

Catalyst 6500/6000 MSFC Boot from the Supervisor Engine PC Card Configuration Example

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Introduction

This document describes a Cisco Catalyst 6500/6000 that runs Catalyst OS (CatOS) software on the Supervisor Engine and Cisco IOS® Software on the Multilayer Switch Feature Card (MSFC). You can boot the MSFC from the Supervisor Engine PC card (PC Memory Card International Association [PCMCIA] card) slot0. This document describes this boot process along with common problems, troubleshooting steps, and solutions.

Prerequisites

Requirements

Before you attempt this configuration, ensure that you meet these requirements:

- Understand the Difference Between CatOS and Cisco IOS System Software.
- Access the Catalyst 6500 command-line interface (CLI) via console and utilize the **switch console** command in order to access the MSFC.

Components Used

This document is not restricted to specific software and hardware versions.

Conventions

References to "MSFC" in this document are applicable and refer to MSFC, MSFC2 and MSFC3.

For more information on document conventions, refer to the Cisco Technical Tips Conventions.

Background Information

MSFC flash constraints can require you to boot an MSFC from the Supervisor Engine PC card. Some new MSFC Cisco IOS Software images exceed the flash space that is available in the bootflash of some MSFCs. First-generation MSFCs have 16 MB of onboard bootflash that you cannot upgrade. This limitation is true of the first-generation MSFCs only, and not MSFC2s or MSFC3s. Some MSFC2s have 16 MB of bootflash that is upgradable to 32 MB.

An MSFC boot from the Supervisor Engine PC card provides the versatility to move the PC card between multiple Catalyst 6500/6000 switches and boot as necessary.

After you configure an MSFC to boot from the Supervisor Engine slot0, the MSFC performs these steps upon boot:

1. Reads the boot variable.
2. Initiates a TFTP session to the Supervisor Engine.
3. Downloads the image into the MSFC DRAM from which the image is loaded, rather than into Flash memory.

Configure

Task

In this section, you are presented with the information to configure the features described in this document.

Step-by-Step Instructions

Complete these steps in order to boot an MSFC from slot0:

1. Access the MSFC Supervisor Engine via Telnet or console.
2. From the Supervisor Engine prompt, copy the MSFC system image to slot0:.

Here is an example:

```
Console> (enable) copy tftp slot0:
IP address or name of remote host []? 10.10.10.10
Name of file to copy from []? c6msfc2-dsv-mz.121-26.E1.bin

16383872 bytes available on device slot0, proceed (y/n) [n]? y
CC

!--- Output suppressed.

CCCCCCCCC
File has been copied successfully.
```

Note: Be sure to include the colon immediately after slot0 in this command and in any command that references this flash device. The colon dictates that the string that is referenced is a flash device and not a file name or command.

3. Confirm the file location and status.

```
Console> (enable) dir slot0:
-#- -length- ----date/time----- name
1 14164760 Jun 01 2005 18:00:38 c6msfc2-dsv-mz.121-26.E1.bin
```

2219112 bytes available (14164888 bytes used)

4. Issue the **switch console** command in order to access the MSFC.

You can also use the **session 15 | 16** command to access the MSFC. The **switch console** command is preferred but requires a physical Supervisor Engine console connection. See the Troubleshoot section of this document for more information about the difference between the **session** command and the **switch console** command.

```
Console> (enable) switch console
Trying Router-15...
Connected to Router-15.
Type ^C^C^C to switch back...
MSFC(boot)>
```

5. Confirm that the MSFC has a valid boot image in the MSFC bootflash.

Note: A valid boot image is a requirement for a slot0 boot. Also, the boot image must be in the MSFC bootflash, not the Supervisor Engine bootflash.

```
MSFC(boot)# dir bootflash:
Directory of bootflash:/

 2 -rw- 1860944 Jun 01 2005 18:25:47 c6msfc2-boot-mz.121-26.E1
31981568 bytes total (28300176 bytes free)

!--- If the MSFC does not have a valid boot image in bootflash,
!--- issue the copy tftp bootflash: command in order
!--- to download an appropriate image.
```

6. Configure the boot system and boot loader variables, and save the configuration.

```
MSFC(boot)# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
MSFC(boot)(config)# boot bootldr bootflash:c6msfc2-boot-mz.121-26.E1
MSFC(boot)(config)# boot system flash sup-slot0:c6msfc2-jsv-mz.121-19.E1.bin
MSFC(boot)(config)# end
MSFC(boot)# copy running-config startup-config
Destination filename [startup-config]?

Building configuration...
[OK]
MSFC(boot)#
```

Note: Reference the Supervisor Engine slot0 as `sup-slot0:`. This is the appropriate flash location reference from the perspective of the MSFC.

Note: A Catalyst 6500/6000 switch that runs Cisco IOS Software references this flash device as `slot0:`.

7. Confirm that the MSFC configuration register assignment is correct.

Typically, the configuration register value is set to 0x2102.

```
MSFC(boot)# show boot
BOOT variable = sup-slot0:c6msfc2-dsv-mz.121-26.E1.bin,1
CONFIG_FILE variable does not exist
BOOTLDR variable = bootflash:c6msfc2-boot-mz.121-26.E1
Configuration register is 0x0
```

The configuration register in this example is incorrect. Correct the value in this way:

```

MSFC(boot)# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
MSFC(boot)(config)# config
MSFC(boot)(config)# config-register 0x2102
MSFC(boot)(config)# end
MSFC(boot)# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]

```

```

MSFC(boot)# show boot
BOOT variable = sup-slot0:c6msfc2-dsv-mz.121-26.E1.bin,1
CONFIG_FILE variable does not exist
BOOTLDR variable = bootflash:c6msfc2-boot-mz.121-26.E1
Configuration register is 0x0 (will be 0x2102 at next reload)

```

8. Reload the MSFC in order to boot the image from slot0.

- ◆ If you initially accessed the MSFC with the **session 15 | 16** command, your prompt returns to the Supervisor Engine upon reload of the MSFC.

```

MSFC(boot)# reload
Proceed with reload? [confirm]
Console> (enable)

```

- ◆ If you initially accessed the MSFC with the **switch console** command, you see the entire MSFC boot process.

```

MSFC(boot)# reload
Proceed with reload? [confirm]

00:05:06: %SYS-5-RELOAD: Reload requested
System Bootstrap, Version 12.1(11r)E1, RELEASE SOFTWARE (fc1)
TAC Support: http://www.cisco.com/tac
Copyright (c) 2002 by cisco Systems, Inc.
Cat6k-MSFC2 platform with 262144 Kbytes of main memory

Self decompressing the image : #####

!--- Output suppressed.

##### [OK]

RP: Currently running ROMMON from S (Gold) region

Loading slot0:c6msfc2-dsv-mz.121-26.E1.bin ....from 127.0.0.11 (via
EOBC0/0): !!!!!!!!

!--- Output suppressed.

!!!!
[OK - 14164760 bytes]
Self decompressing the image : #####

!--- Output suppressed.

##### [OK]

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```

Software clause at DFARS sec. 252.227-7013.

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170 West Tasman Drive
San Jose, California 95134-1706

Cisco Internetwork Operating System Software
IOS (tm) MSFC2 Software (C6MSFC2-DSV-M), Version 12.1(26)E1, RELEASE
SOFTWARE (fc2)
Technical Support: <http://www.cisco.com/techsupport>
Copyright (c) 1986-2005 by cisco Systems, Inc.
Compiled Wed 23-Mar-05 04:56 by ccai
Image text-base: 0x40008F90, data-base: 0x41AB8000

cisco MSFC2 (R7000) processor with 229376K/32768K bytes of memory.
Processor board ID SAL06365VEW
R7000 CPU at 300Mhz, Implementation 39, Rev 3.3, 256KB L2, 1024KB L3 Cache
Last reset from power-on
Bridging software.
X.25 software, Version 3.0.0.
509K bytes of non-volatile configuration memory.

32768K bytes of Flash internal SIMM (Sector size 512K).

Press RETURN to get started!

Troubleshoot

Under some circumstances, an MSFC boot from Supervisor Engine slot0 can fail. Typically, a misconfiguration that relates to the boot variable or a Cisco IOS Software bug causes the Supervisor Engine slot0 boot failure.

If the MSFC fails to boot from Supervisor Engine slot0, you must access the MSFC Supervisor Engine via console instead of Telnet or Secure Shell Protocol (SSH). Only the use of the console allows you to issue the **switch console** command in order to access the MSFC. The **session 15 | 16** command is unlikely to work if the MSFC is in an unusable state. If the MSFC fails to boot or is in a "boot loop", the MSFC is unusable.

The **session** command opens a Telnet session from the Supervisor Engine to the MSFC loopback address. If the MSFC is not in a fully booted state, the MSFC can fail to accept this Telnet session.

The **switch console** command reroutes the console connection from the Supervisor Engine to the MSFC. Therefore, physical console access is necessary. Use of the **switch console** command allows access to the MSFC regardless of operational state.

After you gain access to the MSFC via the **switch console** command, press **Enter** a few times and observe the output for several seconds. In most instances, you observe one of these occurrences in the output:

- The MSFC continually attempts to load a nonexistent image, which indicates a misconfigured boot statement.
- The MSFC is at the `rommon>` prompt.

If the MSFC is in a boot loop, send break sequences to the console until the `rommon>` prompt displays. For example, in Microsoft HyperTerminal, press **Ctrl-Break**.

At the `rommon>` prompt, issue the **set** command in order to inspect the configured boot variables.

```

rommon 1 > set
PS1=rommon ! >
CRASHINFO=bootflash:crashinfo_20050429-052218
?=0
BOOTLDR=bootflash:c6msfc2-boot-mz.121-26.E1
SLOTCACHE=
RET_2_RUTC=1117650971
BOOT=sup-slot0:c6msfc2-dsv-mz.121-26.E1.bin,1
BSI=0
RET_2_RTS=19:07:17 UTC Wed Jun 1 2005
RET_2_RCALTS=1117652837

```

Confirm that the BOOT= and BOOTLDR= values, which are file names, appear *exactly* as they appear in the referenced flash location. These values are case sensitive. If there is a misconfiguration for these values, manually boot the MSFC and correct the boot variables via global configuration. Be sure to remove incorrect statements at this point.

This is an example of a manual boot command:

```
rommon> boot sup-slot0:c6msfc2-dsv-mz.121-26.E1.bin
```

Example of a Misconfigured Boot Statement Problem and Solution

Problem

The correct boot statement reads:

```
boot system flash sup-slot0:c6msfc2-dsv-mz.121-26.E1.bin
```

However, the example in this section omits the **.bin** at the end of the boot statement so that the incorrect statement reads:

```
boot system flash sup-slot0:c6msfc2-dsv-mz.121-26.E1
```

Here is the example:

```

Console> (enable) dir slot0:
-#- -length- -----date/time----- name
1 14164760 Jun 01 2005 18:00:38 c6msfc2-dsv-mz.121-26.E1.bin

2219112 bytes available (14164888 bytes used)
Console> (enable) switch console
Trying Router-15...
Connected to Router-15.
Type ^C^C^C to switch back...
MSFC(boot)# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
MSFC(boot)(config)# boot system flash sup-slot0:c6msfc2-dsv-mz.121-26.E1
MSFC(boot)(config)# end
MSFC(boot)# copy running-config startup-config
Building configuration...
[OK]
MSFC(boot)# show boot
BOOT variable = sup-slot0:c6msfc2-dsv-mz.121-26.E1,1
CONFIG_FILE variable does not exist
BOOTLDR variable = bootflash:c6msfc2-boot-mz.121-26.E1
Configuration register is 0x2102

MSFC(boot)# reload
Proceed with reload? [confirm]

```

```
00:04:56: %SYS-5-RELOAD: Reload requested
System Bootstrap, Version 12.1(11r)E1, RELEASE SOFTWARE (fc1)
TAC Support: http://www.cisco.com/tac
Copyright (c) 2002 by cisco Systems, Inc.
Cat6k-MSFC2 platform with 262144 Kbytes of main memory
```

```
Self decompressing the image : #####
##### [OK]
```

```
RP: Currently running ROMMON from S (Gold) region
```

```
%Error opening sup-slot0:c6msfc2-dsv-mz.121-26.E1 (No such file or directory)Self
decompressing the image : #####
##### [OK]
```

!--- Output suppressed.

```
cisco MSFC2 (R7000) processor with 229376K/32768K bytes of memory.
Processor board ID SAL06365VEW
R7000 CPU at 300Mhz, Implementation 39, Rev 3.3, 256KB L2, 1024KB L3 Cache
Last reset from power-on
X.25 software, Version 3.0.0.
509K bytes of non-volatile configuration memory.
```

```
32768K bytes of Flash internal SIMM (Sector size 512K).
```

```
Press RETURN to get started!
```

```
00:00:03: RP: Currently running ROMMON from S (Gold) region
00:00:22: %SCP-5-ONLINE: Module online
MSFC(boot)>
```

In this example, the MSFC does not drop into ROM monitor (ROMmon) mode or get stuck in a boot loop. Instead, the MSFC reverts to loading the boot helper image. Any of these three outcomes can occur. The outcome depends on other configuration factors and the code version.

If the entire boot configuration is correct, which includes the configuration register, the most likely cause for the boot failure is a Cisco IOS Software bug. The MSFC boot helper image is responsible for initiation of the TFTP session to the Supervisor Engine when the boot helper is instructed to load the image from the Supervisor Engine slot0. An example of an MSFC boot helper is `c6msfc2-boot-mz.121-26.E1`. Some MSFC boot helper Cisco IOS Software bugs exist in which this process malfunctions. The malfunctions most often occur at an attempt to load a larger-sized file from the Supervisor Engine slot0.

Notable bugs include:

- Cisco bug ID CSCdt17684 [🔗](#) (registered customers only) Big image file copy from sup-slot0: to MSFC bootflash: fails.
- Cisco bug ID CSCdx86427 [🔗](#) (registered customers only) Cannot boot from sup-slot0: with images over approximately 13 MB.

Solution

After you verify that the boot configuration is correct, upgrade to a current version of MSFC boot Cisco IOS Software that has fixes for the known bugs.

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