JUNIPER NETWORKS | Engineering Simplicity

# Day One+

## Junos OS

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## Step 1: Begin

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Junos OS is the network operating system that powers our broad portfolio of physical and virtual networking and security products. It comes preinstalled on Juniper devices. In this guide, we show you how to initially configure Junos OS the first time you power on your device, and how to setup user accounts.

**NOTE:** Are you interested in getting hands-on experience with the topics and operations covered in this guide? Visit Juniper Networks Virtual Labs and reserve your free sandbox today! You'll find the Junos Day One Experience sandbox in the stand alone category.

## Meet Junos OS

Junos OS helps automates network operations and furthers operational efficiency. With the modular architecture of Junos OS, you can achieve a high level of performance, high availability, security, and device scalability. Generally, Junos OS is preinstalled on your Juniper Networks device when you receive it from the factory. When you first power on the device, all software starts automatically. You then configure the software so that the device can participate in your network.

## Initial Configuration

**Video:** Junos OS Initial Configuration

Have the following information ready before you begin your configuration:

- A root password
- The hostname you want to use to identify the device
- The domain name you want to use
- The IP address of a DNS server
- The management interface name for your device

> **NOTE:** To find out the management interface for your router, see Supported Routing Engines by Router. To find out the management interface for your switch, see Understanding Management Interfaces.

Here's how to configure Junos OS for the first time starting from the factory default configuration:

1. Connect a laptop or PC to the device's console port.

2. Power on the device and wait for it to boot.

   Junos OS boots automatically. You'll know the boot process is complete when you see the **login:** prompt on the screen.

3. Log in as the user **root**.

   Initially, you won't need a password for the root user account. When you're the root user, the prompt on the device shows the username **root@#**.

4. Type **cli** to start the Junos OS command-line interface (CLI).

   ```
   root@# cli
   root@>
   ```

5. Type **configure** to access configuration mode:

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

6. Configure the hostname of the device.

   We don’t recommend using spaces in the hostname.

   ```
   [edit]
   root@# set system host-name hostname
   ```

7. Configure the device domain name.

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

8. Configure the IP address and prefix length for the device management Ethernet interface.

   The management Ethernet interface provides a separate out-of-band management network for the device.

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

9. Configure a static (default) route for the management interface. In most cases your router will need to reach destinations that are not local to the management subnet. This route should point to a gateway that is directly reachable over the management network.

   ```
   [edit]
   root@re0# set routing-options static route 0.0.0.0/0 next-hop address
   ```

10. Configure the IP address of a backup or default network device.

    The backup device is only used when the routing protocol process (rpd) isn't running. This route is used on the primary routing engine during initial boot, and on the backup routing engine (which does not run rpd).

    For devices with two routing engines, RE1 is the default backup routing engine and RE0 is the default primary routing engine. RE1 uses the backup device as a default gateway after the device boots. This enables you to access the backup routing engine. Choose a backup device that's directly connected to your device through the management interface. The default gateway is commonly used as the default backup device.

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

11. Configure the IP address of a Domain Name System (DNS) server.

    The DNS server translates hostnames into IP addresses.

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

12. (Optional) Delete the factory default configuration commit.

    Junos OS has a default factory configuration that automatically loads upon system startup. If you've made changes to the configuration, the default factory configuration will override your changes on system startup. To avoid this issue, delete the **commit factory-settings** statement at the **[edit system]** hierarchy level.

    ```
    [edit]
    root@# delete system commit factory-settings
    ```

13. (Optional) Disable automatic software downloads.

    By default, Junos OS will automatically download software upgrades using Zero Touch Provisioning (ZTP) when a device is booted. To disable this feature, delete the **auto-image-upgrade** statement under the **[edit chassis]** hierarchy level.

    ```
    [edit]
    root@# delete chassis auto-image-upgrade
    ```

14. Set the root password.

    The root password can be a plain-text password that the system will encrypt, a password that is already encrypted, or an SSH public key string.

    - To enter a plain-text password:

      ```
      [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:

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

    - To enter an SSH public key string:

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

15. Enable remote access using SSH.

    By default the root user can only log in on the console port, and that root login is not permitted over Telnet connections. In this example we enable remote access for the root user using ssh.

    ```
    [edit]
    root@re0# set system services ssh root-login allow
    ```

16. (Optional) Display the configuration statements.

    ```
    [edit]
    root@ show
    system {
        host-name hostname;
        domain-name domain.name;
        backup-router address;
        root-authentication {
            (encrypted-password "password" | public-key);
            ssh-rsa "public-key";
        }
        name-server {
            address;
        }
        interfaces {
            fxp0 {
                unit 0 {
                    family inet {
                        address address ;
                    }
                }
            }
        }
    }
    ```

    On devices that use management Ethernet interface em0, you'll see em0 in place of fxp0 in the **show** command output.

17. (Optional) Disable DHCP.

    DHCP services automate assigning network-parameters to network devices. The DHCP service process is enabled by default. To disable this feature, use the **dhcp-service disable** configuration statement at the **[edit system processes]** hierarchy level.

    ```
    [edit]
    root@# set system processes dhcp-service disable
    ```

18. Commit the changes to activate the configuration on the device:

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

Once you commit the configuration, you'll see the hostname you configured after the username in the CLI prompt, for example, **user@hostname#**.

The initial configuration is now complete.

19. Exit from CLI configuration mode.

```
[edit]
root@hostname# exit
root@hostname>
```

## Back Up the Configuration

After you commit the configuration and the new configuration is running successfully, run the **request system snapshot** command to back up the new software to the file system on your hard drive. If you don't run the **request system snapshot** command, the configuration on the backup device will be out-of-sync with the configuration on the primary device. Depending on the device model, you may need to insert a supported USB storage device for the snapshot to succeed.

# Step 2: Up and Running

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Now that the initial configuration of Junos OS is complete, you're ready to configure user accounts. This will let other people access the device to make changes.

## Configuring User Accounts

User accounts allow access to the device. You add new user accounts to the device's local database. For each account, you define a login name and password for the user, and specify a login class for access privileges. You can define any number of login classes. The login password must meet the following criteria:

- The password must be at least six characters long.
- You can include most character classes in a password (alphabetic, numeric, and special characters), but not control characters.
- The password must contain at least one change of case or character class.

In this example, we show you how to create and configure a super-user account with a login class named **operator-and boot**.

> **NOTE:** This example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see Using the CLI Editor in Configuration Mode in the CLI User Guide.

To configure user accounts:

1. Set the name of the login class and allow the use of the reboot command.

```
[edit system login]
root@ hostname# set class operator-and-boot allow-commands “request system reboot”
```

2. Set the permission bits for the login class.

```
[edit system login]
root@ hostname# set class operator-and-boot permissions [clear network reset trace view]
```

3. Define the username, bind the user to the *operator-and-boot* class, and configure a pre-encrypted password for the user.

> **NOTE:** In the below step you are entering a pre-encrypted password. You can use the **plain-text-password** argument if you prefer to enter a clear text password that will then be encrypted.

```
[edit system login]
root@ hostname#set user name class operator-and-boot authentication encrypted-password $1$ABC123
```

From configuration mode, enter the **show system login** command to confirm your configuration. If the output doesn't display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
root@ hostname# show system login
    class operator-and-boot {
    permissions [ clear network reset trace view ];
    allow-commands "request system reboot";
}
user name {
    class operator-and-boot;
        authentication {
        encrypted-password "$1$ABC123";
    }
}
```

If you are done configuring the device, enter **commit** to apply and save the configuration.

### J-Web

If you'd prefer to configure and manage your device using a graphical user interface (GUI) rather than a CLI, J-Web is your ticket. J-Web is a simple GUI that lets you easily visualize and manage the Juniper devices (SRX, EX, and MX Series) on your network. J-Web uses the same commands as the Junos OS CLI.

For more information about J-Web, see:

- J-Web for SRX Series
- J-Web Platform Package for EX Series
- J-Web Application Package for EX Series

# Step 3: Keep Going

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Congratulations! You've now completed the initial configuration for Junos OS. Let's keep going and learn about some things you might want to do next.

## Log Files

| If you want to | Then |
|---|---|
| Direct system log messages to a remote machine or to the other routing engine on a router with two routing engines | See Directing System Log Messages to a Remote Machine or the Other Routing Engine in the Network Management and Monitoring Guide |
| Set a custom file size for log files so they can hold more logging information | See Specifying Log File Size, Number, and Archiving Properties in the Network Management and Monitoring Guide |
| Include priority information in system log messages so you can see additional information about the facility and severity level of messages | See Including Priority Information in System Log Messages in the Network Management and Monitoring Guide |
| Send system logs to an external server to ensure they are backed up | See Directing System Log Messages to a Remote Machine in the Network Management and Monitoring Guide |

## Traffic Control

| If you want to | Then |
|---|---|
| Configure a static route to manually save a fixed route in the routing table | See Configure Static Routes in the Protocol-Independent Routing Properties User Guide |
| Configure firewall filters to control the traffic that can access your network | See Example: Configuring a Stateless Firewall Filter to Accept Traffic from Trusted Sources in the Routing Policies, Firewall Filters, and Traffic Policers User Guide |
| Limit management protocol access to only trusted IP addresses | See Example: Control Management Access on Juniper Networking Devices in the User Access and Authentication Administration Guide |
| Configure flow detection to help troubleshoot and understand traffic flow | See Setting Up and Using Flow Detection in the Security Services Administration Guide |

## System Recovery and Upgrade

| If you want to | Then |
|---|---|
| Configure a recovery snapshot so you can recover your files if you need to rollback after software installation | See Backing Up an Installation Using Snapshots in the Junos® OS Software Installation and Upgrade Guide |
| Configure a rescue configuration to ensure that you can always revert to a working configuration | See Rescue and Recovery of Configuration File in the Junos® OS Software Installation and Upgrade Guide |
| Upgrade or reinstall Junos OS | See Preparing for Software Installation and Upgrade in the Junos® OS Software Installation and Upgrade Guide |

## Network Management

| If you want to | Then |
|---|---|
| Find information about how to implement and configure the many network management technologies that Junos OS supports | See the Network Management and Monitoring Guide |
| Configure and optimize SNMP, a networking protocol that helps you monitor and administer your network | See Configuring SNMP in the Network Management and Monitoring Guide |
| Configure NTP to synchronize the system clocks of devices in your network | See Configuring NTP in the Time Management Administration Guide |

## General Information

| If you want to | Then |
|---|---|
| Download, activate, and manage your Junos OS software license | See Activate Junos OS Licenses in the Juniper Licensing Guide |
| Learn about new and changed features, limitations, and known and resolved problems in the hardware and software | Visit the Junos OS Release Notes |
| Find all the Junos OS documentation available to you in our TechLibrary | Click Junos OS Documentation |

| If you want to | Then |
| --- | --- |
| Understand the Internet standards supported by Junos OS | Go to Standards Reference |
| Get hands-on experience with the procedures covered in this guide | Visit Juniper Networks Virtual Labs and reserve your free sandbox. You'll find the Junos Day One Experience sandbox in the stand alone category. |

## Learn With Videos

Our video library continues to grow! We've created many, many videos that demonstrate how to do everything from install your hardware to configure advanced Junos OS network features. Here are some great video and training resources that will help you expand your knowledge of Junos OS.

| If you want to | Then |
| --- | --- |
| Learn about how to connect to a factory-defaulted Junos OS device | Watch the Connecting to a Junos Device video |
| See how to Log in as Root | Watch the Logging in as Root video |
| Get short and concise tips and instructions that provide quick answers, clarity, and insight into specific features and functions of Juniper technologies | See Learning with Juniper on Juniper Networks main YouTube page |
| View a list of the many free technical trainings we offer at Juniper | Visit the Getting Started page on the Juniper Learning Portal |

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