How to replace the CF-drive of a Brocade 300 Sans witch

Introduction

If you open a Brocade SAN switch you'll see a standard CF (Compact Flash) drive. On this drive are stored all the specific information of your switch (licenses, configuration) and your Linux OS that keeps your switch working.
I not aware of a procedure how to reinstall your OS and your specific configuration if this CF drive fails.
So, it is better to do a complete backup / dump of your CF drive and to know how a replace your drive with a new one.
All step a described here.

Backup

You need a running Linux PC (here with IP-Address 192.168.50.53) to manage the complete copy task.

Login to your brocade switch as root and run the following command

dd if=/dev/hda1 | ssh a@192.168.50.53 "dd of=/home/a/hda1.dmp"

where "a@192.168.50.53" and "/home/a/" are specific for your environment.

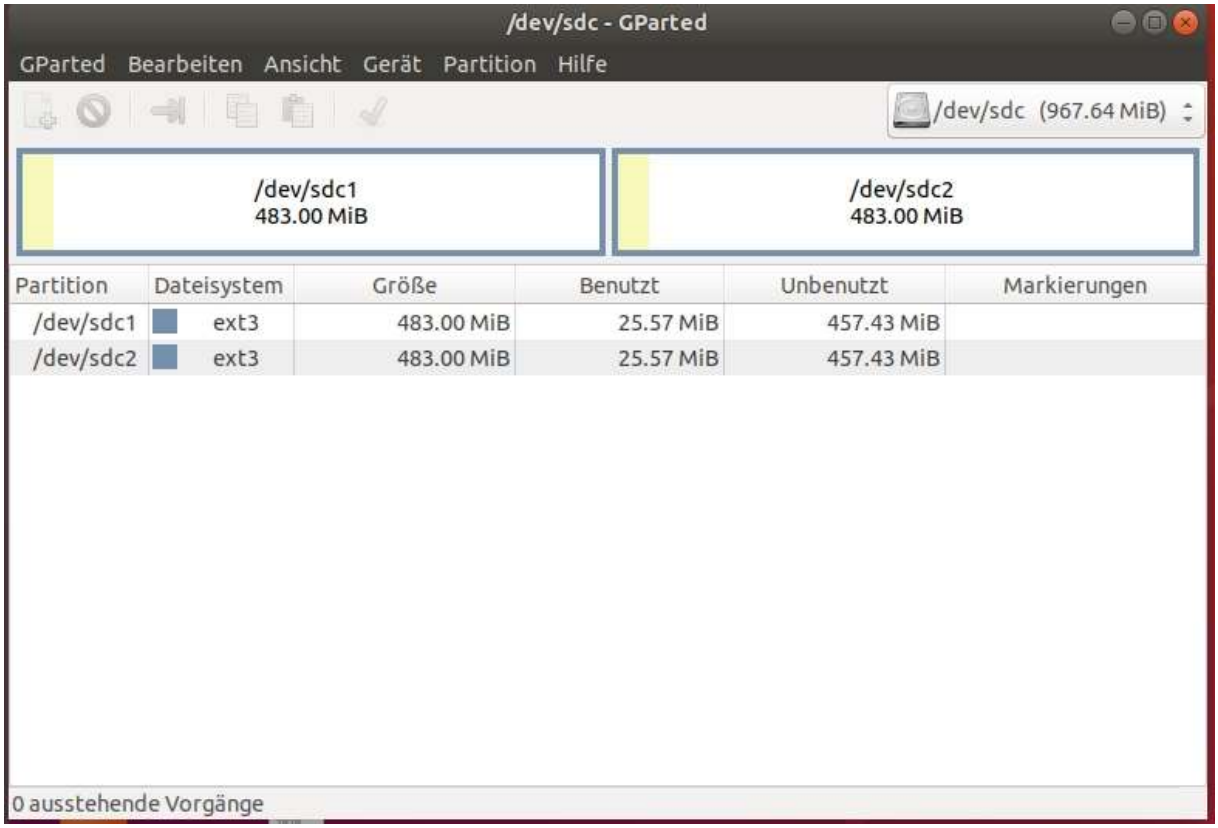
To be sure dump your second CF partition, too:

dd if=/dev/hda2 | ssh a@192.168.50.53 "dd of=/home/a/hda2.dmp"

Restore

You need a USB card reader for CF.

Put the new CF drive into this reader. Create two primary partitions of the same size on this CF drive (gParted helps a lot):



The filesystem type should be the same as the original. In this case here it is "ext3"

file hda1.dmp

hda1.dmp: Linux rev 1.0 ext3 filesystem data, UUID=53bb0b15-4e32-4df2-9f15-93ce178318a2 (needs journal recovery)

Now copy all files to the new CF drive:

mount -t ext3 hda1.dmp -o loop /mnt

mount /dev/sdc1 /mnt1

cd /mnt ; tar cf - . | (cd /mnt1 ; tar xvf -)

cd ; umount /mnt ; umount /mnt1 (remark: the umount take some time to be finished; be patient!)

Do this for your second partition, too:

mount -t ext3 hda2.dmp -o loop /mnt

mount /dev/sdc2 /mnt1

cd /mnt ; tar cf - . | (cd /mnt1 ; tar xvf -)

cd ; umount /mnt ; umount /mnt1

Make your new drive bootable in your SAN switch

If you put your new CF drive into your SAN switch, the boot process fails (logged through the serial line):

The system is coming up, please wait...

U-Boot 1.1.3 (Jan 29 2020 - 02:02:19), Build: jenkins-bsnfos-v7.4.2x_patch-202

CPU: AMCC PowerPC 440EPx Rev. A at 660 MHz (PLB=132, OPB=66, EBC=33 MHz)
    No Security/Kasumi support
    I2C boot EEPROM enabled
    Bootstrap Option G - Boot ROM Location I2C (Addr 0x54)
    Internal PCI arbiter enabled, PCI async ext clock used
    32 kB I-Cache 32 kB D-Cache
Board: Tomahawk
I2C: ready
DRAM: Initializing DDRSDRAM
DDR Init: speed = 132000002
DQS calibration - Window detected:
max_passing_cases = 54
wr_dqs_shift   = 95
dll_dqs_delay_X   = 30
dll_dqs_delay_X window = 4 - 57
DDR0_09=0x00011d5f
DDR0_22=0x00267f0b
DDR0_17=0x1e005900
DDR0_18=0x1e1e1e1e
DDR0_19=0x1e1e1e1e
ECC Enabling   DONE
512 MB
POST RAM test disabled.
Now running in RAM - U-Boot at: 1fb26000
trap_init : 0x0
system inventory subsystem initialized
FLASH: Tomahawk CFI Flash Driver Initialized
 4 MB
CPLD: Init complete
bootrom_verbose_flag=1
PCI: gd->brcd_flags = 0, PCI init
Skip our host bridge
    00 07 1657 0011 0280 18
In: serial
Out: serial
Err: serial
Net:
Checking system RAM - press any key to stop test

```
Checking memory address: 00100000
System RAM test using Default POST RAM Test succeeded.
set_bootstatus: BS_LOAD_OS, platform_idx = 1
Type run flash_nfs to mount root filesystem over NFS
Hit ESC to stop autoboot:  0
ATA device vendor SMI MODEL, product SMI        00004A18, revision 20071116
Map file at LBA sector 0x19ad08
Blk map has an invalid version 0
ATA device vendor SMI MODEL, product SMI        00004A18, revision 20071116
Map file at LBA sector 0x9c067
Blk map has an invalid version 0
do_bootm 171: load_addr 0x00100000 addr 0x00400000
do_bootm 174: ## Booting image at 00400000 load_addr 0x00100000 ...
Bad Magic Number
```

You have to change specific parameters that you'll get if you have a running SAN switch.
So, you need to bypass the "Bad Magic Number" problem.

It is possible to boot the SAN switch not only from your CF drive but from a RAM-disk, too. This RAM boot process lets you get into your SAN Linux OS.

You need specific programs to handle the RAM images. The program package is called "u-boot-tools".

After installation two programs a used here:

dumpimage and mkimage

First of all, you must create a new directory i.e. /home/a/boot and get into this directory.

Mount the hda1.dmp again and copy the contents of the ./boot directory into directory just created:

```
# mount -t ext3 hda1.dmp -o loop /mnt

# cp /mnt/boot/* /home/a/boot
```

The file that has to be used is named "zImage.tree.initrd":

```
# dumpimage -l ./zImage.tree.initrd
Image Name:   Linux-2.6.14.2
Created:      Wed Jan 29 11:06:53 2020
Image Type:   PowerPC Linux Multi-File Image (uncompressed)
Data Size:    4306459 Bytes = 4205.53 KiB = 4.11 MiB
Load Address: 00000000
Entry Point:  00000000
Contents:
   Image 0: 3227782 Bytes = 3152.13 KiB = 3.08 MiB
   Image 1: 1078663 Bytes = 1053.38 KiB = 1.03 MiB
```

This file consists of two images that must be extracted into separate files:

```
# dumpimage -l ./zImage.tree.initrd -o kernel.extracted
# dumpimage -l ./zImage.tree.initrd -o ramdisk.extracted -p 1
```

Now mkimage is used to generate two img files:

```
# mkimage -n '2.6.14.2 kernel' -T kernel -A ppc -O Linux -C none -a 0 -e 0 -d kernel.extracted kernel.img
Image Name:   2.6.14.2 kernel
Created:      Sun Sep  6 10:22:17 2020
Image Type:   PowerPC Linux Kernel Image (uncompressed)
Data Size:    3227782 Bytes = 3152.13 KiB = 3.08 MiB
Load Address: 00000000
Entry Point:  00000000

# mkimage -n '2.6.14.2 initrd' -T ramdisk -A ppc -O Linux -C gzip -a 0 -e 0 -d ramdisk.extracted ramdisk.img
Image Name:   2.6.14.2 initrd
Created:      Sun Sep  6 10:22:28 2020
Image Type:   PowerPC Linux RAMDisk Image (gzip compressed)
Data Size:    1078663 Bytes = 1053.38 KiB = 1.03 MiB
Load Address: 00000000
Entry Point:  00000000
```

Put these two img-files into a tftp-server file directory (I use a OpenTFTPServer for Windows that can be started by a batch-script).

Access your brocade SAN switch through a serial line and select the command shell option:

…

```
1) Start system.
2) Recover password.
3) Enter command shell.

Option? 3

Boot PROM password has not been set.
=>
```

Configure an appropriate IP configuration

```
=> setenv ipaddr “192.168.50.103”
=> setenv submask “255.255.255.0”
=> setenv gatewayip “192.168.50.1”
=> setenv serverip “192.168.50.51” <= this is the address of your tftpserver

=> saveenv
=> Saving Environment to Flash...
Done
=>
```

Now it’s time to download this img-files

```
=> tftpboot 0x100000 kernel.img
Waiting for PHY auto negotiation to complete. done
ENET Speed is 100 Mbps - FULL duplex connection (EMAC0)
ppc_4xx_eth0 initialized
Using ppc_4xx_eth0 device
TFTP from server 192.168.50.51; our IP address is 192.168.50.103
Filename 'kernel.img'.
Load address: 0x100000
Loading: #################################################################
         #################################################################
         #################################################################
         #################################################################
         #################################################################
         #################################################################
         #################################################################
         #################################################################
         #################################################################
         ##############################################
done
Bytes transferred = 3227846 (3140c6 hex)
=> imi 0x100000
## Checking Image at 00100000 ...
   Image Name:   2.6.14.2 kernel
   Image Type:   PowerPC Linux Kernel Image (uncompressed)
   Data Size:    3227782 Bytes =  3.1 MB
   Load Address: 00000000
   Entry Point:  00000000
   Verifying Checksum ... OK

=> tftpboot 0x800000 ramdisk.img
ENET Speed is 100 Mbps - FULL duplex connection (EMAC0)
ppc_4xx_eth0 initialized
Using ppc_4xx_eth0 device
TFTP from server 192.168.50.51; our IP address is 192.168.50.103
Filename 'ramdisk.img'.
Load address: 0x800000
Loading: #################################################################
         #################################################################
         #################################################################
         ################
done
Bytes transferred = 1078727 (1075c7 hex)

=> imi 0x800000
## Checking Image at 00800000 ...
   Image Name:   2.6.14.2 initrd
   Image Type:   PowerPC Linux RAMDisk Image (gzip compressed)
   Data Size:    1078663 Bytes =  1 MB
   Load Address: 00000000
   Entry Point:  00000000
   Verifying Checksum ... OK
```

Now boot your brocade switch from RAM:

```
=> bootm 0x100000 0x800000
do_bootm 171: load_addr 0x00800000 addr 0x00100000
do_bootm 174: ## Booting image at 00100000 load_addr 0x00800000 ...
   Image Name:   2.6.14.2 kernel
   Image Type:   PowerPC Linux Kernel Image (uncompressed)
   Data Size:    3227782 Bytes =  3.1 MB
   Load Address: 00000000
   Entry Point:  00000000
do_bootm_linux 565: ## Current stack ends at 0x1FAE4BB0 => set upper limit to 0x00C00000
## Loading RAMDisk Image at 00800000 ...
   Image Name:   2.6.14.2 initrd
   Image Type:   PowerPC Linux RAMDisk Image (gzip compressed)
   Data Size:    1078663 Bytes =  1 MB
   Load Address: 00000000
   Entry Point:  00000000
   Verifying Checksum ... OK
## initrd at 0x00800040 ... 0x009075C6 (len=1078663=0x107587)
   Loading Ramdisk to 1f9dc000, end 1fae3587 ... OK
 initrd_start = 1f9dc000, initrd_end = 1fae3587
## Transferring control to Linux (at address 00000000) ...
Start Autoneg
Installing Linux 2.6 Kernel
Attempting to find a root file system on hda2...
INIT: version 2.78 booting
Bypassing firmware validation.
INIT: Entering runlevel: 3
Enabling FOS failure detection feature
Starting Fabric OS Services...
FIPS off, RRD...
```

….

Login as root

Now change the “magic numbers”:

```
# mapinst /mnt/boot/zImage.tree.initrd
Map file starting LBA: 0x19ad08
# mapinst /mnt/boot/zImage.tree.initrd
Map file starting LBA: 0x9c067
# bootenv OSLoader "ATA()0x19ad08;ATA()0x9c067" <= hex numbers from output above!

# reboot
```

The boot process starts now regularly from your new CF drive.