

Using Redundant Supervisor Engines

This chapter describes how to use and configure redundant supervisor engines. The Catalyst 5505, 5509, and 5500 switches support an optional redundant supervisor engine. The second supervisor engine takes over if the active supervisor engine fails.

Note For complete information on installing redundant Catalyst 5000 series supervisor engine modules, refer to the *Catalyst 5000 Series Supervisor Engine Installation Guide*.

Note For complete syntax and usage information for the commands used in this chapter, refer to the *Command Reference* for your switch.

This chapter consists of these sections:

- Understanding How Supervisor Engine Redundancy Works on page 16-1
- Redundant Supervisor Configuration Guidelines and Restrictions on page 16-4
- Verifying Standby Supervisor Status on page 16-5
- Forcing a Switchover to the Standby Supervisor on page 16-6
- Configuring the Standby Uplink Ports on page 16-7
- Supervisor Engine III Synchronization Examples on page 16-8

Understanding How Supervisor Engine Redundancy Works

Note Redundant supervisor engine modules must be of the same type (both Supervisor Engine IIs or both Supervisor Engine IIIs). Supervisor Engine III, III FSX, and III FLX modules are interchangeable in a redundant configuration provided the feature card is the same on both supervisor engines (both EARL1+, both NFFCs, or both NFFC IIs).

When you install two supervisor engine modules in the Catalyst 5505, 5509, or 5500 switch, the first supervisor engine module to come online becomes the active module; the second supervisor engine module goes into standby mode. All administrative and network management functions, such as SNMP, CLI console, Telnet, Spanning-Tree Protocol (STP), Cisco Discovery Protocol (CDP), and VLAN Trunk Protocol (VTP) are processed on the active supervisor engine module.

The console port on the standby supervisor engine module is inactive and the module status for the standby supervisor engine shows as “standby.” However, status for the uplink ports on the standby supervisor is shown normally.

You must install redundant supervisor engine modules in slots 1 and 2 of the chassis. Redundant supervisor engine modules are hot swappable. The system continues to operate with the same configuration after switching over to the redundant supervisor engine. For more information, refer to the *Catalyst 5000 Series Supervisor Engine Installation Guide*.

At power-up, both supervisor engine modules run initial module-level diagnostics. Assuming both modules pass this level of diagnostics, the two modules communicate over the backplane, allowing them to cooperate during switching-bus diagnostics. The supervisor in slot 1 becomes active, and the supervisor in slot 2 enters standby mode. At this point, if the software versions of the two supervisors are different, or if the NVRAM configuration of the two supervisors is different, the active supervisor engine automatically downloads its software image and configuration to the standby supervisor engine.

If the background diagnostics on the active supervisor engine detect a major problem or an exception occurs, the active supervisor engine resets. The standby supervisor engine detects that the active supervisor engine is no longer running and becomes active. The standby supervisor engine can detect if the active supervisor engine is not functioning and can force a reset, if necessary. If the reset supervisor engine comes online again, it enters standby mode.

If you hot-insert a second supervisor engine module, the second module communicates with the active supervisor engine after completing its initial module-level diagnostics. Because the active supervisor engine is already switching traffic on the backplane, no switching-bus diagnostics are run for the second supervisor engine because running diagnostics can disrupt normal traffic. The second supervisor engine immediately enters standby mode. The active supervisor engine downloads the software image and configuration to the standby supervisor engine, if necessary.

Note The switchover time from active to standby supervisor engine does not include spanning-tree convergence time.

Understanding How Supervisor Redundancy Works on the Supervisor III

The Supervisor Engine III modules use two Flash images: the *boot image* and the *runtime image*. The boot image filename is specified in the BOOT environment variable, which is stored in NVRAM. The runtime image is the boot image that the ROM monitor uses to boot the Supervisor Engine III module. After the system boots, the runtime image resides in dynamic RAM (DRAM).

When you power up or reset a Catalyst 5000 series switch with redundant Supervisor Engine III modules, synchronization occurs to ensure that the runtime and boot images on the standby supervisor engine are the same as the images on the active supervisor engine.

The Supervisor Engine III modules can have different runtime and boot images. If the boot image and the runtime image are the same, and you change the BOOT environment variable or overwrite or destroy the current boot image on the Flash device that was used to boot the system, the runtime and boot images will differ. Whenever you reconfigure the boot image, the active supervisor engine synchronizes its current boot image with the standby supervisor engine.

Supervisor Engine II modules use 8-MB onboard Flash memory to store a single boot image, and only one boot image can be stored at a time. The Supervisor Engine III, III FSX, and III FLX modules do not have memory dedicated to storing the boot image. Instead, a Flash file system is implemented and the boot image is read directly into the file system. You can perform operations (such as **copy**, **delete**, **undelete**, and so on) on files stored on Flash memory devices, and you can

store the boot image of the active supervisor engine in the standby supervisor engine boot Flash. For more information about using the Flash file system, see Chapter 18, “Working With the Flash File System.”

The Supervisor Engine III FSX and FLX models have only the onboard Flash memory (**bootflash:**). The Supervisor Engine III module has two Flash PC card (PCMCIA) slots (**slot0:** and **slot1:**) in addition to the onboard Flash memory; these slots can hold Flash PC cards that can store additional boot images.

Note Throughout this publication, the term *Flash PC card* is used in place of the term *PCMCIA card*.

Since you can store multiple boot images on the Supervisor Engine III, III FSX, and III FLX modules, you must specify the name of the boot file image and the location of the image file in the Flash file system in order to boot and synchronize properly. For information about how to specify the name and location of the boot image, see Chapter 17, “Modifying the Switch Boot Configuration.”

In the synchronization process, the active supervisor engine checks the standby supervisor engine runtime image to make sure it matches its own runtime image. The active supervisor engine checks three conditions:

- If it needs to copy its boot image to the standby supervisor engine
- If the standby supervisor engine bootstring needs to be changed
- If the standby supervisor engine needs to be reset

The following section describes the conditions that can initiate Flash synchronization. For examples of how the system synchronizes the Supervisor Engine III (including the FSX and FLX models) Flash images with various configurations, see the “Supervisor Engine III Synchronization Examples” section on page 16-8.

Synchronization Process Initiation

These conditions initiate the synchronization of the runtime and boot images on the active and standby Supervisor Engine III modules:

- **Timestamp mismatch between the runtime images on the active and standby supervisor engines**—The active supervisor engine synchronizes its runtime image with the standby supervisor engine if the timestamps of their respective runtime images differ when the system is booted or reset.
- **Timestamp mismatch between the boot images on the active and standby supervisor engines**—The active supervisor synchronizes its boot image with the standby supervisor engine if the timestamps of their respective boot images differ when the system is booted or reset, or if you change the `BOOT` environment variable.
- **Current boot image overwritten**—If you overwrite the current boot image stored on one of the Flash devices, the file system management module detects this event and initiates synchronization. The active supervisor engine copies its new boot image to the standby supervisor engine.
- **BOOT environment variables changed**—If you change the `BOOT` environment variables to specify a different default boot image, the active supervisor initiates boot-image synchronization. The NVRAM configuration module detects this event and calls the Flash synchronization function with the next probable boot filename by looking at the boot configuration parameter.

- Flash PC cards with same boot-image filename—If you change the Flash device on either the active or standby supervisor engine and the new Flash device contains a boot image that has the same name (but a different timestamp) as the boot image from the previous Flash device, the Flash file management module initiates synchronization.
- Current runtime image deleted—If you delete the current runtime image from the Flash device, the Flash file management module prompts you to verify that you want to delete the current runtime image. If you confirm the deletion, the Flash file management module initiates Flash synchronization and informs the NVRAM configuration module of the change. The NVRAM configuration module examines the BOOT environment variable to determine the next probable image to boot and calls the Flash synchronization function using the new image name.

Understanding How the Standby Uplink Ports Work

Whether you can use the uplink ports on the standby supervisor engine depends on the software release running on the switch:

- In software releases prior to release 4.1, the uplink ports on the standby supervisor engine are always inactive. When there is a switchover from the active to the standby supervisor engine, the uplink ports on the standby supervisor become active.
- In software releases 4.1 and 4.2, the uplink ports on the standby supervisor engine are active and behave exactly the same as the uplink ports on the active supervisor engine.
- In software release 4.3 and later, the standby uplink ports are inactive by default. You can configure the ports to be active or inactive. If the ports are configured as inactive and there is a switchover from the active to the standby supervisor, the uplinks become active.

Redundant Supervisor Configuration Guidelines and Restrictions

The following conditions and events can cause the synchronization of images between redundant Supervisor Engine III modules to fail or to produce unexpected results:

- Downloading a new image to the active supervisor engine

When you download a new image to the active supervisor engine, it is copied to a file system (in boot Flash or on one of the Flash PC cards in the Flash PC card slots). Since you may or may not have configured this image as the boot image, the newly downloaded image is not copied to the standby supervisor engine automatically.

To initiate the synchronization function between the active and standby supervisor engines, you must configure this newly downloaded image as the boot image on the active supervisor engine. Synchronization occurs when you change the boot variable. To run the new image, you must reset the system.

- Unable to find the current runtime image

If the active supervisor is unable to find the current runtime image on any of the Flash devices, it signals an error condition. In this case, if the standby supervisor is inserted or reset, Flash synchronization does not occur. In addition, the STATUS LED on the standby supervisor engine turns red and the system generates a syslog error message.

- Supervisor Engines II and III installed in the same chassis

If you have a Supervisor Engine II and a Supervisor Engine III installed as the active and standby supervisor engines in the same chassis, their boot images do not synchronize because their images are in different formats. Supervisor engine redundancy is supported only with supervisor engines of the same type.

- Active supervisor engine in slot 2

When the active supervisor engine is in slot 2, the standby supervisor engine is in slot 1. If you change the configuration to specify a new boot image and then reset the system, the supervisor engine in slot 1 becomes the active supervisor and loads its default boot image, canceling the configuration changes you have just made. To avoid this problem, the system prompts you for Flash synchronization as soon as you change the boot file configuration.

Verifying Standby Supervisor Status

You can verify the status of the standby supervisor engine using a number of CLI commands.

Note On the Supervisor Engine III modules, the **show module** output provides information about installed daughter cards and uplink modules. The **show test** command provides information about onboard ASICs not present on the Supervisor Engine II module.

To verify the status of the standby supervisor engine, perform one or more of these tasks:

Task	Command
• Show the status of the standby supervisor engine.	show module [<i>mod_num</i>]
• Show the state of the standby supervisor engine uplink ports.	show port [<i>mod_num</i> [/ <i>port_num</i>]]
• Show diagnostic test results for both the standby supervisor engine.	show test [<i>mod_num</i>]

This example shows how to check the status of the standby supervisor engine using the **show module** command:

```

Console> (enable) show module
Mod Module-Name          Ports Module-Type          Model      Serial-Num Status
-----
1 10/100BaseTX Supervis 4      10/100BaseTX Supervis WS-X5530  009979082 ok
2 10/100BaseTX Supervis 2      10/100BaseTX Supervis WS-X5530  007451586 standby
3 10BaseT Ethernet       48     10BaseT Ethernet       WS-X5012A 007879593 ok
4 Network Analysis/RMON 1      Network Analysis/RMON  WS-X5380  008175475 ok
5 Route Switch           1      Route Switch           WS-X5302  007460757 ok
6 10BaseT Ethernet Ext   1      10BaseT Ethernet Ext   WS-X5014  007879658 ok
7 10BaseT Ethernet       48     10BaseT Ethernet       WS-X5014  007879658 ok
8 MM OC-3 ATM            1      MM OC-3 ATM            WS-X5155  003414855 ok
9 UTP OC-3 Dual-Phy ATM 2      UTP OC-3 Dual-Phy ATM  WS-X5156  007646048 ok
13 ASP/SRP

```

```

Mod MAC-Address (es)          Hw      Fw      Sw
-----
1 00-e0-4f-ac-b0-00 to 00-e0-4f-ac-b3-ff 1.8     3.1.2   4.3(1a)
2 00-e0-4f-ac-b0-00 to 00-e0-4f-ac-b3-ff 1.3     3.1.2   4.3(1a)
3 00-10-7b-50-1b-00 to 00-10-7b-50-1b-2f 0.202   4.2(108) 4.3(1a)
4 00-e0-14-10-18-00          0.100   4.1.1   4.3(0.31)
5 00-e0-1e-91-d5-14 to 00-e0-1e-91-d5-15 5.0     20.7    11.3(3a)WA4(5)

```

```

7 00-10-7b-5d-30-40 to 00-10-7b-5d-30-6f 0.102 4.2(108) 4.3(1a)
8 00-e0-1e-a9-20-b9 1.2 1.3 3.2(7)
9 00-e0-1e-e5-07-27 2.1 1.3 3.2(6)

```

```

Mod Sub-Type Sub-Model Sub-Serial Sub-Hw
-----
1 NFFC WS-F5521 0008936340 1.0
1 uplink WS-U5537 0007288247 2.0
2 NFFC WS-F5521 0011462777 1.1
2 uplink WS-U5531 0007464204 1.1
Console> (enable)

```

Forcing a Switchover to the Standby Supervisor

You can switch over to the standby supervisor engine module by resetting the active supervisor engine.

Note Resetting the active supervisor engine module disconnects any open Telnet sessions.

To force a switchover to the standby supervisor engine, perform this task in privileged mode:

Task	Command
Reset the active supervisor engine module (where <i>mod_num</i> is the number of the active supervisor).	reset mod_num

You can also switch to the standby supervisor engine module by setting the CISCO-STACK-MIB moduleAction variable to reset(2) on the active supervisor engine module. When the switchover occurs, the system sends a standard SNMP warm-start trap to the configured trap receivers.

This example shows an example of the console output on the active supervisor when you force a switchover from the active to the standby supervisor engine:

```

Console> (enable) reset 1
This command will force a switch-over to the standby Supervisor module.
Do you want to continue (y/n) [n]? y
Console> (enable) 12/07/1998,17:04:39:SYS-5:Module 1 reset from Console//

System Bootstrap, Version 3.1(2)
Copyright (c) 1994-1997 by cisco Systems, Inc.

System Bootstrap, Version 3.1(2)
Copyright (c) 1994-1997 by cisco Systems, Inc.
Presto processor with 32768 Kbytes of main memory

Autoboot executing command: "boot bootflash:cat5000-sup3.4-3-1a.bin"
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
Uncompressing file: #####

System Power On Diagnostics
NVRAM Size .. .....512KB
ID Prom Test .....Passed
DPRAM Size .....16KB
DPRAM Data 0x55 Test .....Passed
DPRAM Data 0xaa Test .....Passed
DPRAM Address Test .....Passed
Clearing DPRAM .....Done

```

```

System DRAM Memory Size .....32MB
DRAM Data 0x55 Test .....Passed
DRAM Data 0xaa Test .....Passed
DRAM Address Test .....Passed
Clearing DRAM .....Done
EARLII .....Present
EARLII RAM Test .....Passed
EARL Serial Prom Test .....Passed
Level2 Cache .....Present
Level2 Cache test.....Passed

Boot image: bootflash:cat5000-sup3.4-3-1a.bin
Downloading epld sram device please wait ...
Programming successful for Altera 10K50 SRAM EPLD

This module is now in standby mode.
Console is disabled for standby supervisor

```

This example shows an example of the console output on the standby supervisor when you force a switchover from the active to the standby supervisor engine:

```

Cisco Systems Console

Enter password:
12/07/1998,17:04:43:MLS-5:Multilayer switching is enabled
12/07/1998,17:04:43:MLS-5:Netflow Data Export disabled
12/07/1998,17:04:44:SYS-5:Module 2 is online
12/07/1998,17:04:45:SYS-5:Module 5 is online
12/07/1998,17:04:45:SYS-5:Module 7 is online
12/07/1998,17:04:45:SYS-5:Module 3 is online
12/07/1998,17:04:52:MLS-5:Route Processor 172.20.52.6 added
12/07/1998,17:05:10:SYS-5:Module 8 is online
12/07/1998,17:05:14:SYS-5:Module 9 is online
12/07/1998,17:05:22:SYS-5:Module 4 is online
12/07/1998,17:06:13:SYS-5:Module 1 is in standby mode
Supervisor image synchronization process will start in 10 seconds
12/07/1998,17:06:37:SYS-5:Ports on standby supervisor(Module 1) are UP
12/07/1998,17:06:41:SYS-5:Active supervisor is synchronizing the NMP image.
12/07/1998,17:06:44:SYS-5:The active supervisor has synchronized the NMP image.

Console>

```

Configuring the Standby Uplink Ports

In software release 4.3 and later, you can configure the uplink ports on the standby supervisor engine as active or inactive. This configuration is independent of other configuration commands such as **set port enable** and **set port disable**. By default, the uplink ports are inactive.

To configure the uplink ports on the standby supervisor engine as active, perform this task in privileged mode:

Task	Command
Step 1 Set the uplink ports on the standby supervisor engine to active.	set standbyports enable
Step 2 Verify the configuration.	show standbyports

This example shows how to set the uplink ports on the standby supervisor engine to active:

```
Console> (enable) set standbyports enable
Standby ports feature enabled.
Please wait while the standby ports are coming up..
Console> (enable) 12/07/1998,16:45:15:SYS-5:Ports on standby supervisor(Module 2) are
UP

Console> (enable)
```

To configure the uplink ports on the standby supervisor engine as inactive, perform this task in privileged mode:

Task	Command
Step 1 Set the uplink ports on the standby supervisor engine to inactive.	set standbyports disable
Step 2 Verify the configuration.	show standbyports

This example shows how to set the uplink ports on the standby supervisor engine to inactive:

```
Console> (enable) set standbyports disable
Standby ports feature disabled.
Console> (enable)
```

Supervisor Engine III Synchronization Examples

The following examples show what happens when the synchronization function encounters certain conditions. These examples apply to the Supervisor Engine III, III FSX, and III FLX models, unless otherwise noted. These examples are not intended to cover every possible condition.

Note In the following examples, the number **1** following the filename in the bootstring (for example, **bootflash:f1,1**) indicates the number of Trivial File Transfer Protocol (TFTP) boot retries that are attempted. However, Supervisor Engine III does not support TFTP booting. The number is included in these examples to be consistent with Cisco IOS conventions.

Synchronizing the Runtime Image with the Bootstring

This section contains four examples in which the active supervisor engine runtime image is synchronized with the standby supervisor engine.

Example 1: Runtime image not synchronized

The configuration for example 1 is as follows:

- The active supervisor engine configuration is as follows (if the image in the standby supervisor is identical to the image in the active supervisor, the output is the same):
 - Runtime image: `bootflash:f1`
 - Boot string: `bootflash:f1,1`
 - Bootflash: `f1`
- The timestamp for **f1** on the active supervisor is the same as **f1** on the standby supervisor.

- Expected result:
 - The active supervisor **f1** image is not copied to the standby supervisor.
 - The standby supervisor engine bootstring is not modified.
 - The standby supervisor is not reset.

Example 2: File copied, bootstring changed, standby supervisor reset

The configuration for example 2 is as follows:

- Active supervisor engine configuration:
 - Runtime image: `bootflash:f1`
 - Boot string: `bootflash:f1,1`
 - Bootflash: `f1`
- Standby supervisor engine configuration:
 - Runtime image: `bootflash:f2`
 - Boot string: `bootflash:f2,1`
 - Bootflash: `f2`
- The timestamp for **f1** on the active supervisor is not the same as **f2** on the standby supervisor.
- Expected result:
 - The active supervisor copies **f1** to the standby supervisor and renames the file **RTSYNC_f1**.
 - The standby supervisor engine bootflash is modified to the following: **f2, RTSYNC_f1**.
 - The standby supervisor engine bootstring is modified to the following:
bootflash:RTSYNC_f1,1;f2,1;
 - The standby supervisor is reset.

Example 3: File not copied, bootstring changed, standby supervisor reset

The configuration for example 3 is as follows:

- Active supervisor engine configuration:
 - Runtime image: `bootflash:f1`
 - Boot string: `bootflash:f1,1`
 - Bootflash: `f1`
- Standby supervisor engine configuration:
 - Runtime image: `bootflash:f2`
 - Boot string: `bootflash:f2,1`
 - Bootflash: `f1, f2`
- The timestamp for **f1** on the active supervisor is the same as **f1** on the standby supervisor but is not the same as **f2** on the standby supervisor.

- Expected result:
 - The active supervisor engine runtime image is synchronized to the standby supervisor.
 - The active supervisor **f1** image is not copied to the standby supervisor.
 - The standby supervisor engine boot string is modified to the following: **f1,1;f2,1;**
 - The standby supervisor is reset.

Example 4: Oldest bootflash file deleted, bootflash squeezed

The configuration for example 4 is as follows:

- Active supervisor engine configuration:
 - Runtime image: `bootflash:f1`
 - Boot string: `bootflash:f1,1`
 - Bootflash: `f1`
- Standby supervisor engine configuration:
 - Runtime image: `bootflash:f2`
 - Boot string: `bootflash:f2,1;`
 - Bootflash: `f2, f3, f4` (less than 1 MB left on device)
- The timestamp for **f1** on the active supervisor is not the same as **f2** on the standby supervisor. The **f2** timestamp is older than **f3**, and the **f3** timestamp is older than **f4**.
- Expected result:
 - The active supervisor engine runtime image is synchronized with the standby supervisor.
 - The active supervisor engine attempts to copy its **f1** image to the standby supervisor.
 - Since there is not enough space on the standby supervisor engine bootflash, the redundant synchronization function finds the oldest file, deletes it, and squeezes bootflash.
 - The active supervisor engine copies the **f1** image to the standby supervisor and renames it **RTSYNC_f1**.
 - The standby supervisor engine bootflash is modified to the following: **f3, f4, RTSYNC_f1**.
 - The standby supervisor engine boot string is modified to the following: **RTSYNC_f1,1;f2,1;**
 - The standby supervisor engine is reset.

Synchronizing the Boot Images on the Active and Standby Supervisor III Modules

This section contains four examples in which the bootstrings on the active and standby Supervisor Engine III modules are synchronized.

Example 1: Unable to allocate the boot image

The configuration for this example is as follows:

- Active supervisor engine configuration:
 - Runtime image: `bootflash:f1`
 - Boot string: `bootflash:f1,1;`
 - Bootflash: `f1`
- Standby supervisor engine configuration:
 - Runtime image: `bootflash:f1`
 - Boot string: `bootflash:f1,1;`
 - Bootflash: `f1`
- The timestamp for **f1** on the active supervisor is the same as **f1** on the standby supervisor.
- The system attempts to modify the active supervisor engine bootstring to the following: **f2,1;**.
- Expected result:
 - The active supervisor is unable to allocate **f2**, causing the synchronization to fail.
 - An error is recorded in syslog.
 - The active supervisor engine **f1** image is not copied to the standby supervisor.
 - The standby supervisor engine bootstring is not modified.
 - The standby supervisor engine is not reset.

Example 2: File copied, bootflash modified, standby supervisor not reset

The configuration for this example is as follows:

- Active supervisor engine configuration:
 - Runtime image: `bootflash:f1`
 - Boot string: `bootflash:f1,1;`
 - Bootflash: `f1, f2`
- Standby supervisor engine configuration:
 - Runtime image: `bootflash:f1`
 - Boot string: `bootflash:f1,1;`
 - Bootflash:
- The timestamp for **f1** on the active supervisor is the same as **f1** on the standby supervisor.
- You modify the active supervisor engine bootstring to the following: **f2,1;**.

- Expected result:
 - The active supervisor engine copies its **f2** image to the standby supervisor and renames it **BTSYNC_f2**.
 - The standby supervisor engine bootflash is modified to the following: **f1, BTSYNC_f2**.
 - The standby supervisor engine bootstring is modified to the following: **bootflash:BTSYNC_f2,1;f1,1;**
 - The standby supervisor is not reset.

Example 3: File not copied, bootstring modified, standby supervisor not reset

The configuration for this example is as follows:

- Active supervisor engine configuration:
 - Runtime image: `bootflash:f1`
 - Boot string: `bootflash:f1,1;`
 - Bootflash: `f1, f2`
- Standby supervisor engine configuration:
 - Runtime image: `bootflash:f1`
 - Boot string: `bootflash:f1,1;`
 - Bootflash: `f1, f2`
- The timestamp for **f1** on the active supervisor is the same as **f1** on the standby supervisor; the timestamp for **f2** on the active supervisor is the same as **f2** on the standby supervisor.
- The active supervisor engine bootstring is modified to the following: **f2,1; f1,1;**
- Expected result:
 - The active supervisor **f1** image is not copied to the standby supervisor.
 - The standby supervisor engine bootstring is modified to the following: **bootflash:f2,1;bootflash:f1,1;**
 - The standby supervisor is not reset.

Example 4: File copied, oldest file deleted, bootflash squeezed, bootstring modified, standby supervisor not reset

The configuration for this example is as follows:

- Active supervisor engine configuration:
 - Runtime image: `bootflash:f1`
 - Boot string: `bootflash:f1,1;`
 - Bootflash: `f1, f2`
- Standby supervisor engine configuration:
 - Runtime image: `bootflash:f1`
 - Boot string: `bootflash:f1,1;`
 - Bootflash: `f0, f1, f3` (less than 1 MB left on device)

- The timestamp for **f1** on the active supervisor is the same as **f1** on the standby supervisor. The timestamp for **f0** is older than **f1**, and the timestamp for **f1** is older than **f3**.
- The active supervisor engine bootstring is modified to the following:
bootflash:f2,1;bootflash:f1,1;
- Expected result:
 - The active supervisor engine attempts to copy its **f2** image to the standby supervisor.
 - Since there is not enough space available on the standby supervisor engine bootflash, the redundant synchronization function finds the oldest file (**f0**), deletes it, and squeezes bootflash.
 - The active supervisor engine copies its **f2** image to the standby supervisor engine and renames it **BTSYNC_f2**.
 - The standby supervisor engine bootflash is modified to the following: **f1, f3, BTSYNC_f2**.
 - The standby supervisor engine boot string is modified to the following:
bootflash:BTSYNC_f2,1;bootflash:f1,1;

