

Tru64 UNIX Best Practice

Building a Consolidated Firmware CD

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Product Version: **Tru64 UNIX Version 5.1 and higher**

This Best Practice describes how to build a consolidated firmware CD image for the Tru64 UNIX operating system and Alpha systems firmware.

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Building a Consolidated Firmware CD

A consolidated firmware CD lets you upgrade your processor firmware from the same CD from which you install the operating system. This is useful if you must install a large number of similar or identical standalone systems.

What this Best Practice is:

This Best Practice describes how to create a consolidated firmware CD image in ISO 9660-compliant format (CDFS), using the *Tru64 UNIX Operating System* CD and the *Alpha Systems Firmware Update* CD.

What this Best Practice is not:

This Best Practice does not describe how to burn the consolidated firmware CD image to an actual compact disk. See your CD writer hardware and software documentation for this information.

See the Tru64 UNIX Best Practices Web page for more information about Best Practices documentation.

Is This Best Practice Right for You?

Not all Best Practices apply to all configurations, so you must be sure that the one you select is appropriate for your system and circumstances. To use this Best Practice, you must meet the requirements described in the following table:

Requirement	Description
Operating System	Tru64 UNIX — see <i>Table 1</i> for supported hardware and software.
System Configuration	This Best Practice applies to single systems only. Do not try to apply this Best Practice to a cluster. You also need 1.5 gigabytes of disk space for the work area and 750 megabytes of disk space for the CD image area. You may use removable disks.

Requirement	Description
Impact on Availability	Your system will be unavailable when you perform a test installation from the consolidated firmware CD. As this requires you to perform a Full Installation, it may be best to not use a production system.
Restrictions	Do not repackage software or firmware unless you have a specific licensing agreement with the manufacturer that allows you to do so.
Skill Level	You should have experience installing and administering Tru64 UNIX systems.

Supported Configurations

Hardware	Version 5.1	Version 5.1A
XP1000		×
AlphaServer 4100	×	×
DS10	×	×
DS20	×	×
DS20E	×	×
ES40	×	×

If you do not meet the requirements in this section, do not use this Best Practice.

Before You Begin

Before you apply the Best Practice for creating a consolidated firmware CD, you need the following media:

- *Tru64 UNIX Operating System CD*
- *AlphaSystems Firmware Update CD*

You also need 1.5 gigabytes of disk space for the work area and 750 megabytes of disk space for the CD image area.

Applying the Best Practice

Before you build a consolidated firmware CD, you must meet all the requirements described in *Before You Begin*.

Preparing the Work Area

1. Log in to the system (where you are creating the consolidated firmware CD) as `root` or use the `su` command to gain superuser privileges.
2. Create a working area on a file system with at least 1.5 gigabytes of free space:

```
# mkdir -p /var/spare
```

Note

If you do not have 1.5 gigabytes of free space, you may have to mount a removable disk. Create the mount point and then mount the disk. For example:

```
# mount /dev/disk/dsk4c /var/spare
```

Preparing the CD Image Area

3. Create a mount point for the CD image:

```
# mkdir -p /cdimage
```
4. Set up the a partition of an unused disk to use as the CD image area. This 750 megabyte partition must start at block 0, have a size of 1536000 512-byte blocks, and a file type of unused. For example:

```
# disklabel -F -r -e dsk2
```

Note

If you use the full path name (for example: `/dev/disk/dsk2`) the `disklabel` command will fail.

Using the `-e` parameter opens your default editor. The `disklabel` command lets you edit a temporary file similar to the following:

```
# /dev/rdisk/dsk2c:
type: SCSI
disk: RZ29B
label:
flags:
bytes/sector: 512
sectors/track: 113
tracks/cylinder: 20
sectors/cylinder: 2260
cylinders: 3708
sectors/unit: 8380080
```

```
rpm: 7200
interleave: 1
trackskew: 9
cylinderskew: 16
headswitch: 0 # milliseconds
track-to-track seek: 0 # milliseconds
drivedata: 0
```

```
8 partitions:
#          size      offset  fstype  fsize  bsize  cpg # ~Cyl values
a:    1536000         0    4.2BSD  1024   8192   16 #      0 - 679*
b:     393216    393216  unused     0     0     #    173*- 347*
c:     8380080         0  unused     0     0     #      0 - 3707
d:     2531216    786432  unused     0     0     #    347*- 1467*
e:     2531216    3317648  unused     0     0     #   1467*- 2587*
f:     2531216    5848864  unused     0     0     #   2587*- 3707
g:     3872768    786432  unused     0     0     #    347*- 2061*
h:     3720880    4659200  unused     0     0     #   2061*- 3707
```

1 Partition a settings

5. Edit the a partition information so that the size value is 1536000, the offset is 0, the fstype is unused, the fsize and bsize are 0, and cpg is blank. For example:

```
#          size      offset  fstype  fsize  bsize  cpg # ~Cyl values
a:    1536000         0  unused     0     0     #      0 - 679*
```

Make sure that all other partitions are set to unused.

6. Save the new information and exit the editor. You see the following message:

```
write new label? [y]:
```

Press Return to write the new information to the disk label.

See `disklabel(8)` and the *Installation Guide — Advanced Topics* for more information.

7. Copy the CD image disk label information to a temporary file. For example:

```
# disklabel -r dsk2 > /tmp/DL
```

Copying the Base Operating System

8. Insert the *Tru64 UNIX Operating System* CD into your CD drive and mount the CD:

```
# mount /dev/disk/cdrom0a /mnt
```

9. Create a tar file in your working area that contains the contents of the *Tru64 UNIX Operating System* CD.

Note

This step may take as long as 60 minutes to complete.

For example:

```
# cd /mnt
# tar cf /var/spare/os_copy.tar .
```

If you include the verbose argument (`tar cvf`), the `tar` command lists each file and symbolic link as it is added to the `tar` file.

10. Insert the saved disk label information into the CD image area, specifying the bootstrap files from the *Tru64 UNIX Operating System* CD. For example:

```
# disklabel -R -r -t ufs dsk2 /tmp/DL \  
/mnt/mdec/xxboot /mnt/mdec/bootxx
```

Note

You can enter this command on one line. The backslash (`\`) character in this example indicates line continuation.

See `disklabel(8)` for more information.

11. Unmount the *Tru64 UNIX Operating System* CD:

```
# cd /
# umount /mnt
```

12. Remove the *Tru64 UNIX Operating System* CD from the CD drive.

13. Create new file system information for the CD image area. For example:

```
# newfs /dev/disk/dsk2a
```

You see output similar to the following:

```
Warning: 800 sector(s) in last cylinder unallocated
/dev/rdisk/dsk2a: 1536000 sectors in 680 cylinders of 20 tracks, 113 sectors
750.0MB in 43 cyl groups (16 c/g, 17.66MB/g, 4288 i/g)
super-block backups (for fsck -b #) at:
32, 36320, 72608, 108896, 145184, 181472, 217760, 254048,
290336, 326624, 362912, 399200, 435488, 471776, 508064, 544352,
580640, 616928, 653216, 689504, 725792, 762080, 798368, 834656,
870944, 907232, 943520, 979808, 1016096, 1052384, 1088672, 1124960,
1157152, 1193440, 1229728, 1266016, 1302304, 1338592, 1374880, 1411168,
1447456, 1483744, 1520032,
```

See `newfs(8)` for more information.

14. Mount the CD image disk onto your system. For example:

```
# mount /dev/disk/dsk2a /cdimage
```

15. Change directory to the CD image area and extract the base operating system from the `tar` file in your working area.

Note

This step may take as long as 60 minutes to complete.

For example:

```
# cd /cdimage
# tar xpf /var/spare/os_copy.tar
```

If you include the verbose argument (`tar xvpf`), the `tar` command lists each file and symbolic link as it is extracted from the `tar` file.

Copying the Firmware

16. Insert the *AlphaSystems Firmware Update* CD into the CD drive.
17. Change to the root directory and mount the *AlphaSystems Firmware Update* CD. For example:

```
# cd /
# mount -t cdfs -r /dev/disk/cdrom0a /mnt
```

18. Copy the System Marketing Model (SMM) table from the *AlphaSystems Firmware Update* CD to the CD image area:

```
# cp /mnt/SMMTABLE.TXT\;1 /cdimage/smmtable.txt
```

Note

The backslash in the first argument escapes the semicolon (`;`) in the file name. Change the target file name to lower case and remove the `;1` suffix.

19. View the SMM table to find the firmware that you need. For example, you may be preparing your consolidated firmware CD for DS10 and ES40 systems. Look for the DS10 and ES40 entries:

```
... [DS10] DS10_V6_0.EXE          6  6.0-6   ! Compaq AlphaServer DS10
... [ES40] ES40_V6_0.EXE          6  6.0-28  ! Compaq AlphaServer ES40
```

- 1 The values inside the brackets (DS10 and ES40) reflect the directories on the *AlphaSystems Firmware Update* CD where the executable files reside.
 - 2 The values immediately following the directory entries reflect the executable files. The actual file names on the *AlphaSystems Firmware Update* CD have ;1 suffixes, for example: DS10_V6_0.EXE;1 and ES40_V6_0.EXE;1.
20. Create the necessary firmware directories in the CD image area. For example:
- ```
mkdir -p /cdimage/ds10
mkdir -p /cdimage/es40
```
21. Copy the firmware files into these firmware directories. Use lower case for the target directory and file names, and remove the ;1 suffixes. For example:
- ```
# cp /mnt/DS10/DS10_V6_0.EXE;1 /cdimage/ds10/ds10_v6_0.exe
# cp /mnt/ES40/ES40_V6_0.EXE;1 /cdimage/es40/es40_v6_0.exe
```
22. Unmount the *AlphaSystems Firmware Update* CD:
- ```
umount /mnt
```
23. Remove the *AlphaSystems Firmware Update* CD from the CD drive.

## Building the CD Image

24. In your working area, build a target CDFS file image of the CD image area directory structure:
- ```
# /usr/sbin/mkisofs -D -R -a -d -o \
/var/spare/consFWos.cdfs /cdimage
```

Note

You can enter this command on one line. The backslash (\) character in this example indicates line continuation.

See `mkisofs(8)` for more information.

25. Insert a label into the CDFS file image, specifying the bootstrap files from the CD image area. For example:

```
# disklabel -r -w -t cdfs -f /var/spare/consFWos.cdfs \  
/cdimage/mdec/xxboot.cdfs /cdimage/mdec/bootxx.cdfs
```

Note

You can enter this command on one line. The backslash (\) character in this example indicates line continuation.

See `disklabel(8)` for more information.

26. Unmount the CD image area:

```
# umount /cdimage
```

Verifying Success

After you apply this Best Practice, you can verify whether it was successful by installing the operating system from the consolidated firmware CD.

27. To test your CD image, shut down your system:

```
# shutdown -h now
```

28. At the console prompt, boot from the disk where you built the CD image. For example:

```
>>> boot dka200
```

29. Install the base operating system as described in the *Tru64 UNIX Installation Guide*.

30. If your installed firmware is an older version than the firmware on the CD image, you see the Loadable Firmware Update Utility execute before the last reboot of the Full Installation process.

31. Login in as root.

32. Use the `sizer -v` command to verify the operating system version. For example:

```
# sizer -v  
Compaq Tru64 UNIX V5.1A (Rev. 1880); Fri Jul 20  
14:55:28 EDT 2001
```

33. Use the `consvar -l -v` command to verify the firmware version. For example:

```
# consvar -l -v  
Firmware Rev: 7.2 1  
system fam:15  cpu:5  smm:1275  
auto_action = BOOT
```

```
boot_dev = dsk0
bootdef_dev = dsk0
booted_dev = dsk0
boot_file =
booted_file =
boot_osflags = a
booted_osflags = a
boot_reset = ON
Failed to get dump_dev
enable_audit = ON
license = MU
char_set =
language = 0x36
tty_dev = 0
Failed to get scsiid
Failed to get scsifast
Failed to get com1_baud
Failed to get com1_modem
Failed to get com1_flow
Failed to get com1_misc
Failed to get com2_baud
Failed to get com2_modem
Failed to get com2_flow
Failed to get com2_misc
Failed to get password
Failed to get secure
Failed to get logfail
srm2dev_id =
```

1 Firmware version

If the Best Practice was not successful, see *Troubleshooting* for information about identifying and solving problems.

Troubleshooting

If you determine that the Best Practice was not successful as described in *Applying the Best Practice* or *Verifying Success*, use the following table to identify and solve problems:

Problem	Possible Solutions
Cannot edit the disk label for the CD image area.	Clear the disk label and apply a standard disk label (<code>disklabel -z</code> and <code>disklabel -rw</code>). Try to edit the disk label again. See <code>disklabel(8)</code> .
Cannot extract base OS from the <code>tar</code> file.	You may have forgotten to include the last “dot” argument when you created the <code>tar</code> file: <pre>tar cf /var/spare/os_copy.tar .</pre> Recreate the <code>tar</code> file and try again.
Cannot boot the system from the CD image.	<ul style="list-style-type: none"> • Make sure that you are booting from the disk containing the CD image that you mounted on <code>/cdimage</code> and not the working area that you mounted on <code>/var/spare</code>. • Make sure that you specified the correct bootstrap files after you copied the operating system into the CD image area from the <code>tar</code> file.
Firmware is not updated when you install the operating system from the CD image.	<ul style="list-style-type: none"> • Firmware images in the CD image are not newer than the firmware on the system, and the loadable firmware updated utility does not update the firmware. • Firmware images in the CD image do not correspond to the system type. Recreate the consolidated firmware CD with the correct firmware images for your system and reinstall from the CD image.

Comments and Questions

We value your comments and questions on the information in this document. Please mail your comments to us at this address:

`best_practices@zk3.dec.com`

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