command syntax, see *JUNOSe System Basics Configuration Guide, Chapter 2, Command-Line Interface*.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
Text Conventions		
Bold text like this	Represents commands and keywords in text.	<ul style="list-style-type: none"> ■ Issue the clock source command. ■ Specify the keyword exp-msg.
Bold text like this	Represents text that the user must type.	host1(config)# traffic class low-loss1
Fixed-width text like this	Represents information as displayed on your terminal's screen.	<pre>host1#show ip ospf 2 Routing Process OSPF 2 with Router ID 5.5.0.250 Router is an Area Border Router (ABR)</pre>
<i>Italic text like this</i>	<ul style="list-style-type: none"> ■ Emphasizes words. ■ Identifies variables. ■ Identifies chapter, appendix, and book names. 	<ul style="list-style-type: none"> ■ There are two levels of access, <i>user</i> and <i>privileged</i>. ■ <i>clusterId</i>, <i>ipAddress</i>. ■ <i>Appendix A, System Specifications</i>.
Plus sign (+) linking key names	Indicates that you must press two or more keys simultaneously.	Press Ctrl + b.
Syntax Conventions in the <i>Command Reference Guide</i>		
Plain text like this	Represents keywords.	terminal length
<i>Italic text like this</i>	Represents variables.	<i>mask</i> , <i>accessListName</i>
(pipe symbol)	Represents a choice to select one keyword or variable to the left or right of this symbol. (The keyword or variable can be either optional or required.)	diagnostic line
[] (brackets)	Represent optional keywords or variables.	[internal external]
[]* (brackets and asterisk)	Represent optional keywords or variables that can be entered more than once.	[level1 level2 l1]*
{ } (braces)	Represent required keywords or variables.	{ permit deny } { in out } { <i>clusterId</i> <i>ipAddress</i> }

Related E-series and JUNOSe Documentation

The E-series and JUNOSe documentation set consists of several hardware and software guides, which are available in electronic and printed formats.

E-series and JUNOSe Documents

Table 3 lists and describes the E-series and JUNOSe document set. For a complete list of abbreviations used in this document set, along with their spelled-out terms, see *JUNOSe System Basics Configuration Guide, Appendix A, Abbreviations and Acronyms*.

Table 3: Juniper Networks E-series and JUNOS Technical Publications

Document	Description
E-series Hardware Documentation	
<i>E120 and E320 Quick Start Guide</i>	Shipped in the box with all new E120 and E320 routers. Provides the basic procedures to help you get the routers up and running quickly.
<i>E120 and E320 Hardware Guide</i>	<p>Provides the necessary procedures for getting E120 routers and E320 routers operational, including information about:</p> <ul style="list-style-type: none"> ■ Installing the chassis and modules ■ Connecting cables ■ Powering up the routers ■ Configuring the routers for management access ■ Troubleshooting common issues <p>Describes switch route processor (SRP) modules, line modules, and I/O adapters (IOAs) available for E120 and E320 routers.</p>
<i>E120 and E320 Module Guide</i>	<p>Provides detailed specifications for line modules and IOAs in E120 and E320 routers, and information about the compatibility of these modules with JUNOS software releases.</p> <p>Lists the layer 2 protocols, layer 3 protocols, and applications that line modules and their corresponding IOAs support.</p> <p>Provides module LED information.</p>
<i>E-series Installation Quick Start poster or ERX Quick Start Guide</i>	Shipped in the box with all new ERX routers. Provides the basic procedures to help you get an ERX router up and running quickly.
<i>ERX Hardware Guide</i>	<p>Provides the necessary procedures for getting ERX-14xx models, ERX-7xx models, and ERX-310 routers operational, including information about:</p> <ul style="list-style-type: none"> ■ Installing the chassis and modules ■ Connecting cables ■ Powering up the routers ■ Configuring the routers for management access ■ Troubleshooting common issues <p>Describes switch route processor (SRP) modules, line modules, and I/O modules available for the ERX routers.</p>
<i>ERX Module Guide</i>	<p>Provides detailed specifications for line modules and I/O modules in ERX-14xx models, ERX-7xx models, and ERX-310 routers, and information about the compatibility of these modules with JUNOS software releases.</p> <p>Lists the layer 2 protocols, layer 3 protocols, and applications that line modules and their corresponding I/O modules support.</p> <p>Provides module LED information.</p>
<i>ERX End-of-Life Module Guide</i>	<p>Provides an overview and description of ERX modules that are end-of-life (EOL) and can no longer be ordered for the following routers:</p> <ul style="list-style-type: none"> ■ ERX-7xx models ■ ERX-14xx models ■ ERX-310 router

Table 3: Juniper Networks E-series and JUNOS Technical Publications (continued)

Document	Description
JUNOS Software Guides	
<i>JUNOS System Basics Configuration Guide</i>	Provides information about: <ul style="list-style-type: none"> ■ Planning and configuring your network ■ Using the command-line interface (CLI) ■ Installing JUNOS software ■ Configuring the Simple Network Management Protocol (SNMP) ■ Managing the router and its modules, including the use of high availability (HA) for SRP redundancy ■ Configuring and running a unified in-service software upgrade (ISSU) ■ Configuring passwords and security ■ Configuring the router clock ■ Configuring virtual routers
<i>JUNOS Physical Layer Configuration Guide</i>	Explains how to configure, test, and monitor physical layer interfaces.
<i>JUNOS Link Layer Configuration Guide</i>	Explains how to configure and monitor static and dynamic link layer interfaces.
<i>JUNOS IP, IPv6, and IGP Configuration Guide</i>	Explains how to configure and monitor IP, IPv6 and Neighbor Discovery, and interior gateway protocols (RIP, OSPF, and IS-IS).
<i>JUNOS IP Services Configuration Guide</i>	Explains how to configure and monitor IP routing services. Topics include: <ul style="list-style-type: none"> ■ Routing policies ■ Firewalls ■ Network Address Translation (NAT) ■ J-Flow statistics ■ Bidirectional forwarding detection (BFD) ■ Internet Protocol Security (IPSec) ■ Access Node Control Protocol (ANCP), also known as Layer 2 Control (L2C) ■ Digital certificates ■ IP tunnels ■ Virtual Router Redundancy Protocol (VRRP) ■ Mobile IP home agent
<i>JUNOS Multicast Routing Configuration Guide</i>	Explains how to configure and monitor IP multicast routing and IPv6 multicast routing. Topics include: <ul style="list-style-type: none"> ■ Internet Group Management Protocol (IGMP) ■ Protocol Independent Multicast (PIM) ■ Distance Vector Multicast Routing Protocol (DVMRP) ■ Multicast Listener Discovery (MLD)
<i>JUNOS BGP and MPLS Configuration Guide</i>	Explains how to configure and monitor: <ul style="list-style-type: none"> ■ Border Gateway Protocol (BGP) routing ■ Multiprotocol Label Switching (MPLS) and related applications ■ Layer 2 services over MPLS ■ Virtual private LAN service (VPLS) ■ Layer 2 virtual private networks (L2VPNs)
<i>JUNOS Policy Management Configuration Guide</i>	Explains how to configure, manage, and monitor customized policy rules for packet classification, forwarding, filtering, and flow rates. Also describes the packet mirroring feature, which uses secure policies.

Table 3: Juniper Networks E-series and JUNOS Technical Publications (continued)

Document	Description
<i>JUNOS Quality of Service Configuration Guide</i>	<p>Explains how to configure quality of service (QoS) features to queue, schedule, and monitor traffic flow. These features include:</p> <ul style="list-style-type: none"> ■ Traffic classes and traffic-class groups ■ Drop, queue, QoS, and scheduler profiles ■ QoS parameters ■ Statistics
<i>JUNOS Broadband Access Configuration Guide</i>	<p>Explains how to configure and monitor a remote access environment, which can include the following features:</p> <ul style="list-style-type: none"> ■ Authentication, authorization, and accounting (AAA) ■ Dynamic Host Configuration Protocol (DHCP) ■ Remote Authentication Dial-In User Service (RADIUS) ■ Terminal Access Controller Access Control System (TACACS +) ■ Layer 2 Tunneling Protocol (L2TP) ■ Subscriber management
<i>JUNOS System Event Logging Reference Guide</i>	Describes the JUNOS system logging feature and describes how to use the CLI to monitor your system's log configuration and system events.
<i>JUNOS Command Reference Guide A to M;</i> <i>JUNOS Command Reference Guide N to Z</i>	<p>Together constitute the <i>JUNOS Command Reference Guide</i>. Contain important information about commands implemented in the system software. Use to look up:</p> <ul style="list-style-type: none"> ■ Descriptions of commands and command parameters ■ Command syntax ■ A command's related mode ■ Starting with JUNOS Release 7.1.0, a history of when a command, its keywords, and its variables were introduced or added <p>Use with the JUNOS configuration guides.</p>
<i>JUNOS Comprehensive Index</i>	Provides a complete index of the JUNOS software documentation set.
<i>JUNOS Glossary</i>	Provides definitions for terms used in JUNOS technical documentation.
Release Notes	
<i>JUNOS Release Notes</i>	<p>Provide the latest information about features, changes, known problems, resolved problems, and system maximum values. If the information in the <i>Release Notes</i> differs from the information found in the documentation set, follow the <i>Release Notes</i>.</p> <p>Release notes are included on the corresponding software CD and are available on the Web.</p>

JUNOS^e Configuration Guides

JUNOS^e software configuration guides use a bottom-up approach to describe the relationship of layers, protocols, and interfaces in the configuration process. For more information, see *Layered Approach* in *JUNOS^e System Basics Configuration Guide, Chapter 1, Planning Your Network*.

The chapters in JUNOS^e software configuration guides typically include the following topics:

- Conceptual and overview information
- Information you need to know or tasks you need to perform before you begin
- Platform-specific issues you need to take into consideration
- Applicable references, such as RFCs and IETF draft documents, about the protocols and features supported by the router
- Required and optional tasks, as step-by-step procedures
- Descriptions and examples of the commands you use
- Illustrations of network topologies
- Examples of command sequences for configuration, testing, and monitoring activities
- Sample displays that result when you issue the **show** command

Obtaining Documentation

To obtain the most current version of all Juniper Networks technical documentation, see the products documentation page on the Juniper Networks Web site at <http://www.juniper.net/>.

To order printed copies of this manual and other Juniper Networks technical documents or to order a documentation CD, which contains this manual, contact your sales representative.

Copies of the Management Information Bases (MIBs) available in a software release are included on the software CDs and at <http://www.juniper.net/>.

Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation to better meet your needs. Send your comments to techpubs-comments@juniper.net, or fill out the documentation feedback form at <http://www.juniper.net/techpubs/docbug/docbugreport.html>. 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

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 Manager:
<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 Manager 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, visit
<http://www.juniper.net/support/requesting-support.html>

