

## Chapter 11

# Booting the System

This chapter provides information about booting your E-series router.



**NOTE:** The type of file you must always use for booting your system is a software release file with the extension `.rel`.

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## Platform Considerations

System booting is supported on all E-series routers.

For information about the modules supported on E-series routers:

- See the *ERX Module Guide* for modules supported on ERX-7xx models, ERX-14xx models, and the ERX-310 router.
- See the *E120 and E320 Module Guide* for modules supported on the E120 router and the E320 router.

## Configuring Your System for Booting

Juniper Networks delivers your E-series router already set up with a factory default configuration and a software release (`.rel`) file. You can, however, create a new configuration file (`.cnf`) and select a different software release file to use in future reboots of your router. When you reboot your router, you can use:

- An existing configuration file to be used each time the system reboots
- An existing configuration file limited to a single reboot

- An existing script file to be used on only the next reboot
- An existing script file to be used on the next and every subsequent reboot using backup mode
- The configuration that is already running on the system
- The factory default configuration

In addition, you can configure the system to load a different software release file on its next reboot. Use the **boot system** command to do this. If you do not configure your system with a backup release, it reverts to the release and configuration it had before the crash.

You can use the **boot backup** command to specify a software release and configuration for the system to use in case the system resets too many times in a given period.

The **boot subsystem** command enables you to override the system release setting for a given subsystem—for example, OC3.

### **Booting the GE-2 Line Module**

The GE-2 line module can now detect whether it supports the software release installed on the primary SRP module in an E-series router. When the GE-2 line module is booting and it detects that it supports the software release on the SRP module, the line module boots successfully with that software release. However, if the GE-2 line module detects that it does not support the software release on the SRP module, the module does not boot successfully and the following messages appear in the system log:

```
ERROR 05/04/2005 06:09:05 system (slot 13): Line card failed diags in slot 13
with status: Autoboot disabled
ERROR 05/04/2005 06:09:05 system (slot 13): board failed diagnostics
```

#### ***boot backup***

- Use to set the release version and the configuration to be used when the boot logic chooses backup mode.
- This command does not reboot the system; it configures the system for rebooting.
- You can require the system to reboot from an existing configuration file, from an existing local script file, or with the factory default configuration.
- Example  

```
host1(config)#boot backup rel_1_1_0.rel newfile.cnf
```
- Use the **no** version of this command to remove the backup setting.

**boot config**

- Use to specify the configuration with which the system is rebooted.



**CAUTION:** All versions of this command except those using the **running-configuration** or **startup-configuration** keywords erase the current system running configuration. Before issuing one of those versions, you might want to save the running configuration to a .cnf file by issuing the **copy running-configuration** command.

- You can require the system to reboot from a configuration file.

To specify an existing system configuration (.cnf) file that the system uses for the next reboot and all subsequent reboots:

```
host1(config)#boot config newconffile.cnf
```

To specify an existing system configuration (.cnf) file that the system uses only on the next reboot. On subsequent reboots, the system will use the running configuration current at the time of that reboot:

```
host1(config)#boot config newconffile.cnf once
```

- You can require the system to reboot from an existing local script (.scr) file that the system uses only on the next reboot. On subsequent reboots, the system will use the running configuration current at the time of that reboot:

```
host1(config)#boot config scriptfile.scr
```

Configuring this option causes the system to ignore—only at the next reboot—an autocfg.scr file that you may also have configured.

- If you specify a .cnf file, upon the next reboot the system resets to the factory defaults; it then opens the .cnf file and begins applying it immediately. If you specify a .scr file, upon the next reboot the system resets to the factory defaults; it then waits for a 600-second countdown timer to expire before applying the script. This period gives the line modules an opportunity to fully initialize before configuration begins. Upon timer expiration or system initialization (whichever occurs first), the script executes regardless of the state of the line modules. You can escape from the countdown by pressing Ctrl + c; the system prompts you to execute the script immediately or return to the system console.
- You can require the system to reboot from the configuration running on the system at the time of the reboot.

If the system is in Automatic Commit mode:

```
host1(config)#boot config running-configuration
```

If the system is in Manual Commit mode:

```
host1(config)#boot config startup-configuration
```

See *Saving the Current Configuration* in *Chapter 5, Managing the System*, for information about Automatic and Manual Commit modes.

- You can require the system to reboot from the factory default configuration. On subsequent reboots, the system will use the running configuration current at the time of that reboot:

```
host1(config)#boot config factory-defaults
```

- This command does not reboot the system.
- Use the **no** version to clear a previous request to reboot in a specified manner.

### ***boot force-backup***

- Use to force the system to use the backup release/configuration on the next boot.
- This command does not reboot the system.
- Example

```
host1(config)#boot force-backup mysafe.rel mysafe.cnf
```



**NOTE:** Even if you request the normal release/configuration, the boot logic still checks the reboot history file. It may force the backup mode regardless of your request. To guarantee that the boot logic does not override your request to use the normal release/configuration, do either of the following:

- Delete the reboot history file after issuing the **no boot force-backup** command.
  - Do not configure a backup release or configuration file.
- 

- Use the **no** version to set the system to return to its normal release/configuration on the next boot.

### ***boot revert-tolerance***

- Use to set the reversion tolerances that the boot logic uses to determine whether to use normal or backup settings.
- The default settings tolerate up to three resets in 30 minutes.
- This command does not reboot the system when high availability is not enabled.
- Issuing this command when high availability is enabled results in the system cold-restarting the router and using the backup settings if the tolerance settings are met.

- Example

```
host1(config)#boot revert-tolerance 2 60
```

- Use the **no** version to restore the default values, 3 and 1800.

**boot revert-tolerance never**

- Use to set the boot logic to never revert to the backup image/configuration.
- This command does not reboot the system.
- Example

```
host1(config)#boot revert-tolerance never
```



**NOTE:** This command is functionally equivalent to specifying no backup image/configuration, but it allows you to leave the backup settings alone and to toggle autoreversion on and off. This command is undone by using the **no boot revert-tolerance** command, which restores the default settings, or the **boot revert-tolerance** command. The default settings are count = 3 (crashes) and time = 1800 (seconds); that is, 3 crashes in 30 minutes.

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- There is no **no** version.

**boot subsystem**

- Use to configure the software release the selected subsystem will use the next time it reboots.
- This command does not reboot the subsystem.
- Example 1

```
host1(config)#boot subsystem ct3 rel_1_0_1.rel
```

- The **boot backup subsystem** version of this command enables you to configure a backup subsystem for booting.
- Example 2

```
host1(config)#boot backup subsystem ct3 rel_1_0_1.rel
```

- Use the **no** version to remove the configuration setting.

**boot system**

**CAUTION:** This command attempts to reprogram the SRP boot PROMs, if necessary. The SRP has a primary and, typically, a backup boot PROM. If the **boot system** command is executed on an SRP with no backup boot PROM, the following message is displayed: “Write to Backup Boot ROM failed.” In this instance, this message is correct, and you can ignore it.

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- Use to specify the software release (.rel) file that your system will use when rebooting.
- This command does not reboot the system.
- In a dual SRP configuration, when this information is synchronized to the standby SRP, the standby SRP is reloaded to boot the specified release. The high availability feature requires the release to be the same on the active and the standby SRP. This means that arming the system to boot with a different release causes the standby to reload and prevent high availability from becoming active or disable high availability if it is active or pending.

- Example  
`host1(config)#boot system release1.rel`
- There is no **no** version.

## Rebooting Your System

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You can reboot your system as a whole or select a single slot in the system to be rebooted. You can reboot your system immediately or in a designated interval of time, and can configure the system to prompt you if the modules are in a state that could lead to a loss of configuration data or an NVS corruption.

If you reboot the system before it has completely written configuration updates to NVS, the system will start with the last saved configuration. If you reboot the system after it has written the configuration updates to NVS, but before it has applied those updates to actual configuration data, the configuration update process resumes immediately following the reboot and completes before any application accesses its configuration data.

### **reload**

- Use to reload the software on the system immediately.
- Reloads the system software (.rel) file and the configuration (.cnf) file on the system.
- When you issue this command, the system prompts you for a confirmation before the procedure starts.
- If you specify the **force** keyword, the procedure will fail if the system is updating the boot prom. In this case, the system will display a message that indicates that the procedure cannot currently be performed and the cause. However, if the system is in a state that could lead to a loss of configuration data or an NVS corruption, such as during the synchronization of SRP modules, the system displays a message that describes the state, and asks you to confirm (enter y for yes, n for no) whether you want to proceed.
- If you do not specify the **force** keyword, the procedure will fail if the system is in a state that could lead to a loss of configuration data or an NVS corruption, and the system will display a message that explains why the procedure failed.
- Use the **standby-srp** keyword to reload the system software (.rel) file and the configuration (.cnf) file on the standby SRP module without having to look up its slot number to use with the **reload slot** command.
- When you issue this command, the system prompts you for a confirmation before the procedure starts.
- If you remove a standby SRP module without issuing the **slot erase** command to delete the configuration, the E-series router cannot guarantee that the SRP modules were synchronized. In this situation, you must do either of the following to reload the router:
  - Issue the **reload** command with the **force** keyword.
  - Issue the **slot erase** command followed by the **reload** command.

- Example  
`host1#reload`  
`host1#reload force`
- There is no **no** version.

### ***reload at***

- Use to reload the software on the system at an absolute time.
- This command halts the system.
- Reloads the system software (.rel) file and the configuration (.cnf) file on the system. If the system is in a state that could lead to a loss of configuration data or an NVS corruption, it will delay the procedure for one minute. Each time the system delays the procedure, it adds a message to the os log that explains why the procedure was delayed. If the system cannot reload on its sixth attempt, the reboot procedure will fail, and the system will add an explanation to the os log.
- Example  
`host1#reload at 10:10 May 5`  

This command reloads the software 10 minutes after 10 on May 5th.
- There is no **no** version.

### ***reload in***

- Use to reload the software on the system in a relative period of time.
- This command halts the system.
- Reloads the system software (.rel) file and the configuration (.cnf) file on the system.
- If the system is in a state that could lead to a loss of configuration data or an NVS corruption, it will delay the procedure for one minute. Each time the system delays the procedure, it adds a message to the os log that explains why the procedure was delayed. If the system cannot reload on its sixth attempt, the reboot procedure will fail, and the system will add an explanation to the os log.
- Example  
`host1#reload in 00:10`  

This command reloads the software in 10 minutes.
- There is no **no** version.

### ***reload slot***

- Use to reboot a selected slot on the router.
- Reloads the system software (.rel) file and the configuration (.cnf) file on the module in the selected slot.
- When you issue this command, the system prompts you for a confirmation before the procedure starts.

- If you specify the **force** keyword and the slot number of the primary SRP module, the procedure will fail if the system is updating the boot prom. In this case, the system will display a message that indicates that the procedure cannot currently be performed and the cause. However, if the system is in a state that could lead to a loss of configuration data or an NVS corruption, such as using the synchronization of SRP modules, it displays a message that describes the state, and asks you to confirm (enter yes or no) whether you want to proceed.
- If you do not specify the **force** keyword, the procedure will fail if the system is in a state that could lead to a loss of configuration data or an NVS corruption, and the system will display a message that explains why the procedure failed.
- Example  
`host1#reload slot 3`
- There is no **no** version.

### ***Rebooting When a Command Takes a Prolonged Time to Execute***

Although some commands might take a relatively long time to execute, most do not. If the CLI displays no output other than “Please wait...” for a prolonged period, you can press Ctrl + x to reset the system. Use Ctrl + x only as a last resort; if at all possible, wait until the command is completed, or attempt to connect to the system through a Telnet or SSH client through which you can use the **reload** command.

#### ***service ctrl-x-reboot***

- Use to enable the Ctrl + x key combination to reset the system from any location.
- Issuing the Ctrl + x command has no effect if you are accessing the system through Telnet.
- This feature is disabled by default.
- Loading the factory default configuration does not override this feature.
- Example  
`host1(config)#service ctrl-x-reboot`
- Use the **no** version to disable this feature.

### ***Configuration Caching***

Configuration caching prevents the system from being partially configured with changes in the event of a reset. When a script or macro begins execution, the resulting configuration changes are automatically cached in system RAM rather than being committed to nonvolatile storage (NVS). When the script or macro completes execution, the cache is flushed as a background operation, saving the configuration changes to NVS.

If the SRP module resets during the script or macro execution, the system boots as though the script were never started because no NVS files have changed. If the SRP module resets during the flush operation, the system boots with factory defaults.



If you start another script or macro in the middle of an ongoing flush operation, the current flush is halted; now if the SRP module resets during the script, the system boots with factory defaults.

If you issue the **reload** command to manually reset the system, the system checks for an ongoing cache flush and warns you if a flush operation is discovered.

## Operations in Boot Mode

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To access Boot mode:

1. Reload the system from Privileged Exec mode:

```
host1#reload
WARNING: Execution of this command will cause the system to reboot.
Proceed with reload? [confirm]
Reload operation commencing, please wait...
7
```

2. Press the < mb > key sequence (case-insensitive) during the countdown that is displayed immediately after the BPOST tests are bypassed. This puts the CLI in Boot mode.

```
:boot##
```

If you do not press the < mb > key sequence before the countdown timer expires, the reloading process continues and returns the CLI to the normal User Exec mode.

## Displaying Boot Information

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You can display information about the system's booting configuration, installed hardware versions, and installed software versions.

### **show boot**

- Use to show the current boot settings.
- Example

```
host1#show boot
System Release:      release.rel
System Configuration: running-configuration
```

Note: This system is not configured with backup settings.

### **show hardware**

- Use to display detailed information about the system hardware.
- Field descriptions
  - slot—Physical slot that contains the module
  - type—Type of module
  - serial number—Serial number of the module

- assembly number—Part number of the module
  - assembly rev—Hardware revision of the module
  - ram (MB)—Memory capacity of the host processor
  - number of MAC addresses—Total number of Ethernet addresses on an I/O module
  - base MAC address—Lowest Ethernet address on an I/O module
- Example

```
host1#show hardware
```

| slot | type             | serial number | assembly number | assembly rev. | ram (MB) |
|------|------------------|---------------|-----------------|---------------|----------|
| 0    | SRP-10Ge         | 4305358981    | 3500005472      | A06           | 2048     |
| 1    | SRP-10Ge         | 4305359020    | 3500005472      | A06           | 2048     |
| 2    | ---              | ---           | ---             | ---           | ---      |
| 3    | ---              | ---           | ---             | ---           | ---      |
| 4    | CT3-12           | 4305337201    | 3500010901      | A07           | 128      |
| 5    | OC3/OC12/DS3-ATM | 4605300290    | 3500103958      | A06           | 256      |
| 6    | GE/FE            | 4605340294    | 3500104554      | A08           | 256      |

| slot | type           | serial number | assembly number | assembly rev. | number of MAC addresses |
|------|----------------|---------------|-----------------|---------------|-------------------------|
| 0    | ---            | ---           | ---             | ---           | ---                     |
| 1    | SRP-10Ge I/O   | 4605250426    | 3500003302      | A02           | 1                       |
| 2    | ---            | ---           | ---             | ---           | ---                     |
| 3    | ---            | ---           | ---             | ---           | ---                     |
| 4    | CT3/T3-12 I/O  | 4305316605    | 3500010801      | A02           | ---                     |
| 5    | OC3(8)-MM I/O  | 4304443600    | 4500001501      | A03           | 4                       |
| 6    | GE-SFP I/O     | 4605310064    | 4500002001      | A05           | 1                       |
| base |                |               |                 |               |                         |
| slot | MAC address    |               |                 |               |                         |
| 0    | ---            |               |                 |               |                         |
| 1    | 0090.1aa0.577a |               |                 |               |                         |
| 2    | ---            |               |                 |               |                         |
| 3    | ---            |               |                 |               |                         |
| 4    | ---            |               |                 |               |                         |
| 5    | 0090.1a41.7c68 |               |                 |               |                         |
| 6    | 0090.1aa0.6216 |               |                 |               |                         |

### **show last-reset**

- Use to display the reason for the system's last user-directed reload or error-caused reset.
- Example

```
host1#show last-reset
last reset: power cycle
```

**show reload**

- Use to display the system's reload status.
- Example

```
host1#show reload
reload scheduled for TUE OCT 2 2001 10:10:00 UTC
```

**show version**

- Use to display the configuration of the system hardware and the software version.
- Example

```
host1#show version
Juniper Edge Routing Switch ERX-700
Copyright (c) 1999-2005 Juniper Networks, Inc. All rights reserved.
System Release: erx_7-1-0.rel Partial
Version: 7.1.0 [BuildId 4518] (December 21, 2005 11:23)
System running for: 25 days, 3 hours, 31 minutes, 5 seconds
(since THU DEC 22 2005 11:36:41 UTC)
```

| slot | state   | type       | admin   | spare | running release | slot uptime    |
|------|---------|------------|---------|-------|-----------------|----------------|
| 0    | standby | SRP-10Ge   | enabled | ---   | erx_7-1-0.rel   | ---            |
| 1    | online  | SRP-10Ge   | enabled | ---   | erx_7-1-0.rel   | 25d03h:28m:49s |
| 2    | ---     | ---        | ---     | ---   | ---             | ---            |
| 3    | ---     | ---        | ---     | ---   | ---             | ---            |
| 4    | online  | CT3-12     | enabled | ---   | erx_7-1-0.rel   | 25d03h:24m:46s |
| 5    | online  | OC3-4A-APS | enabled | ---   | erx_7-1-0.rel   | 25d03h:24m:22s |
| 6    | online  | GE         | enabled | ---   | erx_7-1-0.rel   | 25d03h:24m:44s |

**Output Filtering**

The output filtering feature of the **show** command is not available in Boot mode.

