Chapter 1
-
HP-UX
Installation

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Introduction

This chapter is intended as a short guide for the cold installation procedure of an HP-UX system. It is based on **UX 11.11 (or 11i)**. If you need more detailed information we strongly recommend to refer to the HP's official installation guide:

http://docs.hp.com/hpux/os/11i/index.html#Installing%20and%20Updating

Installation guides for UX 11.00 or UX 10.20 can also be found on http://docs.hp.com.
If you prefer to *update* your system instead of *cold installing* it, refer to the Update Chapter in this book.

When do you need to do a cold install?

- There is no operating system installed yet.
- The installed operation system is corrupt and cannot be repaired.
- The boot disk is defective and needs to be replaced

In the latter two cases, you might want to recover the system from an Ignite-UX tape/server (if available). Refer to the Ignite-UX Chapter in this case.

Prerequisites

Four basic requirements must be fulfilled in order to be able to cold-install a system:

System must be supported

The system and the installed interface cards must be supported with the HP-UX release you like to install. A table of systems that are supported with HP-UX 11.11 can be found in the Update Chapter of this book. Remind that newer HP-UX releases might not support older hardware. Be sure to have the latest installation media. A newer system may not be supported with an older version of the installation CD because the install kernel on the media may not be able not boot the system.

Firmware update my be needed

Some systems require a certain PDC (processor) firmware level in order to be bootable with HP-UX 11i. A table of minimum required firmware versions for UX 11.11 can be found in the Update Chapter.

Disk space and physical memory need to be sufficient

UX 11.11 core needs at least a 4GB root disk, 64MB RAM, 128MB swap space. More is better and strongly recommended.

There should be no hardware defects

Cold installing a system is the last resource to solve a software related problem (this should never be needed with HP-UX). If even a cold install does not fix - you most probably deal with a hardware problem.

NOTE:
There are some cases where there are problems with the model string of the system. The model string is located on the *stable storage*, a non-volatile piece of memory. It can be modified by HP engineers only using the `ss_config` utility. This needs to be done e.g after hardware upgrades. It is essential that the model string is set correctly because it will be checked during installation.

Preparation

Backup for Failback

If you are re-installing a system, e.g. in order to update it from an earlier HP-UX release, it is strongly recommended to back it up before so that a fail-back is in place if the installation process fails.

Backup using fbackup

Many administrators use the basic fbackup command to back up the entire system to tape. You do not need to unmount any imported file systems; fbackup does not cross NFS boundaries unless specified. Using the normal tape location to do a full backup, insert a new tape and enter:

```
# fbackup -f /dev/rmt/0m -i / -v
```

Later, if you wish to return the system to its previous state, use the frecover command. See the `fbackup(1M)` manpage for examples.

Ignite-UX recovery commands

For recovering a system, a better alternative to using fbackup and frecover is to use the recovery commands available with Ignite-UX, which offer more flexibility than fbackup and frecover, including the ability to recover non-bootable systems. The Ignite-UX server software for HP-UX 11i is provided on the HP-UX 11i OE CD1.

Using make_tape_recovery

The Ignite-UX server's `make_tape_recovery` command creates a bootable recovery tape for an LVM or whole disk file system while it is up and running. When a system has a logical volume layout, the recovery tape will only include data from the root volume group, plus data from any non-root volume group containing the `/usr` directory.
You can run `make_tape_recovery` either on the Ignite-UX server or locally on the system from which you are trying to make a recovery tape.
To create the bootable recovery tape, enter:

```
# /opt/ignite/bin/make_tape_recovery -Av -C -d /dev/rmt/0m
```

where: `v` is for verbose mode and `A` specifies the entire root disk or volume group. Also, more than one volume group can be specified with the `-x` option. The `-d` option lets you specify the tape drive, e.g. `-d /dev/rmt/3mn`. `–C` will create a check_recovery log file which can be verified when you run check_recovery command to ascertain whether there is a need to run make_tape_recovery command again after some hardware- or software-related changes.

To recover a failed system disk or volume group after a recovery tape has been made, simply load the recovery tape, boot the system, interrupting the boot sequence to redirect to the tape drive. Allow the install process to complete. Do not intervene. The system will reboot and, because map files for all associated volume groups have been saved on the tape, any other existing volume groups are imported and mounted automatically. Data which is not in the root volume group must be backed up and recovered using normal backup utilities.

For more information on using `make_tape_recovery`, see the `make_tape_recovery(1M)` manpage on an Ignite-UX server or Ignite-UX Chapter.

Using make_net_recovery
The Ignite-UX server also has the `make_net_recovery` command to create a system recovery archive on another system on the network. The archive created by `make_net_recovery` is specific to the system it was created for and its identity includes hostname, IP_address, networking information, and so on. In the event of a root disk failure, you use the Ignite-UX server to restore the system by installing the recovery archive.

The contents of the system recovery archive always includes all files and directories which are essential to bringing up a functional system. This "essential" list is pre-defined by `make_net_recovery`. You can run `make_net_recovery` in its interactive mode to review the directories and files which make up the "essential list," and also add or remove other data from the archive on a disk/volume group, file, or directory basis.

For more information on using `make_net_recovery`, see the `make_net_recovery(1M)` manpage or Ignite-UX Chapter.

Have anything ready before starting the install process

Before you install the system you should have the following things ready:

- **Installation, Support Plus and Application Media**

  Installation
  HP-UX 11i Operating Environment (OE) CDs 1 and 2, June 2002 or later.
  Refer to the section Available Operating Environments for other OEs.

  Support Plus Media
  includes general release patch bundle, quality patch bundles and diagnostics, June 2002 or later.

  Application Media
  Install applications not installed with the OE or install a newer version of an OE application. Some applications installed with an 11i OE may be older versions than

those available on the HP-UX Applications CDs supplied in the media kit. Products available on Application CDs are listed in the CD_TABLE_OF_CONTENTS file on each CD.

Latest versions can be downloaded from http://software.hp.com or the ITRC http://itrc.hp.com (Software Update Manager).

There's a good HP internal website that lists all Application Releases (DART): http://rcweb.norway.hp.com/Teknikk/Tools2use/Dart/ (HP internal)

For detailed information on which media is available go to the Releases & Media website: http://www.software.hp.com/RELEASES-MEDIA/

- **Hardware path of the install source**
  The CD-ROM drive in this case.

- **Hardware path of the install target**
  Which should become the new root disk(s)?

- **Sizes of each filesystem**
  `/`, `/usr`, `/var`, `opt`, ... If in doubt, just use the defaults.

- **Hostname and IP address**
  In case you like to connect the system to a network you need the IP address, subnet mask and hostname and eventually DNS server.

Installation

This chapter describes cold-installing from the HP-UX 11i CDs, including the operating system, a selected operating environment (OE) bundle, network drivers, CDE language bundle, diagnostics, and required patches from the Support Plus CD.

Besides installing from CD/DVD there are alternate methods of cold-installing:

- **Installing from software depots**

  Use Software Distributor commands to create depots containing OS, OE, and other software bundles, then install from the depot using Ignite-UX. For help with this method, refer to the Ignite-UX chapter.

- **Installing from golden images**

  If you need to install the same OS/OE and applications on many systems in your network, use an Ignite-UX server as explained in the Ignite-UX chapter.
  With Ignite-UX, you can create a single install image (golden image) containing OS/OE bundles, application bundles and patch bundles, then install the image on multiple systems in your environment.

Cold-installation procedure step by step

Cold-installing HP-UX 11i typically takes 2-3 hours, depending on the system and whether you are installing only the OS or also installing an OE.

To perform a cold installation follow the steps below:

Step 1   Insert the HP-UX 11i CD1 into the drive.
Make sure any external devices connected to the target system are turned ON and operational. Then turn the system ON or cycle power.

Step 2   Stop the autoboot:
- On workstations, press and hold down the Esc key.
- On servers, press any key.
You will see the boot console menu. Boot procedures vary somewhat between systems. If you need help, enter **HELP**

Step 3   Ensure that Fast Boot is enabled (the full memory check run when Fast Boot is OFF may take several hours on a large system):
- Select the Configuration Menu: **CO**
- If the Fast Boot selection is available, switch Fast Boot ON: **FB ON**
- Return to the Main Menu: **MA**
(Remember to switch Fast Boot back OFF after installing 11i.)

Step 4   Search for bootable devices, using the choices displayed (for example, enter **search**

or **sea**). You'll see a table similar to this:

```
Path#   Device Path        Device Type
-----   -----------        -----------
P0      SESCSI.2.0         TOSHIBA CD-ROM
P1      LAN.1.2.3.4.5.6    1.2.3.4
P2      FWSCSI.6.0         IBM DDRS-34560WS
```

Of the media listed, a fast/wide SCSI device (FWSCSI) is usually a disk, whereas a single-ended SCSI device (SESCSI) can be a disk or CD drive. CDs usually default to a device path ending in 2.

Step 5   Boot from the CD drive using the listed path number.
For the example shown above (P0), enter: **BOOT P0**

Step 6   After a few minutes, you'll be asked `Interact with IPL?` Press: **n**
The install kernel will load (takes 3-5 minutes), after which a screen might ask you to enter the keyboard language of your console. Enter the number and press **Return/Enter** and again to confirm.

Step 7   When the initial Ignite-UX screen appears, take a moment to read how to navigate and select choices using this terminal interface:

```
          Welcome to the HP-UX installation/recover process!

  Use the <tab> key to navigate between fields, and the arrow keys
  within the fields. Use the <return/enter> key to select an item.
  Use the <return> or <space-bar> to pop-up a choices list. If the
  menus are not clear, select the "HELP" item for more information.

 Hardware Summary:       System Model: 9000/812/80
 +--------------------+--------------+------------------+ [Scan Again]
 | Disks: 1 ( 4.0GB)  | Floppies: 1  | LAN Cards:   1   |
 | CD/DVDs:        1  | Tapes:    0  | Memory:      128Mb |
 | Graphics Ports: 1  | IO Buses: 3  | CPUs:        1    | [H/W Details]
    +-------------------+-------------+------------------+

                    [      Install HP-UX       ]

                    [   Run a Recover Shell  ]

                    [    Advanced Options     ]

        [  Reboot  ]                              [  Help  ]
```

- Use the **Tab** key to navigate between fields and the arrow keys to navigate within fields.
- Press **Return/Enter** to select an item. Pressing Return/Enter or the space-bar opens a menu list.
- To navigate more quickly, enter the underlined letter of an item (such as **I** for **Install HP-UX**).

Step 8   Select: **Install HP-UX** from the **User Interface and Media Options** screen, choose:

- **Source Location Options: Media-only installation**
- **User Interface Options: Guided Installation** - provides an install wizard with limited choices. Select if you are not familiar with Ignite-UX.

Alternately, select **Advanced Installation** to see tabbed screens, enabling you to customize your system. Use this mode to change LVM settings and set system parameters, network services, file-system characteristics, and other configuration details. You can exit **Guided Installation** and restart the configuration using **Advanced Installation** at any time by either selecting the **Cancel** button or pressing **C**. Make your choices and select **OK**.

Step 9 Whether using Guided Installation or Advanced Installation, proceed through each screen to configure your system:

- **Configurations**: Lists the OS version (initially B.11.11).
- **Environments**: Specify desired OE from those available on the CD. If your system is 32/64-bit capable, select the bundle for the OS word-width you wish to install, 32 or 64 (see supported systems table in the Update Chapter).
- **Languages**: Select the **Languages...** button to view CDE-languages bundles to be loaded. **Global** is set by default when installing on workstations, resulting in all available CDE-language bundles being installed. **Global (Non-CDE)** is set when installing on servers to indicate that a generic, CDE-language bundle will be installed.
- **Additional Software**: Select networking drivers and other applications for your system.

  IMPORTANT: Do not de-select the **HPUXBaseAux**, **HWEnable11i**, **OnlineDiag** or **BUNDLE11i bundles**. If in doubt, leave the selections as default. Other software products may be selectable, however, we recommend that you do not de-select any products at this time.

  TIP: If you're installing an Ignite-UX server, be sure to select the entire Ignite-UX server product, B5725AA, thus installing the new `make_tape_recovery` command (see the `make_tape_recovery(1M)` manpage) on your Ignite-UX server.

- At the end of the Guided Installation session, a screen allows you to review any messages that Ignite-UX encountered. If there are any errors, resolve them before continuing with the installation.

Step 10 When finished configuring your installation:

- With Guided Installation, select: **Finish**
- With Advanced Installation, select **GO!** (at the bottom of any tab).
  A confirmation screen lists the disks that will be written to during installation and a log of any warnings or errors encountered. You have the chance to **Cancel** at this time. If you cancel, you return to the previous configuration screen.

  After you selecting **Finish** or **GO!**, the system configures the hard disks and loads a minimum set of commands and libraries. SD then downloads all the products and patches from the first CD.

Step 11 When prompted, replace HP-UX 11i CD1 with the requested CD from the media kit. Software will be automatically loaded from each CD. If you see the message:

```
Unable to verify CD-ROM media content ...
```

You may have pressed **Enter** before changing the CD. If so, select the displayed Recovery Action 1: **Retry software Load**... and press **Enter** again.

Step 12 The system automatically reboots after all software has been loaded.
Eject the last CD. Be sure to store all CDs in a safe place. You may need them later to install drivers or to install or change the OE.

Step 13 If you specified **Ask at first boot** during the installation screens, the `set_parms` command runs now so you can set the root password, date, time, time zone, IP address, and other network parameters. You may need to customize NFS mounts, gateways, file systems, and so forth after you log in. Changes to the kernel, such as adding devices, will require a reboot to enable them.

Step 14 The depot named GOLDQPK11i includes two quality pack bundles, GOLDAPPS11i, which updates OE applications, and GOLDBASE11i, which updates the Base OE (including the always-installed and selectable driver products).
After installing or updating applications, insert the HP-UX Support Plus CD and install the Quality Pack patch bundles to update the Base OE and OE applications on your system. For example:

```
/usr/sbin/swinstall -s /cdrom/GOLDQPK11i \
                    -x patch_match_target=true -x autoreboot=true
```

For more about this package, see the Quality Pack page available at the following web site: http://software.hp.com/SUPPORT_PLUS/qpk.html

If you encounter a problem during the cold-install process, first review the Known Problems section for possible solutions.

After the installation process completed successfully you need to install the latest patches for special hardware (e.g. FDDI). Then install your applications from the Application CD (DART) and the latest patches for these applications. Refer to the SD-UX Chapter and the Patches Chapter for details.

If the system is ready for production back it up! Refer to the Backup section above for details.

Verifying Installation

To verify that HP-UX 11i was successfully installed, use Software Distributor's `swlist` and `swverify` commands:

1)   To list all products on your system, enter:

```
# swlist -a state -l fileset
```

All filesets should be in the state `configured`. If not you can try configure it by using `swconfig`, e.g.:

```
# swconfig MeasureWare.MWA
```

2)   Run `swverify` to verify that each bundle is intact. For example, to verify that HP-UX 11i OS is intact, enter:

```
# swverify HPUXBase64
```

Or, to verify all software on your system, enter:

```
# swverify \*
```

The Selection process locates all required filesets for the product. After the list you should see:

```
* Selection succeeded.
```

Then the Analysis process verifies that each required file is loaded (existence and version), all required dependencies are met, and runs any available verification scripts for the product. This will take some time. After the analysis you should see:

```
* Analysis succeeded.
```

If the `swconfig` or `swverify` analysis fails, either view `/var/adm/sw/swagent.log` to review the analysis log or run the `swjob` command listed at the end of the `swverify` report sent to stdout.

For help with these commands, refer to the [SD-UX Chapter](#).

Available Operating Environments (UX 11i onwards)

There are five different OEs divided into two segments:

Commercial segment

HP-UX 11i Operating Environment `(HPUX11i-OE)`
This OE, a no-charge Internet server environment, includes applications such as Apache Web Server, Java, Netscape Communicator and WebQoS.
This OE is s a subset of:

HP-UX 11i Enterprise OE `(HPUX11i-OE-Ent)`
This OE is an extra-cost package containing HP-UX 11i OE and additional applications such as GlancePlus to enable an enterprise-level server.
This OE is s a subset of:

HP-UX 11i Mission Critical OE `(HPUX11i-OE-MC)`
This OE is an extra-cost package containing the Enterprise OE, plus applications such as MC/ServiceGuard and WorkloadManager to enable a mission-critical server.

Technical segment

HP-UX 11i Minimal Technical OE `(HPUX11i-MTOE)`
This OE includes the Netscape, NDS, Perl, VxVM, and Judy applications, plus the OpenGL Graphics Developer's Kit.
This OE is s a subset of:

HP-UX 11i Technical Computing OE `(HPUX11i-TCOE)`
This OE includes most applications in the HP-UX11i OE, plus Extensive graphics applications. This OE is also supported on technical servers.

Details about the OEs such as which applications are included can be found here:
http://docs.hp.com/hpux/os/11i

Known Problems

System Console "kthread table full" or "fork failed" Messages

After a successful cold install, the system starts displaying console messages such as `kthread table full` or `fork failed` console messages. These messages are also logged in `/var/adm/syslog.log`.

This is caused by the `maxusers` kernel tunable not set at high enough value.

How Do You Know if This Affects You

An example of what you might see is the following message logged onto the system console:

`kthread: table is full`

You would also see the following message being logged in `/var/adm/syslog.log`:

`Jan 30 09:21:39 sd2600 vmunix: kthread: table is full`

The above example demonstrates table is full messages; however, you might see the similar "fork failed" messages.

What To Do

To correct this, increase the `maxusers` tunable to 200. Refer to the Kernel Chapter to find out how to modify kernel tunables.

Kernel Build Fails on 64-bit Install

On J2240 workstations having an SCSI floppy drive, cold-installing 64-bit OS will fail during the kernel build with an "unsatisfied symbols" error.

What To Do

Edit the `/stand/system` file to delete the floppy driver:

1) In the shell provided, use `vi` to edit the `/stand/system` file:
   `vi /stand/system`

2) Delete the line: `sflop`

3) Press **Cntl-D** to close the window.

The install process should now rebuild the kernel and complete successfully. The SCSI floppy drive will be non-operational, and is not supported on this system with 64bit 11i OS.

Patch Needed Before Installing Fibre Channel Adaptor

Before you install HP-UX 11i make sure that PHKL_23626 (or newer) is included in your installation.

Known Issues With OE Media Install Tool and Network Depots

The Ignite-UX install tool on the OE media supports the use of network depots. However, network depots must match the media depots for the choices in the install tool to work

properly.

The Ignite-UX documentation also explains the setup and use of network depots without using the OE media for each installation. Refer to the Ignite-UX Chapter for information on the Ignite-UX.

Additional Information

HP-UX 11i Installation Guide:
http://docs.hp.com/hpux/os/11i/index.html#Installing%20and%20Updating

11i Operating Environments
http://docs.hp.com/hpux/os/11i

HP-UX Application Releases (DART):
http://rcweb.norway.hp.com/Teknikk/Tools2use/Dart/ (HP internal)

HP Releases & Media website:
http://www.software.hp.com/RELEASES-MEDIA/

IT Resource Center website
http://itrc.hp.com

HP Software Depot
http://software.hp.com

Related chapters included in this book:

- Update 11i
- Software Distributor
- Patches
- Ignite-UX
- Kernel