# Introduction to the Junos Operating System

**Category:** Networking & Security | **Vendor:** Juniper

**Duration:** 32.00 hours (4 days) **26.0 CPD Hours** **Rating:** ⭐ 4.6 (5,878 reviews)

## Course Information

**Delivery Format:** Instructor Led - Online

## Course Overview

This four-day course provides students with the foundational knowledge required to configure, verify, and troubleshoot devices that run Junos OS.

Students will gain a wide variety of practical experience with using the command-line interface (CLI). The course focuses on routers and switches, and explains Layer 3 network interface basics, routing tables, static routes, OSPF, Layer 2 switchports, user accounts, firewall filters, routing policy, and troubleshooting.

Particular attention is given to the power of the candidate configuration, rolling back changes, and the power of the Junos OS configuration hierarchy. The course also discusses the key architectural components of the Junos software, the separation of the control plane and the data plane, and the reasons that Junos OS is built for automation.

Through demonstrations and hands-on labs, students will gain experience in configuring and monitoring Junos OS and monitoring basic device operations. This course is based on Junos OS Release 22.1R1.10.

# About This Course

- Course Introduction
- SSH and Operational Mode
- Refresher—IPv6 Addressing
- Network Interfaces, Part 1—Interface Naming and Logical Units
- Network Interfaces, Part 2—Revealing and Filtering Detailed Interface Output
- Reading a Junos OS Configuration
- Configuring Junos OS—The Basics
- Configuring Junos OS—Become a Power User
- Routing Tables, Route Preference, and Longest Prefix Matches
- Static Routes
- Dynamic Routing Protocols—The Theory
- Dynamic Routing Protocols—Configuring OSPF
- Junos OS Switches, Part 1—VLANs, MAC Tables, and Access Ports
- Junos OS Switches, Part 2—Trunk Ports
- Junos OS Device Administration
- Setting Up a Brand-New Junos OS Device
- Junos OS Architecture—The Control Plane and the Data Plane
- Junos OS Architecture—The Software That Powers Junos OS
- Logging, Troubleshooting, and Monitoring
- Junos OS Firewall Filters, Part 1—The Theory
- Junos OS Firewall Filters, Part 2—The Practical
- Junos OS Configuration—A Deeper Dive
- Interfaces—A Deeper Dive
- Junos OS Architecture—APIs and Automation
- Where Do You Go from Here?

Self-Study Modules

- Routing—A Deeper Dive
- Junos OS Firewall Filters—A Deeper Dive
- Logging, Troubleshooting, and Monitoring—A Deeper Dive
- Junos OS Device Administration—A Deeper Dive
- Junos OS Routing Policy
- Upgrading Junos OS
- J-Web

- Refresher—Cables and Ethernet
- Refresher—IPv4 and Subnetting
- Refresher—Switches, MAC Learning, Broadcast Domains, and VLANs
- Refresher—TCP and UDP

## Who Should Attend

- Individuals who work with routers, switches, and firewalls that run Junos OS
- Individuals who want to learn how to manage Junos OS using the CLI
- Individuals who want to learn a basic understanding of IPv4, IPv6, routing switching, troubleshooting, packet filtering, and Junos administration concepts

### Prerequisites & Entry Requirements

**General Prerequisites:**

- Students are highly recommended to have watched the self-study Getting Started with Networking (e-learning) video series before attending this course.
- Basic understanding of IPv4 and IPv6.
- Basic understanding of Ethernet and MAC address learning.
- Basic understanding of TCP and UDP.
- Basic understanding of the layered OSI and TCP/IP models.

# Learning Outcomes

**Upon successful completion of this course, participants will be able to:**

After successfully completing this course, you should be able to:

- Explain the most important benefits of Junos OS and describe the kind of devices that run it.
- Explain how to remotely connect to the Junos CLI, and how to use operational mode to verify system information.
- Describe the reasons that IPv6 was created and explain how to read an IPv6 address.
- Explain the difference between a physical network interface and a logical unit.
- Demonstrate how the Junos OS CLI can reveal detailed information about network interfaces.
- Describe how Junos OS stores its configuration using a logical and hierarchical structure.
- Demonstrate how to deploy configuration in Junos OS, and how the commit process helps to prevent mistakes.
- Demonstrate the commands and keyboard shortcuts that make Junos CLI configurations more efficient.
- Describe how routes enter a routing table, and how routers choose the best routes for forwarding traffic.
- Describe how static routes manually install routing information into a router.
- Describe how routing protocols can automatically find the best path to remote destinations.
- Demonstrate how to deploy OSPF to automatically advertise and learn prefixes in a single network.
- Explain how to manage a switch that runs Junos OS.
- Explain how to manage a switch that runs Junos OS.
- Demonstrate how to enable some crucial Junos OS administrative features.
- Describe the most important things to consider when deploying a new device that runs Junos OS.
- Demonstrate how knowledge of the underlying Junos OS architecture can bring advantages to network operators.
- Demonstrate how a knowledge of the underlying Junos OS software helps you when upgrading Junos and troubleshooting networks.
- Demonstrate the most important and useful tools available in Junos OS that can help you fix real-world problems.
- Explain how Junos OS can filter and manipulate traffic in real time using stateless firewall filters.
- Explain how to configure stateless firewall filters that accept or discard packets.
- Demonstrate some powerful CLI configuration options that can increase your productivity.

- Describe the advantages and configuration of a variety of different interface types and features.
- Demonstrate how the architecture of Junos OS is built with automation in mind.
- Explain how to continue your studies once the course has been completed.

Additional objectives for self-study:

- Explain how to utilize backup static routes, routing instances, OSPF areas, and BGP.
- Deploy some of the advanced features available within a firewall filter.
- Describe advanced troubleshooting and monitoring features available in Junos OS.
- Demonstrate some advanced device administration features.
- Describe how routing policies control what prefixes can enter the routing table, and what prefixes can be advertised by protocols.
- Describe the tasks involved in upgrading Junos OS.
- Use the J-Web graphical interface to make configuration changes and monitor and maintain Junos devices.
- Describe the most common network cables in use today, and the reasons for using the Ethernet protocol in modern networks.
- Describe how IP addresses create end-to-end network communication.
- Explain how switches enable Layer 2 Ethernet communication between hosts on a shared LAN segment.
- Describe the difference between TCP and UDP.

## Detailed Course Outline

DAY 1

Course Introduction

Introducing Junos OS and the Hardware It Powers

- Test your knowledge of some networking fundamentals
- Explain the advantages of Junos OS
- Define the terms fixed-port chassis, modular chassis, and Routing Engine

- Describe the advantages of Juniper Networks MX Series, PTX Series, and ACX Series routers, and SRX Series Firewalls

SSH and Operational Mode

- Demonstrate how to use SSH to log in to a device running Junos OS
- Explain the purpose of operational mode
- Describe some of the most immediately useful show system commands
- Demonstrate how to use built-in command reminders, auto-completion, and the Junos hierarchy

Lab 1: SSH and Operational Mode

Refresher—IPv6 Addressing

- Demonstrate how to use hexadecimal to read IPv6 addresses, MAC addresses, and memory addresses
- Explain the format of IPv6 addresses and subnet masks, and the purpose of link-local addressing

Network Interfaces, Part 1—Interface Naming and Logical Units

- Define the concepts of physical network interfaces, FPCs, and PICs
- Demonstrate how the show interfaces terse command verifies logical interfaces, interface status, and IP addresses

Network Interfaces, Part 2—Revealing and Filtering Detailed Interface Output

- Explain how to read the output of the full show interfaces command
- Demonstrate how to use the CLI pipe to filter the output of any command

Lab 2: Network Interfaces and Logical Units

Reading a Junos OS Configuration

- Explain the difference between viewing a Junos configuration in hierarchy view and in set view, and the advantages of each method
- Demonstrate how to read a Junos OS router configuration in set view
- Demonstrate how to read a Junos OS router configuration in hierarchy view

Lab 3: Reading a Junos OS Configuration

DAY 2

Configuring Junos OS—The Basics

- Describe how the candidate configuration helps to prevent mistakes during configuration changes
- Demonstrate how to commit changes, and how to roll back to previous configurations
- Describe how to deploy, edit, and delete pieces of configuration
- Explain how to use the commit confirmed feature

Lab 4: Configuring Junos OS—The Basics

Configuring Junos OS—Become a Power User

- Explain how to lock the candidate configuration, and how to deactivate and disable pieces of configuration
- Demonstrate how to deploy configuration within a specific part of the hierarchy
- Explain how to renameand replace configuration
- Describe the keyboard shortcuts that bring efficiency to your CLI session

Lab 5: Configuring Junos OS—Become a Power User

Routing Tables, Route Preference, and Longest Prefix Matches

- Define the difference between directly connected, static, and dynamic routes
- Explain how route preference selects the best route to a destination

- Explain the process of longest prefix match lookups

- Demonstrate how to view and verify the inet.0 and inet6.0 routing tables

Lab 6: Routes and Routing Tables

Static Routes

- Explain the advantages and trade-offs of using static routes

- Demonstrate how to configure and verify IPv4 and IPv6 static routes

- Explain the purpose of a default route, and deploy one to enable Internet connectivity

Lab 7: Static Routes

Dynamic Routing Protocols—The Theory

- Explain how routing protocols solve the problems of static routes

- Describe the difference between interior and exterior gateway protocols, and the advantages of link-state protocols such as OSPF and IS-IS

Dynamic Routing Protocols—Configuring OSPF

- Configure and verify a basic IPv4 OSPF deployment

- Configure and verify a basic IPv6 OSPF deployment

Lab 8: Dynamic Routing Protocols

DAY 3

Junos OS Switches, Part 1—VLANs, MAC Tables, and Access Ports

- Test your knowledge of some Layer 2 switching fundamentals

- Demonstrate how to configure and verify VLANs on a switch running Junos OS

- Describe how to configure access ports and verify MAC tables

Junos OS Switches, Part 2—Trunk Ports

- Describe how to deploy trunk ports on Junos OS switches
- Demonstrate how to configure multiple logical units on IP interfaces
- Explain the advantages of Juniper Networks EX and QFX Series Switches, and the wireless, wired, and WAN solutions offered by Mist AI

Lab 9: IP Interfaces with Multiple Logical Units

Junos OS Device Administration

- Explain the advantage of out-of-band management interfaces
- Describe how to maintain accurate time on a Junos OS device
- Explain the DNS resolution process, and how to enable DNS resolution
- Describe how to create new user accounts for management
- Demonstrate the features of the J-Web graphical interface

Setting Up a Brand-New Junos OS Device

- Describe the variety of default configurations you will find on Junos OS devices
- Explain how to use the console port, and the one piece of mandatory configuration on new devices
- Demonstrate some recommended initial system settings
- Explain the advantage of zero-touch provisioning

Lab 10: Junos OS Device Administration and Initial Settings

Junos OS Architecture—The Control Plane and the Data Plane

- Define the control plane, the forwarding plane, and the Packet Forwarding Engine
- Explain the difference between transit traffic and exception traffic

Junos OS Architecture—The Software That Powers Junos OS

- Describe the modular nature of Junos OS daemons, and explain how Junos OS is based on FreeBSD
- Explain the advantages offered by Junos OS Evolved

Logging, Troubleshooting, and Monitoring

- Explain how to create log files
- Demonstrate network connectivity troubleshooting commands
- Describe how to view interface statistics, errors, and live control plane traffic
- Demonstrate some helpful CLI management troubleshooting tricks

Lab 11: Logging, Troubleshooting, and Monitoring

DAY 4

Junos OS Firewall Filters, Part 1—The Theory

- Test your knowledge on some important transport layer fundamentals
- Define the difference between stateful security policies and stateless firewall filters
- Describe how firewall filters use named terms to take action on packets, based on your match conditions
- Demonstrate the logic involved in processing terms in a firewall filter

Junos OS Firewall Filters, Part 2—The Practical

- Describe the configuration of a Junos OS firewall filter
- Demonstrate how to use the insert command to change the order of terms in a firewall filter

Lab 12: Junos OS Firewall Filters

Junos OS Configuration—A Deeper Dive

- Describe how to annotate, lock, and redact parts of the configuration
- Explain how to create and manage files on your Junos device
- Describe how to use load commands to quickly apply configuration in bulk
- Demonstrate the ways that you can automate aspects of a Junos OS configuration

Lab 13: Junos OS Configuration—A Deeper Dive

Interfaces—A Deeper Dive

- Describe the configuration of IRB and loopback interfaces
- Explain how source IP addresses are selected from multiple options on an interface
- Demonstrate the advantages of load balancing and of aggregated Ethernet interfaces

Lab 14: Interfaces—A Deeper Dive

Junos OS Architecture—APIs and Automation

- Explain how Junos OS uses an XML API as an interface to the CLI and to a variety of automation options

Where Do You Go from Here?

- Describe how to continue getting hands-on practice with Junos OS once the course is complete
- Explain the Juniper Networks certification track
- Explain some of the most popular Juniper Networks courses that you might choose to take next

SELF-STUDY MODULES

Routing—A Deeper Dive

- Demonstrate a variety of advanced static route features
- Demonstrate the functionality and configuration of routing instances

- Describe the advantages of OSPF areas, IS-IS levels, and BGP as an exterior gateway protocol

Junos OS Firewall Filters—A Deeper Dive

- Demonstrate some advanced firewall filter match conditions and actions
- Explain the benefits of control plane firewall filter protection
- Describe how policers can rate-limit any traffic of your choosing
- Demonstrate some firewall filter caveats and potential best practices

Logging, Troubleshooting, and Monitoring—A Deeper Dive

- Demonstrate how monitoring systems use SNMP to interact with a device
- Explain how traceoptions offer advanced troubleshooting visibility of any problem
- Describe the error information available in the show interfaces extensive command
- Demonstrate some advanced CLI troubleshooting commands and filtering tools

Junos OS Device Administration—A Deeper Dive

- Explain the meaning of AAA, and demonstrate how to enable RADIUS and TACACS+ authentication
- Describe the order in which user authentication methods are checked
- Explain how to customize user accounts with custom permission classes and custom idle timeouts

Junos OS Routing Policy

- Explain how import and export policies can readvertise prefixes between protocols
- Describe the CLI syntax of a routing policy
- Demonstrate how a routing policy can export static routes into OSPF
- Describe some important advanced routing policy features and behaviors

Upgrading Junos OS

- Describe how to download a Junos OS image from the Juniper Networks website

- Demonstrate how to check available storage, and how to remove unnecessary files
- Demonstrate the Junos OS upgrade procedure
- Describe the most helpful upgrade customization options

J-Web

- Identify the purpose of each individual tab on the J-Web menu
- Configure device administration settings and perform simple tasks such as configuration and file management
- Demonstrate how to configure and monitor a network interface in J-Web
- Use the Feature Explorer to find out if a device supports J-Web

Refresher—Cables and Ethernet

- Explain the difference between copper and fiber-optic networking cables
- Describe how Ethernet uses MAC addresses to pass traffic to the next visible hop in the path

Refresher—IPv4 and Subnetting

- Describe the format of IPv4 addresses, and explain how to create a subnet
- Explain the role of a router in a network

Refresher—Switches, MAC Learning, Broadcast Domains, and VLANs

- Explain the difference between Layer 2 and Layer 3 switches
- Describe how switches and hosts learn MAC addresses
- Define the concept of VLANs and broadcast domains

Refresher—TCP and UDP

- Explain the difference between reliable and best-effort transmission, and between source and destination port numbers

**Skills You Will Learn:**

After successfully completing this course, you should be able to:<br><br><br>- Explain the most important benefits of Junos OS and describe the kind of devices that run it.<br>- Explain how to remotely connect to the Junos CLI, and how to use operational mode to verify system information.<br>- Describe the reasons that IPv6 was created and explain how to read an IPv6 address.<br>- Explain the difference between a physical network interface and a logical unit.<br>- Demonstrate how the Junos OS CLI can reveal detailed information about network interfaces.<br>- Describe how Junos OS stores its configuration using a logical and hierarchical structure.<br>- Demonstrate how to deploy configuration in Junos OS, and how the commit process helps to prevent mistakes.<br>- Demonstrate the commands and keyboard shortcuts that make Junos CLI configurations more efficient.<br>- Describe how routes enter a routing table, and how routers choose the best routes for forwarding traffic.<br>- Describe how static routes manually install routing information into a router.<br>- Describe how routing protocols can automatically find the best path to remote destinations.<br>- Demonstrate how to deploy OSPF to automatically advertise and learn prefixes in a single network.<br>- Explain how to manage a switch that runs Junos OS.<br>- Explain how to manage a switch that runs Junos OS.<br>- Demonstrate how to enable some crucial Junos OS administrative features.<br>- Describe the most important things to consider when deploying a new device that runs Junos OS.<br>- Demonstrate how knowledge of the underlying Junos OS architecture can bring advantages to network operators.<br>- Demonstrate how a knowledge of the underlying Junos OS software helps you when upgrading Junos and troubleshooting networks.<br>- Demonstrate the most important and useful tools available in Junos OS that can help you fix real-world problems.<br>- Explain how Junos OS can filter and manipulate traffic in real time using stateless firewall filters.<br>- Explain how to configure stateless firewall filters that accept or discard packets.<br>- Demonstrate some powerful CLI configuration options that can increase your productivity.<br>- Describe the advantages and configuration of a variety of different interface types and features.<br>- Demonstrate how the architecture of Junos OS is built with automation in mind.<br>- Explain how to continue your studies once the course has been completed.<br>Additional objectives for self-study:<br><br><br>- Explain how to utilize backup static routes, routing instances, OSPF areas, and BGP.<br>- Deploy some of the advanced features available within a firewall filter.<br>- Describe advanced troubleshooting and monitoring features available in Junos OS.<br>- Demonstrate some advanced device administration features.<br>- Describe how routing policies control what prefixes can enter the routing table, and what prefixes can be advertised by protocols.<br>- Describe the tasks involved in upgrading Junos OS.<br>- Use the J-Web graphical interface to make configuration changes and monitor and maintain Junos devices.<br>- Describe the most common network cables in use today, and the reasons for using

the Ethernet protocol in modern networks.<br>- Describe how IP addresses create end-to-end network communication.<br>- Explain how switches enable Layer 2 Ethernet communication between hosts on a shared LAN segment.<br>- Describe the difference between TCP and UDP.

# Frequently Asked Questions

### Q: What delivery options are available for Introduction to the Junos Operating System?

We offer multiple delivery formats:

- Live Instructor-Led Classroom Online (Virtual/Live Online)
- Traditional Instructor-Led Classroom Training (ILT)
- On-site delivery at your offices anywhere in United Kingdom
- Private dedicated courses customized for your team

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### Q: How many CPD hours does this course provide?

The 4-day Introduction to the Junos Operating System course provides up to 26.0 CPD hours of structured learning. CPD certificates can be provided upon request.

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### Q: What is the duration of the Introduction to the Junos Operating System training?

The training takes place over 4 day(s), with each day lasting approximately 32.00 hours including breaks for lunch and refreshments.

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### Q: Do you provide corporate training for Introduction to the Junos Operating System?

Yes, we provide corporate training, dedicated training, and closed classes for Introduction to the Junos Operating System. Training can take place anywhere in United Kingdom including London, Manchester, Birmingham, Edinburgh, or live online allowing teams from across United Kingdom or internationally to attend.

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### Q: What related terms do people search for?

Popular related searches include: Introduction to the Junos Operating System, Service Provider Routing and Switching, IJOS

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### Q: Why choose Nexus Human for Introduction to the Junos Operating System?

Nexus Human is recognized as one of the leading training providers. Our trainers have won multiple awards including:

- Small Firms Best Trainer Award
- National Training Partner of the Year (Ireland) - Multiple Years
- Global Top 30 Instructor Awards (2012, 2019, 2021)
- Tech Excellence Award Nominations
- Learning Performance Institute (LPI) External Training Provider Sponsor 2024

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### Q: Are there any discount codes available?

Yes! Use discount code **PENPAL5** when booking your Introduction to the Junos Operating System training. Please note that only one discount code can be used per booking and cannot be combined with other special offers.


## Nexus Human

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