Installing the SmartEdge OS

for SmartEdge and SM Family Routers

INSTRUCTIONS

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Contents

1 Introduction

This document describes the SmartEdge® router, the SM family chassis, and this release of the SmartEdge OS.

For current security notifications, visit the Ericsson E-business portal at https://ebusiness.ericsson.net/.

2 Supported Hardware

This section describes supported hardware for the SmartEdge OS for this release.

2.1 Supported Devices

Caution!

This release of the SmartEdge OS does not support line cards based on Packet Processing ASIC version 1 (PPA1). PPA1-based line cards can still be installed and detected in a SmartEdge chassis, but the SmartEdge OS does not recognize and initialize them to a usable state. After upgrading, card slots that were provisioned with PPA1-based line cards are deconfigured and show a card type of "unknown" in the command-line interface (CLI).

This release supports the Cross-Connect Route Processor (XCRP) Version 4 (XCRP4) and the SM Route Processor Version 2 (SMRP2) Controller card. It does not support the XCRP Version 3 (XCRP3) Controller card.

In general, release-specific restrictions and limitations are documented in the *Network Impact Report* for the SmartEdge OS.

This release is compatible with the common equipment available for the SmartEdge router and the SM family of systems. You can run this release on the following SmartEdge devices:

• SmartEdge 100 router

- SmartEdge 400 router

- SmartEdge 600 router

- SmartEdge 800 router

- SmartEdge 1200 router

- SmartEdge 1200H router

You can also run this release on the following SM family devices:

- SM 240 system

- SM 480 system

For more information about hardware and common equipment, see the CD-ROM that accompanies the SmartEdge router, the SM family chassis, or the support web site for the hardware guide for your specific platform:

- *SmartEdge 100 Router Hardware Guide*

- *SmartEdge 400 Router Hardware Guide*

- *SmartEdge 600 Router Hardware Guide*

- *SmartEdge 800 Router Hardware Guide*

- *SmartEdge 1200 Router Hardware Guide*

- *SmartEdge 1200H Router Hardware Guide*

- *SM 240 Hardware Guide*

- *SM 480 Hardware Guide*

For information about new hardware introduced in this release, see the *Network Impact Report* for the SmartEdge OS.

2.2 Identifying Hardware

To identify hardware, enter the `show hardware` command (in any mode).

Table 1 lists the two-character product codes (the first two characters in the serial number) that identify the SmartEdge or SM family chassis types.

Table 1   Chassis Types

Chassis	Product Code	Description
SmartEdge 100 AC	B8	SmartEdge 100 chassis that supports AC power

Table 1   Chassis Types

Chassis	Product Code	Description
SmartEdge 100 DC	B9	SmartEdge 100 chassis that supports DC power
SmartEdge 400 AC	44	SmartEdge 400 chassis that supports AC power source with an AC power tray
SmartEdge 400 DC	0A	SmartEdge 400 chassis that supports DC power
SmartEdge 800e	9C	SmartEdge 800 chassis; not certified as NEBS-compliant
SmartEdge 800 NEBS	8Y	NEBS-compliant SmartEdge 800e chassis
SmartEdge 800s	B2	SmartEdge 800 NEBS chassis with BNC connectors removed
SmartEdge 1200n	D9	NEBS-compliant SmartEdge 1200 chassis
SmartEdge 1200H	H1	High-power NEBS-compliant SmartEdge 1200 chassis
SM 240	G5	NEBS-compliant SM 240 chassis
SM 480	F8	NEBS-compliant SM 480 chassis

3 Booting the Device for the First Time

To boot a SmartEdge router or an SM family chassis for the first time:

1. Connect a console to the named port on the device:

    - SmartEdge 100 router—**CRAFT** on the front panel of the chassis.

    - SmartEdge 400 router—**CRAFT** on the controller card. This is slot 6 for the active controller card or slot 5 for the standby controller card.

    - SmartEdge 600 router—**CRAFT** on the controller card. This is slot 7 for the active controller card or slot 8 for the standby controller card.

    - SmartEdge 800 router—**CRAFT** on the controller card. This is slot 7 for the active controller card or slot 8 for the standby controller card.

    - SmartEdge 1200 router—**CRAFT** on the controller card. This is slot 7 for the active controller card or slot 8 for the standby controller card.

    - SmartEdge 1200H router—**CRAFT** on the controller card. This is slot 7 for the active controller card or slot 8 for the standby controller card.

- SM 240 chassis—**CRAFT** on the active controller card in slot 7.

- SM 480 chassis—**CRAFT** on the active controller card in slot 7.

2. Power on the device:

- SmartEdge 100 router—Toggle the switch to **on**, which is marked **1** on the rear panel.

- SmartEdge 400 router—Insert the fuses in the external fuse panel or, if the router is powered by AC power, connect each AC power cord to a separate building outlet for a circuit rated at 15A with a 15A circuit breaker. The PWR A, and optionally, PWR B LED on the front of the chassis light up if there is adequate power.

- SmartEdge 600 router—Insert the fuses in the external fuse panel. The PWR A, and optionally, PWR B LED on the front of the chassis light up if there is adequate power.

- SmartEdge 800 router—Insert the fuses in the external fuse panel. The PWR A, and optionally, PWR B LED on the front of the chassis light up if there is adequate power.

- SmartEdge 1200 router—Insert the fuses in the external fuse panel. The PWR A, and optionally, PWR B LED on the front of the chassis light up if there is adequate power.

- SmartEdge 1200H router—Insert the fuses in the external fuse panel. The PWR A1 and PWR A2 LEDs on the front of the chassis should light to signify adequate power.

- SM 240 chassis—Insert the fuses in the external fuse panel. The PWR A and PWR B LEDs on the front of the chassis should light to signify adequate power.

- SM 480 chassis—Insert the fuses in the external fuse panel. The PWR A1 and PWR A2 LEDs on the front of the chassis should light to signify adequate power.

If you need more information about powering on your system or inserting fuses, see the hardware guide for your device.

3. Check the console output:

a If you see an `ok` prompt, the auto-boot? variable is set to false. You must change its value; proceed to Step 4.

b If a message appears indicating that the system will auto-boot in five seconds, the auto-boot? variable is set to true. No changes are necessary; proceed to Step 5.

4. Set the auto-boot? variable to true with the following command:

```
setenv auto-boot?  true
```

5. Reset the hardware:

    ```
    reset-all
    ```

6. Wait for the system to reload.

4 Preparation

Before upgrading your system to this release of the SmartEdge OS, perform the following steps to ensure your system is ready to upgrade.

1   Confirm the system has sufficient space; see Section 4.1 on page 5.

2   Check for release-specific alerts and notifications; see Section 4.2 on page 5.

3   Back up important information; see Section 4.3 on page 6.

4   Record the current state of your system; see Section 4.4 on page 6.

5   Check that your system is running the required version of boot ROM; see Section 4.5 on page 7.

6   Check that your system is running the required version of the minikernel; see Section 4.6 on page 11.

4.1 Confirm the System Has Sufficient Space

You must have 400 MB available on the system to upgrade. The alternate partition is erased during upgrade, so you can count the space consumed by the alternate partition as available space. In other words, the current free space plus the disk space consumed by the alternate partition must be at least 400 MB.

4.2 Check for Release-Specific Alerts and Notifications

Before upgrading the SmartEdge OS, read the *Network Impact Report* for the SmartEdge OS, which is produced for every release of the SmartEdge OS. It describes new and changed hardware and software features, release restrictions and limitations, required system components, and release-specific upgrade information. The *Network Impact Report* is in the `Planning` folder of the Customer Product Information library for your system.

Check the "Implementation" section of the *Network Impact Report* to see if there are any upgrade alerts for your release. Take any necessary steps identified in those alerts.

In addition, check for security notifications on the Ericsson E-business portal at https://ebusiness.ericsson.net

4.3 Back Up Important Information

Before upgrading to the new release, back up all important information and verify that the save has been successful. The upgrade process reboots the system at least once, and the reboot could delete the running configuration.

1 Back up your configuration.

— Save your configuration to the flash drive or to a remote location; do not back up configuration to the default `redback.cfg` configuration file.

— You can save the configuration to the local drive if you use a filename that distinguishes the backup file from the default configuration file; for example, `redback_SEOS-6.5.1.3p3.cfg`.

— You can save to the flash drive using the `save configuration /flash/filename` command.

— You can transfer the configuration to a remote server with FTP or SCP using the `save configuration ftp://username[:pass word]@ip-address//path/filename` or `save configuration scp://username[:password]@ip-address//path/filename` command.

2 Verify that the information has been successfully saved.

3 When your configuration is backed up, back up important data on the internal CompactFlash memory card. You can use the `copy` command to do this.

4.4 Record Device State

Record the current state of your system so that you can restore information if necessary.

1 Record configuration features.

2 Establish a baseline for your system routing.

— Enter the `show ip route summary all-context` command (in any mode) to display summary information for all IP routes in all contexts.

— Record the results so that you can verify routing operations after the upgrade.

3 Record the running state of the device. Include important information such as the number of connected subscribers, the number of links up within link groups, and so on.

4.5 Confirm Correct Boot ROM Image Version

The software boot ROM (also called the OFW, for Open Firmware) includes high-level and low-level components, including the system bootstrap.

Caution!

You must upgrade the boot ROM to the version required for your release, as listed in the *Network Impact Report*. If you do not, serious errors might occur and the system might be unable to boot.

Stop!

For SmartEdge routers, the Advanced Services Engine (ASE) card must be running the correct version of the boot ROM and so must the SmartEdge OS system. To avoid a serious equipment outage in the field, if you are running SmartEdge OS Release 6.2.1.5 or later on either the ASE or the SmartEdge OS system, DO NOT DOWNGRADE to 6.2.1.4 or earlier. If you must downgrade, contact your support representative for an equipment-safe procedure. Downgrading from these releases can cause permanent damage to the ASE.

The File Server System Blade (FSSB) obtains its software from the XCRP Controller card. The FSSB will have the correct version as long as the XCRP is upgraded to correct version.

4.5.1 Checking the Version of the Boot ROM

Read the *Network Impact Report* to see the required boot ROM version for this release. To check which version of the boot ROM your system is running, enter the `show version` command in any mode to see what version of the boot ROM your system is running.

If your system is running the required boot ROM version, go to Section 4.6 on page 11) If your system is not running the required version, upgrade the boot ROM image using the procedure in the next section.

4.5.2 Upgrading the Boot ROM Image

Table 2 lists command syntax for boot ROM upgrade:

Table 2   Command Syntax for Boot ROM Upgrade

Use This Syntax:	To Download This and Upgrade:
`upgrade bootrom /md/`*`filename`* [`no-reload`]	A file in the **/md** directory, where *`filename`* includes the file extension.
`upgrade bootrom ftp://`*`url`* [`no-reload`]	A file on a remote FTP server.
`upgrade bootrom scp://`*`url`* [`no-reload`]	A file on a remote SCP server.
	For remote FTP and SCP servers, the syntax for the *`url`* argument is *`username`*[`:`*`passwd`*]`@{`*`ip-addr`*|*`hostname`*`}/`*`directory`*`/`*`filename`*, where *`filename`* includes the file extension.

Upgrade the boot ROM image using the following steps:

1   Download the file. Upgrade initiates automatically.

By default, the system reboots and reloads after upgrading. You can postpone reloading by including the `no-reload` keyword. If you delay reloading, the boot ROM upgrade does not take effect until the system is reloaded.

To upgrade the boot ROM image without reloading, perform the following step:

—   Enter the `upgrade bootrom` command in exec mode, using the syntax shown in Table 2 and include the `no-reload` keyword.

For example, to download the `OFW-XC4-2.0.2.45.fallback.md5` boot ROM image from an FTP server on the host `lab1`, as user `john` with password `xxx`, where the file is located in the `testdir` directory, enter the following command:

```
[local]Redback#upgrade bootrom ftp://john:xxx@lab1/t
estdir/OFW-XC4-2.0.2.45.fallback.md5 no-reload
```

To upgrade the boot ROM image with a system reload, perform the following steps:

a   Enter the `upgrade bootrom` command in exec mode, using the syntax shown in Table 2. Omit the `no-reload` keyword.

For example, to download the `OFW-XC4-2.0.2.45.fallback.md5` boot ROM image from an FTP server on the host `lab1`, as user `john` with password `xxx`, where the file is located in the `testdir` directory, enter the following command:

```
[local]Redback#upgrade bootrom ftp://john:xxx@lab1/t
estdir/OFW-XC4-2.0.2.45.fallback.md5
```

The system displays the following prompt:

```
This operation will cause the box to reload, do you
want to continue?
```

b Type **y** and press Enter.

The system transfers the file and upgrades the boot ROM. After this process is complete, the system automatically reboots and reloads. The reload process takes several minutes.

Note: If the system does not reboot, make sure that the auto-boot? variable in the new version of the boot ROM image is set to true.

2 If you chose to reload your system, you can perform the following verification steps.

a When the upgrade and reload are both complete, you can verify that the system is using the new boot ROM image by entering the **show version** command in any mode. If you chose not to reload the system, the new boot ROM image is not yet in effect.

b If your system has dual controller cards, wait a few minutes to ensure that the system synchronizes its controller cards, and then verify the redundancy state by issuing the **show redundancy** command.

The following example shows the output from the **show redundancy** command for a SmartEdge router:

```
[local]Redback>show redundancy

--------------------------------
This XCRP is active
--------------------------------
STANDBY XCRP READY?: YES
VxWorks in sync?          : YES
Database in sync?         : YES
Software Release in sync? : YES
Firmware in sync?         : YES
Mate-to-Mate link up?     : YES

ARP                            SUCCESS
CSM                            SUCCESS
DHCP                           SUCCESS
ISM                            SUCCESS
RDB                            SUCCESS
SM AAA DSLline                 SUCCESS
SM AAA Session                 SUCCESS
SM AAA Strings                 SUCCESS
SM ISM2                        SUCCESS
SM LDP ADJ                     SUCCESS
SM LDP CTX                     SUCCESS
SM LDP PEER                    SUCCESS
SM LM                          SUCCESS
SM RCM                         SUCCESS
SM RIB                         SUCCESS
SM STATD                       SUCCESS
```

The following example shows the output from the `show redundancy` command for an SM family system:

```
[local]Redback>show redundancy

--------------------------------
This SMRP is active
--------------------------------
STANDBY SMRP READY?: YES
VxWorks in sync?          : YES
Database in sync?         : YES
Software Release in sync? : YES
Firmware in sync?         : YES
Mate-to-Mate link up?     : YES

ARP                           SUCCESS
CSM                           SUCCESS
DHCP                          SUCCESS
ISM                           SUCCESS
RDB                           SUCCESS
SM AAA DSLline                SUCCESS
SM AAA Session                SUCCESS
SM AAA Strings                SUCCESS
SM ISM2                       SUCCESS
SM LDP ADJ                    SUCCESS
SM LDP CTX                    SUCCESS
SM LDP PEER                   SUCCESS
SM LM                         SUCCESS
SM RCM                        SUCCESS
SM RIB                        SUCCESS
SM STATD                      SUCCESS
```

4.6 Confirm Correct Minikernel Version

Caution!

You must upgrade the minikernel to the version listed in the *Network Impact Report*. If you do not, serious errors might occur. Depending on your system, you might also need to perform the steps in "Additional Minikernel Upgrade Steps."

4.6.1 Checking the Version of the Minikernel

The *Network Impact Report* lists the required version of minikernel for this release. To check which version of the minikernel your system is running, enter the **show version** command in any mode.

If your system is running the required version of the minikernel, go to Section 5 on page 15. If your system is not running the required version, upgrade the minikernel image using the procedure in the following sections.

4.6.2 Upgrading the Minikernel Image

Table 3 lists command syntax for minikernel upgrade:

Table 3   Command Syntax for Minikernel Upgrade

Use This Syntax:	To Download This and Upgrade:
`upgrade minikernel /md/`*`filename`* `[no-reload]`	A file in the **/md** directory, where *`filename`* includes the file extension
`upgrade minikernel ftp://`*`url`* `[no-reload]`	A file on a remote FTP server
`upgrade minikernel scp://`*`url`* `[no-reload]`	A file on a remote SCP server
	For remote FTP and SCP servers, the syntax for the *`url`* argument is *`username`*[:*`passwd`*]@{*`ip-addr`*|*`hostname`*}/*`directory`*/*`filename`*, where *`filename`* includes the file extension.

To upgrade the minikernel image, perform the following steps:

1   Download the file. Upgrade initiates automatically.

By default, the system performs a reload after upgrading. You can postpone reloading, by including the `no-reload` keyword. If you delay reloading, the minikernel upgrade does not take effect until the system is reloaded.

To upgrade the minikernel image without reloading, perform the following step:

—   Enter the `upgrade minikernel` command in exec mode using the syntax shown in Table 3 and include the `no-reload` keyword.

For example, to download the `MINIKERN_RBN64-xc4.p11.v7` minikernel image from an SCP server on the host at IP address `10.10.1.4`, as user `ann` with password `yyy`, where the file is located in the `test2` directory, enter the following command:

`[local]Redback#`**`upgrade minikernel scp://ann:yyy@10.1 0.1.4/test2/MINIKERN_RBN64-xc4.p11.v7 no-reload`**

The system transfers the file and upgrades the minikernel without reloading.

To upgrade the minikernel image with a reload, perform the following steps:

a   Enter the **upgrade minikernel** command in exec mode using the syntax shown in Table 3. Omit the **no-reload** keyword.

For example, to download the `MINIKERN_RBN64-xc4.p11.v7` minikernel image from an SCP server on the host at IP address `10.10.1.4` , as user `ann` with password `yyy`, where the file is located in the `test2` directory, enter the following command:

```
[local]Redback#upgrade minikernel scp://ann:yyy@10.1
0.1.4/test2/MINIKERN_RBN64-xc4.p11.v7
```

The system displays the following prompt:

```
This operation will cause the box to reload, do you
want to continue?
```

b   Type **y** and press Enter.

The system transfers the file and upgrades the minikernel. After this process is complete, the system automatically reboots and reloads. The reload process takes several minutes. If your system has a standby controller card, the minikernel image on the standby controller card is automatically synchronized the active controller card.

2   If you chose to reload your system during this step, you can perform the following verification steps.

a   When the upgrade and reload are complete, verify that the system is using the new minikernel image by entering the **show version** command in any mode. If you chose not to reload the system, the new minikernel image are not yet in effect.

b   If your system has dual controller cards, wait a few minutes to ensure that the system synchronizes. Verify the redundancy state by issuing the **show redundancy** command.

If either of the following two conditions apply to your system, you must proceed to the section, Additional Minikernel Upgrade Steps after upgrading the minikernel:

- You used minikernel 11.5 to reformat the internal flash memory card.

- The internal flash memory card has less than 900 MB of total space. Use the **show disk** command to determine the space on the internal Flash memory card (in 512-byte increments).

If neither of these conditions applies to your system, go to the next upgrade step, Upgrade the SmartEdge OS.

4.6.3 Additional Minikernel Upgrade Steps

Perform the steps in this section only if one of the following conditions applies to your system:

* You used minikernel 11.5 to reformat the internal flash memory card.

* The internal flash memory card has less than 900 MB of total space. Use the **show disk** command to determine the space on the internal flash memory card (in 512-byte increments).

If neither of these conditions applies to your system, go to the next section, Upgrade the SmartEdge OS.

Note: This procedure uses the boot ROM shell interface (**ok** prompt). For information about the boot ROM shell and boot variables, see *Basic Troubleshooting Techniques*.

To continue upgrading the minikernel image:

1. Make sure that your configuration has been saved, as described in Section 4.3 on page 6. If you want to save the configuration again, you can back up the configuration during this upgrade procedure. When the system prompts you to save the current configuration, enter **y** and specify the location and filename for the file. If you do not specify the location and filename, the SmartEdge OS saves the configuration to **/flash/redback.cfg**

   Verify that the configuration was saved before proceeding with the upgrade.

2. Access the boot ROM interface (navigate to the **ok** prompt):

   a   From the console port, enter the **reload** command (in exec mode):

   ```
   [local]Redback#reload
   ```

   b   Watch the reload progress messages carefully. When the following message appears, type **se*** within five seconds:

   ```
   Auto-boot in 5 seconds - press se* to abort, ENTER
   to boot:
   ```

   If you typed **se*** within five seconds, the boot ROM **ok** prompt appears. The system sets the autoboot time limit to five seconds. However, during some operations, such as a release upgrade, the system sets the time limit to one second to speed the process and then returns it to five seconds when the system has rebooted. (If you miss the time limit, the reload continues.)

3. Invoke the minikernel image by entering the following boot ROM command at the **ok** prompt:

   ```
   ok installsys
   ```

Note: If the system returns an error or does not return a prompt after you enter the `installsys` command, the minikernel image is not installed. In this case, go back and install the minikernel image.

4. Enter the data when the system prompts you for the local IP address of the server, network mask, and gateway IP address boot variables for a server on which the software release is located.

5. If you are installing the minikernel by using the external flash memory, leave the prompts for the network configuration blank and press Enter.

6. At the prompts for the network configuration:

    *   To format the internal flash memory, enter **y** at the prompt.

    *   To format the external flash memory, enter **n** at the prompt.

    *   To install the new release, enter **y** at the prompt.

7. When the system prompts you for the remote server data, do one of the following:

    *   If you are installing from a remote server, enter the IP address of the server, username, password, and URL of the release package.

    *   If you are installing from the external flash memory, enter the URL to the operating system image.

8. Reload the system with the downloaded image:

    a   To reboot the system, enter the **y** at the prompt.

    b   If a standby controller card is present, the system synchronizes it to the updated active controller card.

5   Upgrading the SmartEdge OS

Before performing the procedures in this section, make sure that your system is ready for upgrade by following the steps in Preparation.

To upgrade your system to this release of the SmartEdge OS, perform the following steps:

1. Download the New Release Image

2. Upgrade to the New Release Image

3. Verify System Chassis State

4. Ensure Line Card FPGAs Match

5. Verify System Routing

5.1 Download the New Release Image

In this procedure, you download the new release of the SmartEdge OS image to the alternate partition on your system. Table 4 lists the syntax for upgrading the release image:

Table 4   Command Syntax for Release Software Upgrade

Use This Syntax:	To Download This and Upgrade:
`release download ftp://url`	A file on a remote FTP server
`release download scp://url`	A file on a remote SCP server
	The syntax for the *url* argument is *username*[:*passwd*]@{*ip-addr* | *hostname*}/*directory*/*filename*, where *filename* includes the file extension. The router must be configured to use the Domain Name System (DNS) service to be able to use a hostname instead of an IP address.

To download the new SmartEdge OS image to the alternate partition on your system, perform the following steps:

1   Enter the `release download` command in exec mode, using the syntax shown in Table 4. Note that the `release download` command works in the local context.

For example, to download the `SEOS-rel-new.tar.gz` software image from an FTP server on the host at IP address `10.1.1.1`, as user `guest` with no password, where the file is located in the `images/RELnew` directory, enter the following command:

```
[local]Redback#release download ftp://guest@10.1.1.1/im
ages/RELnew/SEOS-rel-new.tar.gz
```

2   To erase any existing alternate image, enter `y` when prompted. Wait until the download finishes.

3   When the download is complete, verify that the alternate partition has loaded the new SmartEdge OS image, by entering the `show release` command in any mode.

5.2 Upgrade to the New Release Image

In this step, you upgrade your system by activating the new SmartEdge OS image on the alternate partition.

Before upgrading the release image, make sure your system is backed up and that the information has been saved. The upgrade procedure reboots the device, which could delete the running configuration.

Caution!

Before beginning the release upgrade process, you must perform any steps described in the upgrade alerts listed in the *Network Impact Report*.

To upgrade your system with the new SmartEdge OS image, perform the following steps:

1   Enter the `release upgrade` command in exec mode, as shown:

    ```
    [local]Redback#release upgrade
    ```

2   The system displays a warning message that it will reboot and the release will become active immediately. Inspect this message to verify that the SmartEdge OS version it refers to is correct.

3   At the prompt to continue, type `y` and press Enter. The system begins the upgrade.

4   When the upgrade is complete, the system will be running the new SmartEdge OS. Verify that the system is using the correct SmartEdge OS image by issuing the `show version` command in any mode.

5   If your system has dual controller cards, wait a few minutes until the system synchronizes its controller cards and then verify the redundancy state by issuing the `show redundancy` command.

Do not upgrade the line card FPGAs until the active and standby controller cards are synchronized.

5.3 Ensure That Line Card FPGAs Match

Each line card has one or more field-progammable gate arrays (FPGAs) and each SmartEdge OS release supports a required version of each FPGA. The required version for all FPGAs is bundled with the SmartEdge OS software.

5.3.1 Detecting an FPGA Mismatch

If a line card is running a different version of the FPGA from what is bundled with the SmartEdge OS, the system detects a mismatch and logs a message similar to the following:

```
%LOG-6-TDM_CONS: [resMgrLo] *NOTICE* Card in slot 2 has
HubFpga rev mismatch
```

Depending on the line card type, the card might not initialize when an FPGA mismatch occurs.

- If the card does not initialize, use the **show chassis** command to check if an FPGA upgrade is required.

  If the command output shows M (for FPGA Mismatch) for a particular card, you must upgrade the FPGA for the card in that slot.

- If the card initializes, use the **show hardware card *slot* detail** command to check if an FPGA upgrade is required.

  If the value of *name*Fpga rev (the version on the card) in the command output is different from the value of the *name*Fpga file rev (the version in the SmartEdge OS), you must upgrade or downgrade the FPGA.

  — Upgrade the FPGA if the version on the card is lower than the version in the SmartEdge OS.

  — Downgrade the FPGA if the version on the card is higher than the version in the SmartEdge OS.

The following example indicates a FPGA mismatch. When you examine the output of the **show hardware card 1 detail** command, you see that the value of the FPGA file (HubFpga file rev) is 0x42, which is greater than the value of the current FPGA image on the line card (HubFpga rev) 0x41. A newer FPGA image is available for the line card, so the card must be upgraded.

```
[local]Redback# show hardware card 1 detail
. . .
Slot :        1                      Type              : 10ge-1-port
Serial No    : A821G240840410        Hardware Rev      : 21
EEPROM id/ver : 0x5a/4               Mfg Date          : 20-JUN-2008
HubFpga rev  : 0x41                  HubFpga file rev  : 0x42
```

5.3.2   Upgrading an FPGA

Caution!

No live traffic can be running on a card while its FPGA is being upgraded.

To upgrade the FPGA on a line card:

1. Confirm that you have the time required to perform the upgrade.

   Traffic on a card is interrupted for approximately five minutes for each FPGA upgrade.

2. Stop traffic to the card you want to upgrade by administratively shutting it down with the **shutdown** command.

3. Enter the following command in exec mode:

   reload fpga *slot*

   Note: If you are upgrading an ATM OC media interface card (MIC) on a SmartEdge 100 router, see additional syntax specifications for the **reload fpga** command. If you are upgrading another type of line card on the SmartEdge 100 router, use the **reload fpga mic** *slot* command.

4. After the upgrade is complete, bring the card back into service using the **no shutdown** command.

5. Verify that the FPGA version is correct by issuing the following command:

   show hardware card *slot* **detail**

   Ensure that the value of *name*Fpga rev (the version on the card) in the command output matches the value of the *name*Fpga file rev (the version in the SmartEdge OS).

5.4   Verify the Chassis State

To verify that the installed cards have been initialized and are operating, enter the **show chassis** command (in any mode). The following example shows the output from the **show chassis** command for a SmartEdge 1200 router:

```
[local] Redback>show chassis
Current platform is SE1200 NEBS
 (Flags:
    A-Active Crossconnect      B-Standby Crossconnect    C-SARC Ready
    D-Default Traffic Card     E-EPPA Ready              G-Upgrading FPGA
    H-Card Admin State SHUT    I-IPPA Ready              M-FPGA Upgrade Required
    N-SONET EU Enabled         O-Card Admin State ODD    P-Coprocessor Ready
    P1-ASP1 Ready              P2-ASP2 Ready             R-Traffic Card Ready
    S-SPPA Ready               U-Card PPAs/ASP UP        W-Warm Reboot
    X-XCRP mismatch)
Slot: Configured-type          Slot: Installed-type          Initialized Flags
--------------------------------------------------------------------------------
  1 : 10ge-4-port                1 : 10ge-4-port               Yes IEUDR
  2 : 10ge-4-port                2 : 10ge-4-port               Yes IEUR
  3 : 10ge-4-port                3 : 10ge-4-port               Yes IEUR
  4 : ge-10-port                 4 : none                      No
  5 : 10ge-4-port                5 : none                      No
  6 : ge-10-port                 6 : none                      No
  7 : xcrp4-base                 7 : xcrp4-base                Yes A
  8 : xcrp4-base                 8 : xcrp4-base                Yes B
  9 : none                       9 : none                      No
 10 : none                      10 : none                      No
 11 : none                      11 : ge4-20-port               No
 12 : none                      12 : none                      No
 13 : none                      13 : none                      No
 14 : none                      14 : none                      No
```

The following example shows the output from the **show chassis** command for an SM 480 system:

```
[local] Redback>show chassis

Current platform is SM480
 (Flags: A-Active Crossconnect     B-StandBy Crossconnect   C-SARC Ready
         D-Default traffic card    E-EPPA Ready             G-Upgrading FPGA
         H-Card Admin State SHUT   I-IPPA Ready             M-FPGA Mismatch
         N-SONET EU Enabled        O-Card Admin State ODD   R-Traffic card Ready
         S-SPPA Ready              U-Card PPAs UP           W-Warm Reboot
         X-SMRP mismatch)
Slot: Configured-type          Slot: Installed-type     Initialized Flags
----------------------------------------------------------------------
  1 : ge-10-port-sm             1 : ge-10-port-sm        Yes IEUR
  2 : none                      2 : none                 No
  3 : none                      3 : none                 No
  4 : none                      4 : none                 No
  5 : ge-10-port-sm             5 : ge-10-port-sm        Yes IEUDR
  6 : none                      6 : none                 No
  7 : smrp                      7 : smrp                 Yes A
  8 : smrp                      8 : smrp                 Yes B
  9: ge-10-port-sm              9 : ge-10-port-sm        Yes IEUR
 10 : none                     10 : none                 No
 11 : none                     11 : none                 No
 12 : none                     12 : none                 No
 13 : none                     13 : none                 No
 14 : ge-10-port-sm            14 : ge-10-port-sm        Yes IEUR
```

5.5   Verify System State

Verify the system state information, comparing it against the state you recorded in Section 4.4 on page 6:

1   Verify the configuration features.

2   Verify the routing operations against the baseline you established before upgrading.

3   Verify the running state of the device against the state you recorded in
     Section 4.4 on page 6. Check information such as the number of connected
     subscribers, the number of links up within link groups, and so on.

6   Verifying System Operation After an Upgrade

When the upgrade is complete, you should verify that the newly installed
SmartEdge router or SM family chassis is operating properly.

6.1   Preparation

Testing and verifying the SmartEdge software begins after you have powered
on your device and accessed the SmartEdge OS CLI through the console port.
The hardware guide for your device contains descriptions of how to power on
the device and connect to the console port.

Although this procedure covers all SmartEdge and SM family systems, it does
not provide the details of each possible installation configuration. You need the
following information before proceeding:

- Results of the `show hardware detail` command run on a validated
  SmartEdge router or SM family chassis equipped with the same options as
  the unit to be tested with this procedure

- SmartEdge OS, boot ROM, and minikernel versions for the system

- Controller and line card hardware versions for the system

- Approximate available memory that the system should have in the system
  partition of its Flash memory (check the output of the `show memory`
  command)

6.2   Check the Software and Hardware Versions

To check thesoftware and hardware versions:

1.   Enter the `show version` command (in any mode) to confirm that the
     expected SmartEdge OS, boot ROM, and minikernel versions are installed.

2. Enter the `show hardware` command (in any mode) to verify that the hardware versions are as expected. Check the temperature and voltage readings.

3. Enter the `card` command (in global configuration mode) to enable the line cards on the router.

The following example shows the output from the `card` command for a SmartEdge router:

```
[local]Redback#configure
[local]Redback(config)#card ge-10-port 5
```

The following example shows the output from the `card` command for an SM family system:

```
[local]Redback#configure

[local]Redback(config)#card 10ge-1-port-sm 5
```

4. Enter the `show chassis` command (in any mode) to display installed and configured card types and slot locations and verify that all installed cards are successfully initialized.

The following example shows the output from the `show chassis` command for a SmartEdge router:

```
[local]Redback>show chassis

Current platform is SE800e
(Flags: A-Active Crossconnect    B-StandBy Crossconnect   C-SARC Ready
...
```

The following example shows the output from the `show chassis` command for an SM family system:

```
[local]Redback>show chassis

Current platform is SM480
(Flags: A-Active Crossconnect    B-StandBy Crossconnect   C-SARC Ready
...
```

6.3   Check the Results of Power-On Diagnostics Tests

To display the results of the POD tests, enter the `show diag pod` command with the `detail` keyword (in any mode). All POD results should have the PASS condition.

```
[local]Redback>show diag pod detail
```

6.4   Run On-Demand Diagnostics Tests on Each Line Card

To run on-demand diagnostics (ODD) tests for each line card:

1. Enter the **card** command (in configuration mode) to enter card configuration mode.

2. Enter the **shutdown** command to shut down the line card.

3. Enter the **on-demand-diagnostic** command to enable ODD.

4. Enter the **diag on-demand** command to start the ODD session on the card. Run the ODD at level 3.

The following example shows the output from these commands for a SmartEdge router:

```
[local]Redback(config)#card ge-10-port 5
[local]Redback(config-card)#shutdown
[local]Redback(config-card)#on-demand-diagnostic
[local]Redback(config-card)#end

Nov 4 14:06:38: Marking PTD channel DEAD for slot 5
...

[local]Redback#diag on-demand card 5 loop 4 level 3

Marking PTD channel DEAD for slot 5
...
```

The following example shows the output from these commands for an SM family system:

```
[local]Redback(config)#card 10ge-1-port-sm 5
[local]Redback(config-card)#shutdown
[local]Redback(config-card)#on-demand-diagnostic
[local]Redback(config-card)#end

Nov 4 14:06:38: Marking PTD channel DEAD for slot 5
...

[local]Redback#diag on-demand card 5 loop 4 level 3

Marking PTD channel DEAD for slot 5
...
```

5. Enter the **show diag on-demand** command with the **detail** keyword to view the results. The Test Summary field shows In Progress if the test has not been completed.

The following example shows the output from the **show diag on-demand** command for a SmartEdge router:

```
[local]Redback#show diag on-demand card 5 detail

Slot Number              : 5
Card Type                : ge-10-port
Detected Card Type       : ge-10-port
Serial Number            : 7UAA8070200197
Detected Serial Number   : 7UAA8070200197
Controller Serial Number : 6Y515070603805
Test Level               : 3
Loop Count               : 4
Start Time               : 14:09:09  11/04/2007
Completion Time          : N/A
Test Summary             : In Progress
```

The following example shows the output from the **show diag on-demand** command for an SM family system:

```
[local]Redback#show diag on-demand card 5 detail

Slot Number              : 5
Card Type                : 10ge-1-port-sm
Detected Card Type       : 10ge-1-port-sm
Serial Number            : 7UAA8070200197
Detected Serial Number   : 7UAA8070200197
Controller Serial Number : 6Y515070603805
Test Level               : 3
Loop Count               : 4
Start Time               : 14:09:09  11/04/2005
Completion Time          : N/A
Test Summary             :
In Progress
```

6. Repeat this procedure for each line card.

6.5 Run ODD Tests on the Standby Controller Card

The SmartEdge 100 router does not support standby controller cards.

To run ODD tests on the standby controller card:

1. Enter the **diag on-demand standby level 2** command to run these tests at level 2.

    Note: For XCRP4 and SmartEdge 100 router controller cards, you can run tests at levels 1, 2, 3, and 4.

    Note: For SM family systems, run tests at levels 1, 2, 3, and 4.

2. Run the ODD test for the standby controller card at level 2.

```
[local]Redback# diag on-demand standby level 2
```

3. Enter the `show diag on-demand standby` command to view the results. Use the `detail` keyword to see the details rather than the summary.

6.6 Bring Line Cards into Service

To bring line cards into service:

1. Enter the `no on-demand-diagnostic` command followed by the `no shutdown` command. For example:

The following example shows the output from the `no on-demand-diagnostic` command for a SmartEdge router:

```
[local]Redback#configure
[local]Redback(config)#card ge-10-port 5
[local]Redback(config-card)#no on-demand-diagnostic
[local]Redback(config-card)#no shutdown
[local]Redback(config-card)#end
```

The following example shows the output from the `no on-demand-diagnostic` command for an SM family system:

```
[local]Redback#configure
[local]Redback(config)#card 10ge-1-port-sm 5
[local]Redback(config-card)#no on-demand-diagnostic
[local]Redback(config-card)#no shutdown
[local]Redback(config-card)#end
```

2. Connect a fiber or wire loopback (Rx to Tx) on each line card port. Verify that the Link LED indicators on the line cards show that all connected ports have successfully established link-level connectivity. The line card LEDs are described in detail in the hardware guides for your device.

3. Enter the `show port detail` command (in any mode) to verify that the line operational and administrative states are both up and no alarms currently exist.

6.7 Assign IP Addresses to Management Ports

Assign an IP address to the Ethernet management port on the active controller card and another IP address to the management port on the standby controller card. (The SmartEdge 100 router does not have a standby controller card.) Verify that you can use a Telnet session to connect to the management ports.

The following example shows how to assign an IP address to the management port of the active controller card in slot 7 of a SmartEdge 800 router:

```
[local]Redback#configure
!Create the interface in the local context and assign an IP address
[local]Redback(config)#context local
[local]Redback(config-ctx)#interface mgmt
[local]Redback(config-if)#ip address 192.168.110.1 255.255.255.0
[local]Redback(config-if)#exit
!Configure the management port
[local]Redback(config)#port ethernet 7/1
[local]Redback(config-port)#bind interface mgmt local
[local]Redback(config-port)#no shutdown
[local]Redback(config-port)#end
```

6.8   Check System Status

To check system status:

1. For systems with two controller cards, issue the **show redundancy** command to verify that the active and standby controller cards are ready and synchronized.

2. Display the status of the internal memory card (NetBSD compact Flash) and external memory card (mass storage device) in the controller card to which you are connected using the **show disk** command in exec mode.

   If you are displaying the status of an external mass storage device, this command should display the device as mounted on the **/md** directory.

3. Display statistics about the available and allocated memory on the controller card to which you are connected using the **show memory** command (in any mode). Verify that the memory approximately matches the expected used and free numbers of bytes.

4. Display system, card, port, channel, and subchannel alarms using the **show system alarm all** command (in any mode). Although some alarm conditions might be present because the traffic ports are not physically connected, you should see no unexpected alarms.

5. Check all the alarms reported since starting this installation procedure using the **show log** command (in any mode). To display system alarm events reported to the console, enter the **show log** command with the **active tdm-console** keywords (in any mode).

6. Enter the **show hardware detail** command. Compare the output with what you expect for this SmartEdge router or SM family chassis equipped with the same options.

```
[local]Redback#show hardware detail
Fan Tray Status              Present
Fan(s) Status                Normal
Power Supply A Status        Normal
Power Supply B Status        Normal
Active Alarms                NONE
...
```

6.9 Switch to the Standby Controller Card and Continue Testing

To test a controller card, it must be in the active state. If have a redundant system in a non-production environment and you want to test the operation of the standby card, you can switch to the standby controller card and repeat the tests previously performed on the active card.

1. To force the standby controller card to assume control of the system, use the **`reload switch-over`** command.

2. To verify that the active and standby controller cards are ready and synchronized after the switchover, use he **`show redundancy`** command.

3. Repeat the following procedures:

   • Check the Versions of Software and Hardware.

   • Run ODD Tests on Each Line Card.

   • Run ODD Tests on the Standby Controller Card.

6.10 Troubleshooting

If the SmartEdge router or SM family chassis stops forwarding packets or routing protocol peers stop exchanging messages, check the process status using the **`show process crash-info`** and **`show chassis`** commands in any mode and make sure that the process respawn count is not greater than 1. If any process has a respawn count greater than 1, that process has been restarted. In this case, send core dump files to your local technical support representative, along with the system version, configuration, console logs of the activity during a crash, and all stored log messages.

If you attempt to upgrade to the new release without upgrading the boot ROM version, you see the following error:

```
---------------------------------------------------------------
Auto-boot in 0 seconds - press se* to abort, ENTER to boot:
no such file core1
Error: Alternate CPU load action 'load flash core1' failed
error: abort
---------------------------------------------------------------
```

If you see this error or your system does not boot, contact your support representative for instructions on how to resolve the problem.

6.11   Rolling Back an Upgrade to the Previous Version

In the event of an unexpected issue with the SmartEdge router (for example, if it is not fully functional after an upgrade), you can roll back the upgrade and return the system to the previous state.

1. Verify that the previous release image is stored in the alternate partition. From the console CLI, enter the **show release** command:

    ```
    local]Redback#show release
    Installed releases:

    p01: alternate
    ------------------------------------------------
    Version SEOS-6.5.1.0-Release
    Built on Tue Mar  8 23:00:27 PST 2011
    Copyright (C) 1998-2011, Redback Networks Inc.
    All rights reserved.


    p02: active (will be booted after next reload)
    --------------
    Version SEOS-11.1.0-Release
    Built on Mon Dec 27 23:00:08 PST 2010
    Copyright (C) 1998-2010, Redback Networks Inc.
    All rights reserved.
    ```

    Either p01 or p02 could be the active partition. In this example, p02 is the active one.

    Note: If the previous release is not stored in the alternate partition, repeat the upgrade procedure, downloading the previous release with the **release download** command and activating it with the **release upgrade** command. For more information, see Section 5.1 on page 16 and Section 5.2 on page 17. Otherwise, proceed with the following steps.

2. Back up the running configuration with the **save configuration \flash**_filename_ command.

3. Restore the configuration for the release you are rolling back to. Use the backup configuration files that you created before you upgraded.

4. Depending on where you stored your backup file, copy, move, or rename the backup file such that it resides in the configuration directory and has the name **redback.cfg**.

5. Activate the release in the alternate partition, enter the **release upgrade** command in exec mode.

6. The system warns you that it will reboot and that the release will become active immediately. Verify that the SmartEdge OS version in the prompt message is correct.

7. When the system prompts you to continue, type **y** and press Enter. The system boots to activate the release in the alternate partition.

8. When the previous release has been activated, verify the version installed using the **show version** command.

```
[local]Redback#show version
Redback Networks SmartEdge OS Version SEOS-6.5.1.0-Release
Built by sysbuild@SWB-node17 Tue Mar 8 23:00:27 PST 2011
Copyright (C) 1998-2011, Redback Networks Inc. All rights reserved.
System Bootstrap version is Mips,rev2.0.2.48
Installed minikernel version is 11.7
Router Up Time -   5 minutes 35 secs
```

9. If your system has dual controller cards, wait a few minutes until the system synchronizes its controller cards and then verify the redundancy state using the **show redundancy** command.

10. Perform the steps in Section 5.3 on page 17 to ensure that the FPGAs are downgraded as necessary.