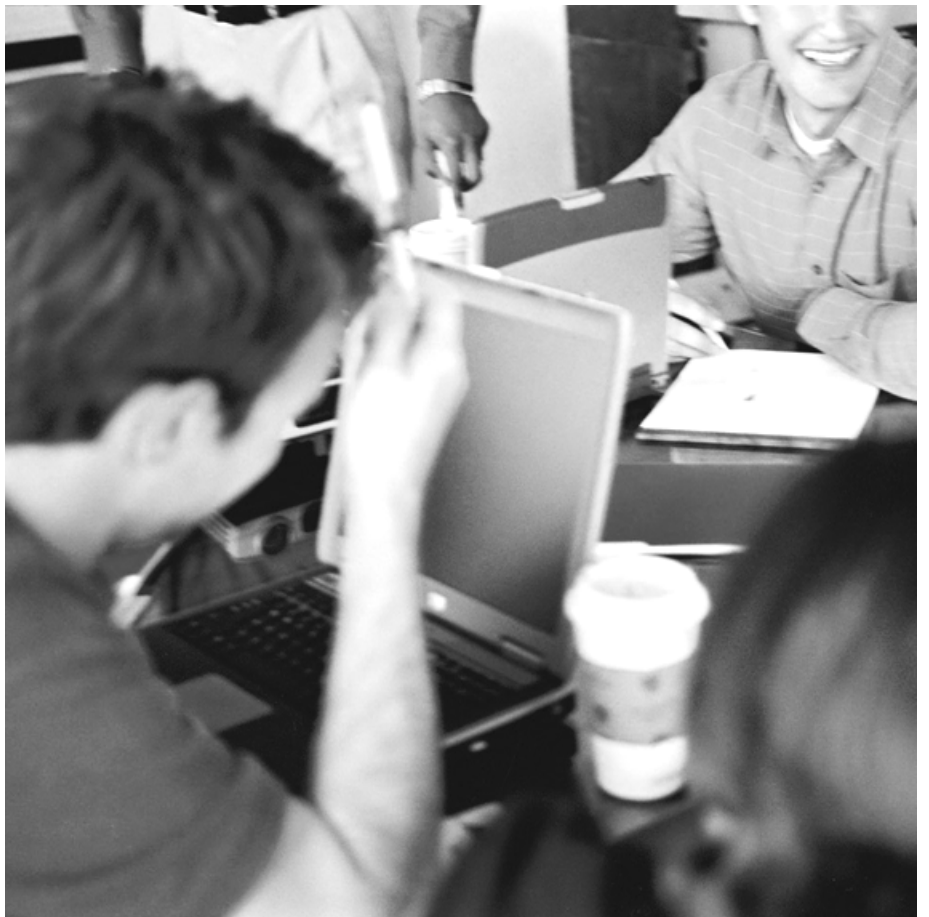


Installing and configuring
Debian GNU/Linux
April 2004

HP Training
Webinar



eLMS 17111



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Debian GNU/Linux
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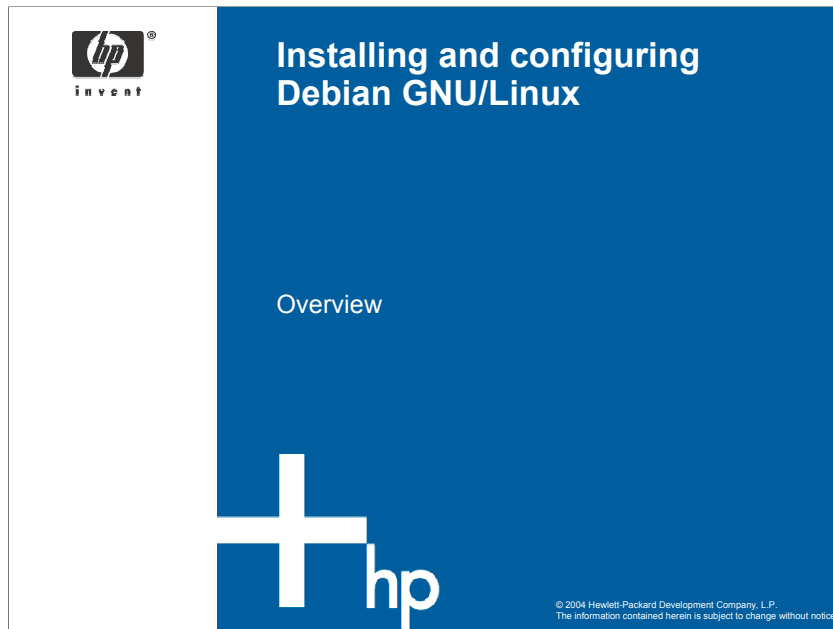
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Installing and configuring Debian GNU/Linux

Webinar
April 2004

Contents		
Overview		
1 – Introduction to Debian		
2 – Installing and configuring Debian		
3 – Package selection and management		
4 – Summary		

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Description



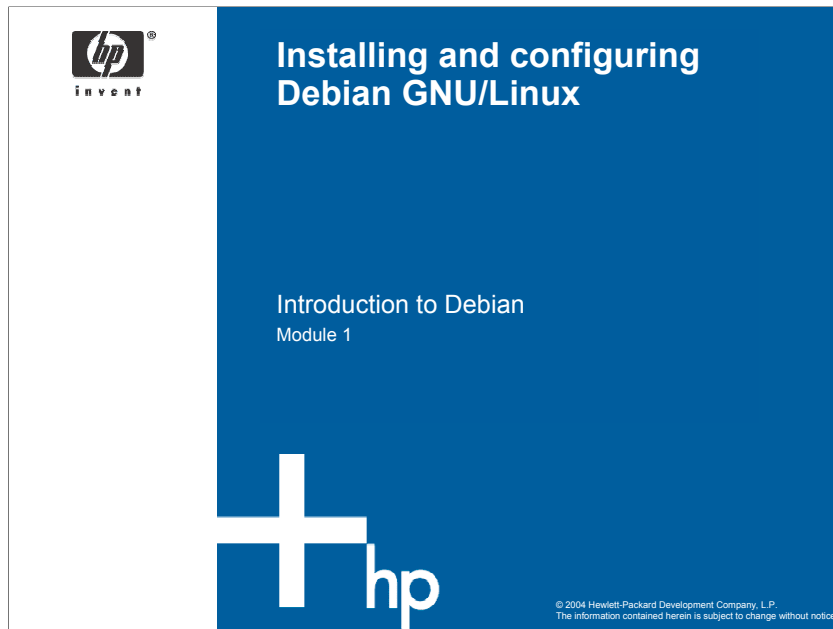
The purpose of this training is to introduce you to the Debian GNU/Linux operating system and show you how to install and configure it. The training also includes a few post-installation package selection and management tasks.

Topics



- An introduction to Debian GNU/Linux
- Installing and configuring Debian GNU/Linux
- Selecting and managing packages
- Summary





Module objectives



Before installing Debian GNU/Linux, you should have an understanding of:

- What Debian is and what distinguishes it from other Linux distributions
- The Debian social contract
- The Debian release system
- How to get Debian GNU/Linux
- The different X86 CD image versions within releases

GNU/Linux

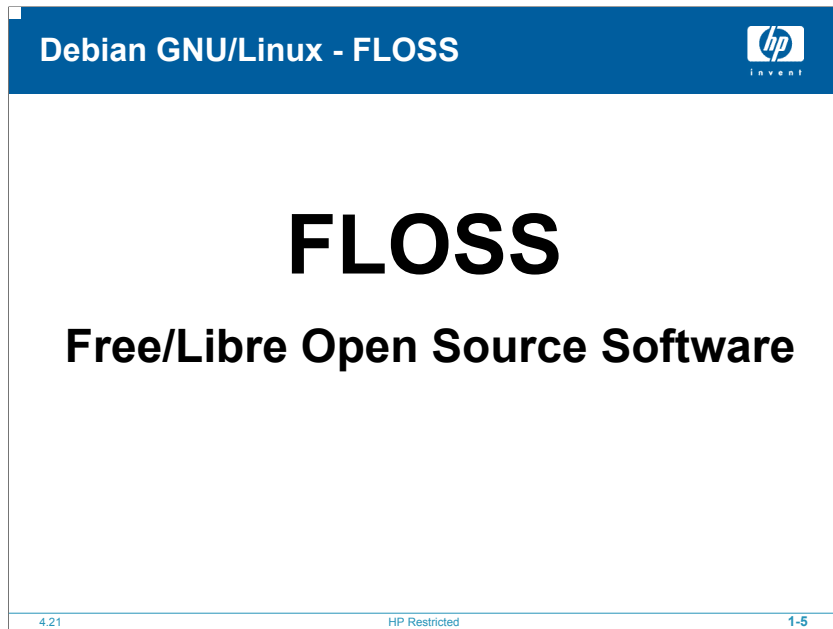


- GNU/Linux is a collection of individual applications built around an operating system **kernel** called **Linux** that work together ... more or less
- A Linux **distribution** is a collection of Linux-based applications made to work **well** together
- The core programs of the GNU/Linux system are licensed under the Free Software Foundation **copyleft**
- Most distributions are “commercial” or problem-specific (like the Linux router project)


Debian versus other Linux distributions



- All Linux systems run the same software!
- Differences among distributions are:
 - File system layout
 - Installation program
 - Controlling license (strict GPL, LGPL, BSD)
 - Release costs (FLOSS, support cost only, mandatory fee)
 - Application packaging system
- Debian is distinguished by being FLOSS and by the Debian packaging system



The Debian social contract (1 of 4)



Debian Linux is free software! You have the freedom to:

- Run the program for any purpose
- Study how the program works and adapt it to your needs
- Redistribute copies so you can help your neighbor
- Improve the program and release your improvements to the public so that the whole community benefits

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The Debian social contract (1 of 4)

Of course to study how the program works or to improve the program, you need access to the source code.

You are free to redistribute copies, with or without modifications, with or without a fee for distribution, to anyone, anywhere. Being free to do these things means that you do not have to ask or pay for permission.

The Debian social contract (2 of 4)



FLOSS (Free/Libre Open Source Software)

- Debian will remain 100% free software
- The Debian organization will give back to the free software community
- The Debian organization won't hide problems
- Debian priorities are Debian users and free software
- Programs that don't meet Debian's free-software standards will be clearly marked as "non-free" in all distributions

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The Debian social contract (2 of 4)

New software will remain free and bug fixes will be returned to the free software community

The Debian social contract (3 of 4)



Debian free software guidelines for authors:

- **Free redistribution**
- **Source code**
- **Integrity of the author's source code**
- **No discrimination**

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The Debian social contract (3 of 4)

You cannot restrict in any way the redistribution of your work.

Any accepted programs must include source code.

The Debian license explicitly permits distribution of software built from modified source code.

No discrimination against persons or groups (not even SCO).

The Debian social contract (4 of 4)



- **No discrimination** against any fields of endeavor
- **No additional license** is necessary and may not be restricted to Debian
- **License must not contaminate other software** –
- **Examples of acceptable licenses are:**
 - GPL
 - BSD
 - Perl's Artistic license

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The Debian social contract (4 of 4)

All programs that are distributed with (or dependent on) the software must also conform to free software standards

Linux distributions

- There are hundreds of Linux distributions
- Debian is at the core of more distributions than any other
- Knoppix is derived from Debian as well, bringing the real number of Debian-derived distributions to 114!

Number	Based on	List
76	Debian	AbuEdu, Adamanix, Aleader, Aratrix, ASLinux, Augustux, BEERnix, Biadis, Bioknoppix, BlackRhino, Bluewall, Bonzai, BriSpeak, CensorNet, ClusterKnoppix, Compionerlibat, Condorux, Darin Small, Dank, Defender, DiamoLinux, Demudi, Eggle, eduKnoppix, Edware, Eurohede, Feather, Florio, Freedux, Gibratar, Onoprix, GNUSSO, Quadralinux, Impi, Katsango, KANCTIX, Kinnereit, knopiLS, knoppie, Knoppix-STD, KnoppixMAME, KnoppMyth, Kurumin, L.A.S., Libranet, LIS, Lindows, LinEx, Linuxin, Lnxw, Lunux, Medialinux, MEPIS, MIKO ONYO, Morphix, NordixKnoppix, Ooo Knoppix, Omokikane, Oratux, Overclockix, Quastiani, Pequelein, Penguin Sleuth, PHLAK, Shabbix, Skolelinux, Slax, Slix, Soyombo, SULX, Tiki, TuptiServer, UserLinux, Yewian, Zopix
61	Red Hat, Fedora	ADIOS, Ares, Aurora, Aurox, ASP, BayanIhan, Berry, BLAO, caos, Chinese 2000, ClarkConnect, CLE, Cobind, Cool, Cosix, CPUBuilders, ELX, EnGarde, e-smith, Gelecek, Hakin9, Hancock, Haydar, HispaFuentes, Holon, IDMS, Ignatium, K12LTSP, KRUD, LOIS, Lineox, Linpus, LinuxTLE, LinuxVP, Lorna, Magic, Media Lab, Miracix, MDI, MSC Linux, NaoOne, OeOne, OpenDesktop, OpenMA, Openwall, PHP Sol, Plan-B, Red Flag, RPM Live, SOT, Tao, TFM, THZ, Trustix, Turbolinux, Vine, Voocoo, White Box, WGM, Xteam, Yellow Dog
38	Knoppix	AbuEdu, Aleader, Augustux, BEERnix, Bioknoppix, ClusterKnoppix, Condorux, Damm Small, Dank, Defender, eduKnoppix, Feather, Florio, Freedux, GNOPPIX, Impi, Kinnereit, knopiLS, Knoppix STD, KnoppMyth, kurumin, L.A.S., NordixKnoppix, Medialinux, MEPIS, Ooo Knoppix, Oratux, Overclockix, Penguin, Penguin Sleuth, Quantian, Shabbix, Slix, SULX, Tiki, Tux, Yewian, Zopix
24	Slackware	AUSTRUMI, BearOps, Burapha, Bin, Buffalo, College, Definity, DeLU, Dinnou, eLearnix, EviEntity, JoLinux, LiveCD Router, Movix, Netwosix, Pismo, ROOT, RUNT, Slackintosh, SLX, STUX, Vector, Zeus
24	Independent	ALT, Arch, Ark, CRUX, Debian, Dynebolic, Freepia, Gentoo, GoboLinux, Icepack, LFS, Litix, Onebase, Peanut, Polar Bear, Puppy, QLinux, Red Hat, ROCK, Ruby, Slackware, Sol, Sorcerer, UHU, uOS
12	LFS	Core, Dewi, IPCop, Lohix, Lix, Murk, Nasgala, Phayoune, Serrinix, TA, Vixux, Yoper, ZENIX
8	Mandrake	Parsoft, BlackFramber, CoolLinux, LinuxConsole, Mandriva, OpenSLS, PCLinuxOS, winnuxCD
6	Morphix	Asakar Bangsa, Arabix, GNUJctop, PHLAK, Slax, Soyombo
4	Gentoo	Gentoox, Jolly, Shark, SystemRescue
3	SUSE	Caixa Mágica, kmLinux, Sun-JOS


From <http://www.distrowatch.com/stats.php?section=independence>

Debian releases



- The home of Debian GNU/Linux is <http://www.debian.org/>
- Debian releases are named after characters in the movie Toy Story
- As of April 1, 2004, the current release is named “Woody” and carries the release number 3.0r2
- The next release will be named “Sarge”



Debian release system

Debian releases finished products in stages:

- **Stable** – Contains the latest officially released distribution of Debian. This is the production release of Debian, the one which HP recommends using.
- **Testing** – Contains packages that haven't been accepted into a stable release yet, but they are in the queue for that.
- **Unstable** – The stage where active development of Debian occurs. Generally, this distribution is run by developers and those who like to live on the edge.

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Debian release system

The advantage and disadvantage of the testing stage are:

- Advantage: This distribution lets you use more recent versions of software.
- Disadvantage: This distribution is not completely tested and has no official support from the Debian security team.

How to get Debian GNU/Linux (1 of 2)




- The hard way – Download all the necessary files over the Internet, make a CD set yourself, and install from that (using jigdo)
- The easy way – Buy a set of CDs from one of the vendors selling Debian CDs and install from it
- The easiest way – Download the installation system (a minimal ISO image of a CD) from the Internet and get the rest by downloading as you install

How to get Debian GNU/Linux (2 of 2)



Requirements for the easiest way (a minimal ISO image of a CD):

1. CD-RW burner with software (a PC will do)
2. Enough bandwidth to download 186 megabytes in a reasonable time
3. Enough bandwidth to install applications via the Internet
4. CD reader on your target machine
5. Internet access from your target machine

X86 CD image versions within releases

- **Vanilla** – Standard kernel package available in Debian
- **Compact** – Like “vanilla” but with many of the less frequently used drivers removed
- **Idepci** – Kernel that supports only IDE and PCI devices (and a very small number of ISA devices)
- **bf2.4** – An experimental flavor which uses a special version of the kernel-image-2.4 package

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X86 CD image versions within releases

- The Vanilla version includes almost all drivers supported by Linux built as modules.
- The Compact version has built-in support for several popular PCI Ethernet devices; these built-in drivers let you take full advantage of the Debian installer's net install feature.
- The bf2.4 version provides support for newer hardware components which is absent in the other (more stable) flavors. It supports more USB hardware.

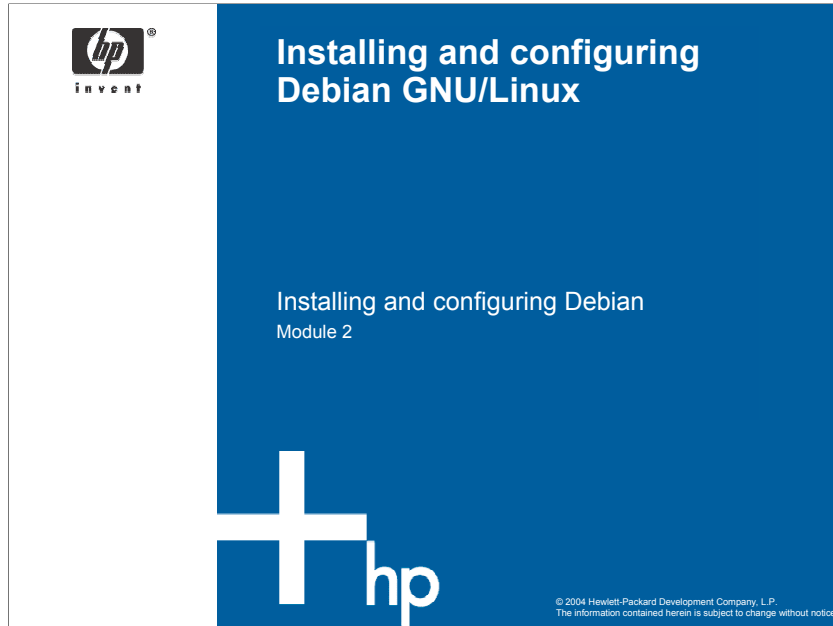


Learning check

Learning check

This is an opportunity to review the information presented in this module to ensure that you understand the material covered so far.





Module objectives



To install Debian GNU/Linux, you need to:

- Create a Debian installation CD and boot from it
- Respond to the installation process (`dbootstrap`) prompts (for example, language choice and keyboard configuration)
- Perform the different installation tasks that `dbootstrap` guides you through (for example, partition a disk)
- Reboot the system

To configure Debian GNU/Linux, you need to:

- Respond to the configuration process (`base-config`) prompts (for example, time zone and password)
- Configure APT

Getting Debian GNU/Linux for this webinar



To get Debian GNU/Linux, you can download 20 floppies or 1 CD. For this webinar, we'll download 1 CD.

- We will download an ISO image from <http://www.debian.org/CD/netinst/>
- The specific image we will be using (a “compact” version) is located at:
<http://www.phy.olemiss.edu/debian-cd/woody-i386-1.iso>
- Click the link and save the resulting file to disk.
Most CD-RW software will recognize this as a CD image and prompt you to create a CD-RW from it.

Debian install – Basic boot using CD-ROM



The first step in installing Debian GNU/Linux is booting the system (basic boot)

- Put the CD-ROM in the drive. The system should boot up and display the `boot :` prompt.
- You can do two things at the `boot :` prompt:
 - Press the function keys F1 through F10 to view pages of helpful information
 - Enter boot parameters (press F4 and F5 to get information on boot parameters)

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Debian install – Basic boot using CD-ROM

If you add any parameters to the boot command line, be sure to type the boot method (the default is `linux`) and a space before the first parameter (for example, `linux floppy=thinkpad`).

If you simply press Enter at the `boot :` prompt, it is the same as typing `linux` without any special parameters.

Debian install – Basic boot messages



- Once you press Enter, you should see the message `Loading...`, and then `Uncompressing Linux...`, and then a screenful or so of information about the hardware in your system.
- During the boot sequence, you may see many messages in the form `can't find...`, or `...not present, can't initialize...`, or even `this driver release depends on...`
- The system may also pause while it waits for a device to respond (and that device is not present on your system).
Most of these messages are harmless.

Debian install – Basic boot problems



If the kernel hangs during the basic boot process, doesn't recognize peripherals you actually have, or doesn't recognize drives properly, the first things to check are the boot parameters.

For a full list of possible boot parameters, go to:

<http://www.tldp.org/HOWTO/BootPrompt-HOWTO.html>

Debian install – dbootstrap (1 of 2)



- After the system performs a basic boot (from a CD or floppy), the installation process uses the Debian bootstrap program `dbootstrap`.
- To navigate within `dbootstrap`, use the:
 - Right arrow or Tab key to move forward between buttons and selections in the current screen
 - Left arrow key or Shift-Tab key combination to move backward between buttons and selections in the current screen
 - Up and down arrow keys to select different items within a scrollable list, and to scroll the list itself
 - Space bar to select an item such as a checkbox
 - Enter key to activate choices

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Debian install – dbootstrap (1 of 2)

`dbootstrap` is responsible for initial system configuration and installation of the “base system.”

`dbootstrap` is a simple, character-based application.

Debian install – dbootstrap (2 of 2)



dbootstrap prompts you for language choice and then displays release notes (you can scroll down or exit)

It then displays the Debian GNU/Linux Installation Main Menu and guides you through a series of questions that you can answer by simply pressing Enter:

- Configure the keyboard (your choice should be obvious)
- Partition a disk (`cfdisk`)
- Last chance to abort the installation (nothing has been destroyed ... yet)

Debian install – Partitioning (1 of 5)



- While you can install Debian GNU/Linux in a single partition using a regular file for swap space, it isn't a good idea. Files can grow and consume the entire disk, and bring the system to a halt.
- A better arrangement is to partition a root directory (/) and swap directory at a minimum.
- Better still is to partition your disks so that no single application can bring your system to a halt.

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Debian install – Partitioning (1 of 5)

For example, place the `/boot` and `/var` directories in their own partitions. This way a spammer can't bring your system down, and with `/boot` in its own partition, you should always be able to boot your system in an emergency.

Debian install – Partitioning (2 of 5)



Debian GNU/Linux adheres to the Filesystem Hierarchy Standard (<http://www.pathname.com/fhs/>) for directory and file naming

At the root level (/), all Debian systems include these directories:

- bin Essential command binaries
- boot Static files of the boot loader
- dev Device files
- etc Host-specific system configuration
- home User home directories
- lib Essential shared libraries and kernel modules
- mnt Mount point for mounting a file system temporarily
- proc Virtual directory for system information
- root Home directory for the root user
- sbin Essential system binaries
- tmp Temporary files
- usr Secondary hierarchy
- var Variable data
- opt Add-on application software packages

Debian install – Partitioning (3 of 5)



Traditionally, the easy way to partition a GNU/Linux system is as follows:

- **root partition (/):** must always physically contain `/etc`, `/bin`, `/sbin`, `/lib`, and `/dev` (otherwise, you won't be able to boot)
- **/usr:** contains all user programs (`/usr/bin`), libraries (`/usr/lib`), documentation (`/usr/share/doc`), and so on (typically one of the largest partitions)
- **/home:** contains data subdirectories for every user
- **/var:** contains all variable data like news articles, e-mails, websites, APTs cache, and so on
- **/tmp:** contains any temporary data that programs create
- **/boot:** contains lilo or grub files so that you can boot the system even with a corrupted root directory

Debian install – Partitioning (4 of 5)



Partitioning very complex systems

Refer to the Multi Disk HOWTO at:

<http://www.tldp.org/HOWTO/Multi-Disk-HOWTO.html>

This contains in-depth information, mostly of interest to ISPs and people setting up servers.

Swap space

On 32-bit architectures (i386, m68k, 32-bit SPARC, and PowerPC), the maximum size of a swap partition is 2GB (on Alpha, PA-RISC, and SPARC64, it's so large as to be virtually unlimited). This should be enough for nearly any installation.

Debian install – Partitioning (5 of 5)



Linux disks and partition names may be different from other operating systems:

- Floppy drives are named `/dev/fd0`, `/dev/fd1`, ...
- SCSI disks (SCSI ID address-wise) are named `/dev/sda`, `/dev/sdb`, ...
- First SCSI CD-ROM is named `/dev/scd0` (also known as `/dev/sr0`)
- Master disk on IDE primary controller is named `/dev/hda`
- Slave disk on IDE primary controller is named `/dev/hdb`
- Master and slave disks of the secondary controller can be called `/dev/hdc` and `/dev/hdd` respectively.
- First XT disk is named `/dev/xda`
- Second XT disk is named `/dev/xdb`

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Debian install – Partitioning (5 of 5)

Newer IDE controllers can actually have two channels, effectively acting like two controllers.

Debian install – Formatting the disk



dbbootstrap will ask you to format the disk using cfdisk

```
cfdisk 2.11n
Disk Drive: /dev/hda
Size: 40016019456 bytes
Heads: 255 Sectors per Track: 63 Cylinders: 4865

Name      Flags      Part Type  FS Type    [Label]    Size (MB)
-----
hda1     Boot      Primary   Linux ext2  98.71
hda2                        Primary   Linux swap  501.75
hda3                        Primary   Linux ext2  39415.55

[Bootable] [ Delete ] [ Help ] [Maximize] [ Print ]
[ Quit ] [ Type ] [ Units ] [ Write ]

Toggle bootable flag of the current partition
```

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Debian install – Selecting archive path



After you have partitioned your hard disks, you will be asked to “Select Debian Archive path.”

The default is adequate most of the time. Options are NFS, Network (the default on our CD), and NFS root (for diskless workstations).

Next, you will be asked to:

1. Configure PCMCIA support
2. Configure device driver modules
3. Configure the network (DHCP or static IP) – network devices are auto-detected

Debian install – Installing the base system



You are now ready to install the base system.

- The “compact” CD we are using will have installed a very small package of network applications.
- You will be asked to choose a set of mirrors to download from.
- You are installing the base system over the network. Some steps may take time and progress may not be evident.
- The initial retrieve of `Packages.gz` and the installs for base and essential packages may seem to be stalled; give them extra time. However, if the install bogs down right away while retrieving a file called `Release`, you can assume that the network archive has not been found or there is a problem with it.

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Debian install – Installing the base system

On a CD-based install, the base system is located in
`D:\dists\woody\main\binary-i386`.

Debian install – Making the base system bootable



Once the base system has been loaded, you will be asked to “Make System Bootable”

- The standard i386 boot loader is called LILO
- If you have special needs, see the LILO mini-HOWTO at: <http://www.tldp.org/HOWTO/mini/LILO.html>
- You will be asked where to put the LILO files and kernel. If you have created a `/boot` partition, put the files there
- You can make a different partition bootable later with `fdisk` or `cdisk`

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Debian install – Making the base system bootable

With LILO, you can boot a number of operating systems, including MS-DOS, NT, and OS/2 in addition to Linux.

Debian install – Rebooting



You are now ready to reboot your system

- Remove the CD and reboot
- After booting from your hard disk, your Debian system will run a process called `base-config`

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Debian install – Rebooting

You can re-run `base-config` at any time as root.

Debian configuration – Using base-config



The `base-config` process will guide you through setting up your system

```
Debian Configuration
-----
Time Zone Configuration

Unix system clocks are generally set to GMT ("Greenwich Mean Time",
also known as "Universal Coordinated Time", or UTC). The operating
system knows your time zone and converts system time into the local
time. You can specify whether the hardware clock is set to either GMT
(recommended for a Linux-only system) or local time (which may be more
convenient for a system that also runs other operating systems).

The hardware clock says the time is now Thu Apr 1 09:50:33 2004.

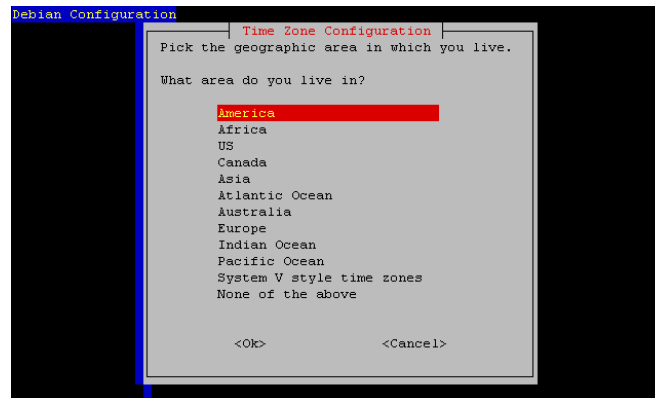
Is the hardware clock set to GMT?

    <Yes>                                <No>
```

Debian configuration – Time zone



Setting the time zone




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Debian configuration – Local time zone



Setting the local time zone

Debian Configuration

Time Zone Configuration

Cities represent the time zone in which they are located, so you may choose any city in your time zone.

Select a city or time zone:

Miquelon	#
Monterrey	#
Montevideo	#
Monticello	#
Montreal	#
Montserrat	#
Nassau	#
New York	#
Nipigon	#


<Ok> <Cancel>

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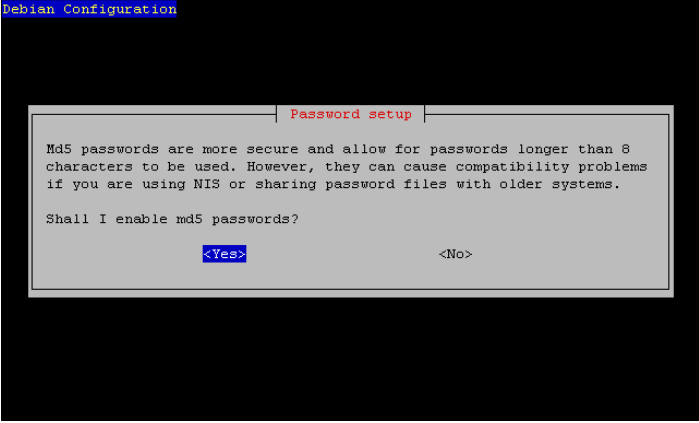
Debian configuration – Local time zone

This screen is bypassed if your system clock is set to GMT.

Debian configuration – Password



Password setup



```
Debian Configuration
Password setup
Md5 passwords are more secure and allow for passwords longer than 8
characters to be used. However, they can cause compatibility problems
if you are using NIS or sharing password files with older systems.
Shall I enable md5 passwords?
<Yes> <No>
```

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Debian configuration – Shadow password



Set up a shadow passwd file

```
Debian Configuration

Password setup

Shadow passwords make your system more secure because nobody is able to
view even encrypted passwords. Passwords are stored in a separate file
that can only be read by special programs. We recommend the use of
shadow passwords. However, if you're going to use NIS you could run
into trouble.

Shall I enable shadow passwords?

<Yes> <No>
```

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Debian configuration – root password and user account



You will also be asked to provide:

- A root password
- An account for an ordinary user

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Debian configuration – root password and user account

Most Debian operations are performed as an ordinary user.

Debian configuration – Internet connectivity



If you dial into an ISP for internet connectivity, then you can set it here. If you have a direct connection (an Ethernet connection), then select <No>.

```
Debian Configuration
-----
| Debian System Configuration |
-----
If you have an account on an ISP, and you want to use it to fetch the
packages to install on the system from the Internet, you may configure
the PPP service now, and I will open a PPP connection to your ISP.

Do you want to use a PPP connection to install the system?

      <Yes>                <No>
```

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Debian configuration – Configuring APT (1 of 6)



Currently, you have a very minimal system installed. To create a useful system, you should add one or more Debian packages. Before you can add packages, you need to configure the Debian package system APT.

```
Debian Configuration
Apt Configuration
Apt can access the Debian archive in a variety of ways. Choose the
access method apt should use. For example if you have a Debian cd,
select "cdrom", while if you plan to install via a Debian mirror,
choose "ftp" or "http".

You probably used a CD to install the Debian base system, but it is not
currently in the drive. You should probably just insert it and select
"cdrom".

Choose the method apt should use to access the Debian archive:

cdrom
http
ftp
filesystem
edit sources list by hand

<Ok>                <Cancel>
```

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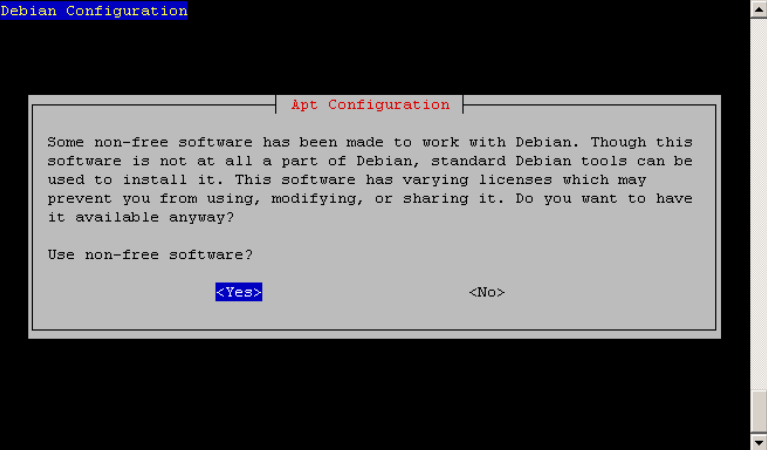
Debian configuration – Configuring APT (1 of 6)

For example, you need to tell `dbootstrap` where to find the Debian packages.

Debian configuration – Configuring APT (2 of 6)



Debian lets you know about packages that aren't FLOSS-based

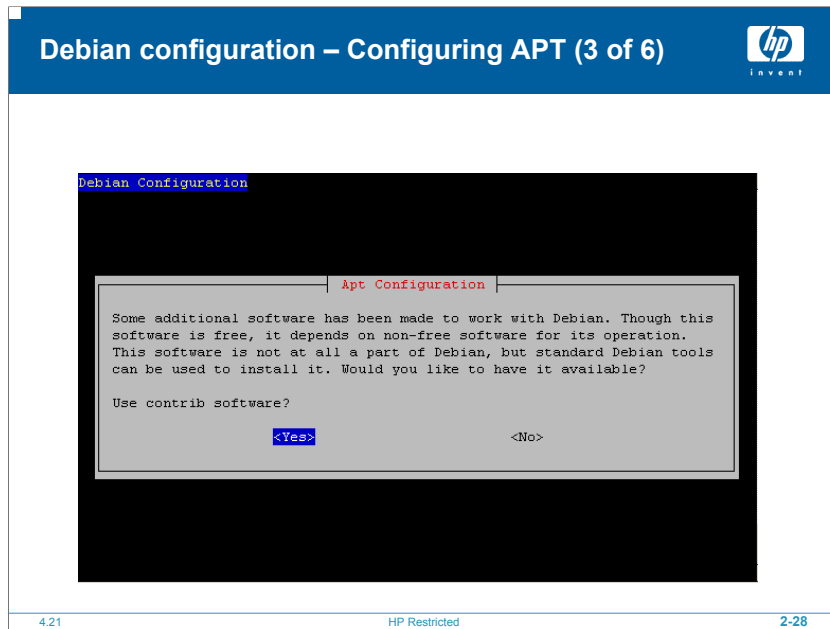


```
Debian Configuration
Apt Configuration
Some non-free software has been made to work with Debian. Though this
software is not at all a part of Debian, standard Debian tools can be
used to install it. This software has varying licenses which may
prevent you from using, modifying, or sharing it. Do you want to have
it available anyway?
Use non-free software?
<Yes> <No>
```

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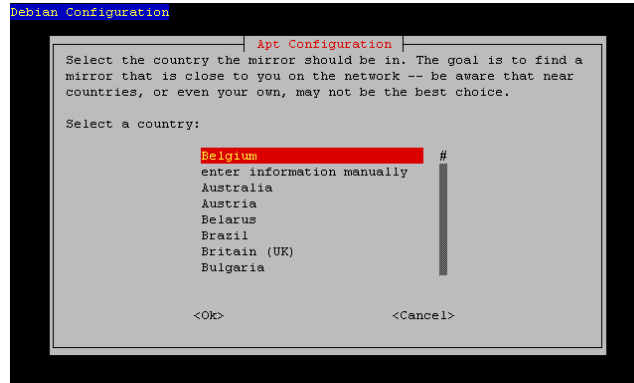
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Debian configuration – Configuring APT (4 of 6)



APT retrieves packages from mirrors scattered all over the world



Debian configuration – Configuring APT (5 of 6)



Choosing a mirror is easy

```
Debian Configuration
Apt Configuration
Select the Debian mirror apt should use. You should select a mirror
that is close to you on the net.
Choose the Debian mirror to use:
ftp.us.debian.org #
ftp.debian.org
mirrors.kernel.org
ftpl.sourceforge.net
mirror.cs.wisc.edu
linux-cs.tccw.wku.edu
debian.res.cmu.edu
ftp-mirror.internap.com
archive.progeny.com
<Ok> <Cancel>
```

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Debian configuration – Configuring APT (6 of 6)



You should add more than one mirror

```
Debian Configuration

Apt Configuration

Apt is now configured, and should be able to install Debian packages.
However, you may want to add another source to apt, so it can download
packages from more than one location.

Add another apt source?

<Yes> <No>
```

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Debian configuratino – Configuring APT (6 of 6)

The default is No but it is recommended that you add another mirror.

Debian configuration – Adding a desktop environment with tasksel (1 of 3)



You almost have a system that is usable. Let's add a desktop environment using the `tasksel` program.

```
Debian Configuration

Debian System Configuration

At this point, your Debian system is very minimal, composed of just
enough software to bootstrap a complete system. You should probably
add some additional software to your system now, to tune it to your
needs. One way to select additional software to install is with the
'tasksel' program. Tasksel lets you pick from various predefined
collections of software that are aimed at letting you set up a system
for specific tasks. After tasksel is run, you will have an chance to
fine-tune the selected packages.

Run tasksel?

<Yes> <No>
```

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Debian configuration – Adding a desktop environment with tasksel (3 of 3)



Debian Task Installer v1.18 - (c) 1999-2001 SPI and others

```
desktop
Description:
This task provides basic "desktop" software, including a variety of
session managers, file managers and web browsers. It incorporates
both the GNOME and KDE desktops, and provides a display manager which
lets the user choose between the two.

Included packages:
kdebase - KDE core applications
imlib-base - Common files needed by the Imlib/Gdk-Imlib packages
konqueror - KDE's advanced File Manager, Web Browser and Document Viewe
gimp1.2 - The GNU Image Manipulation Program, stable version 1.2
kview - A simple image viewer/converter for KDE.
libkonq3 - Core libraries for KDE's file manager
gnome-applets - Various applets for GNOME panel
gnome-users-guide - GNOME User's Guide
mozilla-psm - Mozilla Web Browser - Personal Security Manager (PSM)

<O>
```

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Debian package install – A quick view (1 of 8)



Unlike the RPM packaging system used by SUSE, Red Hat, and others, the Debian package used by the APT system defines prerequisites.

For example, installing an X-Window application implies the installation of the X-Window system itself.

Debian package install – A quick view (2 of 8)



`tasksel` allows you to select a large class of applications. `dselect` allows you to refine the selection.

```
Debian Configuration

Debian System Configuration

'dselect' is used to select which of the thousands of software packages
included with Debian should be installed on your Debian system. If you
have already selected some tasks with tasksel, you can use dselect to
fine-tune the selected packages, and select additional packages too. If
you didn't pick any tasks, this is your chance to select individual
packages for installation.

Run dselect?

<Yes>                                <No>
```


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Debian package install – A quick view (2 of 8)

The default is No but you may want to run `deselect`.



Debian package install – A quick view (3 of 8)


```

dselect - main package listing (avail., priority) mark:+/=- verbose:v help:?
EIO M Pri Section Package Inst.ver Avail.ver Description
-----
- All packages -
  --- Newly available packages ---
  --- New Optional packages ---
  --- New Optional packages in section admin ---
n_ Opt admin acct <none> 6.3.5-32 The GNU Accounting utilit
n_ Opt admin adjtimex <none> 1.13-1 Utility to display or set
n_ Opt admin aide <none> 0.6-2 Advanced Intrusion Detect
n_ Opt admin alien <none> 8.05 install non-native packag
n_ Opt admin anacron <none> 2.3-6 a cron-like program that
n_ Opt admin apmd <none> 3.0.2-1.19 Utilities for Advanced Po
All packages
The line you have highlighted represents many packages; if you ask to
install, remove, hold, &c it you will affect all the packages which match
the criterion shown.

If you move the highlight to a line for a particular package you will see
information about that package displayed here. You can use 'o' and 'O' to
change the sort order and give yourself the opportunity to mark packages in
different kinds of groups.

description
  
```

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Debian package install – A quick view (4 of 8)

```

dselect - main package listing (avail., priority) mark:+/=/- verbose:v help:?
EIO M Pri Section Package Inst.ver Avail.ver Description
-----
- All packages -
--- Newly available packages ---
----- New Optional packages -----
----- New Optional packages in section admin -----
n Opt admin acct <none> 6.3.5-32 The GNU Accounting utilit
n_ Opt admin adjtimex <none> 1.13-1 Utility to display or set
n_ Opt admin aide <none> 0.8-2 Advanced Intrusion Detect
n_ Opt admin alien <none> 8.05 install non-native packag
n_ Opt admin anacron <none> 2.3-6 a cron-like program that
n_ Opt admin apmd <none> 3.0.2-1.19 Utilities for Advanced Po
acct not installed ; purge (was: new package). Optional
acct - The GNU Accounting utilities.

The GNU Accounting utilities `ac`, `accton`, `last`, `lastcomm`, and `sa`
add login and process accounting support to Debian Linux. "Login
accounting" provides summaries of system resource usage based on connect
time, and "process accounting" provides summaries based on the commands
executed on the system. The `last` command is provided by the Debian
sysvinit package and not included here.

description of acct

```

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Debian package install – A quick view (5 of 8)



Once selected, the package is downloaded together with all its dependencies

```
Reading Package Lists... Done
Building Dependency Tree... Done
The following NEW packages will be installed:
 abiword-doc abiword-plugins blas blas-dev build-essential docbook
 esound-clients fam g77 g77-2.95 gimpprint-locales imagemagick kaffe
 libdigest-md5-perl libgal-data libgmp2 libltdl3-dev libmagick5 libmd5-perl
 libncurses5-dev libnss-lwres libreadline4-dev libwmf0.2-2 libxaw6 man2html
 python-egenix-mxdatetime r-base-dev r-recommended util-linux-locales
 webmin-core x-ttcidfont-conf xfonts-abi xlib6g xpdf-common xpdf-utils
0 packages upgraded, 35 newly installed, 0 to remove and 0 not upgraded.
Need to get 15.1MB of archives. After unpacking 63.4MB will be used.
Do you want to continue? [Y/n] y
Get:1 http://security.debian.org stable/updates/main libxaw6 4.1.0-16woody3 [167
kB]
Get:2 http://security.debian.org stable/updates/main xlib6g 4.1.0-16woody3 [60.6
kB]
Get:3 http://security.debian.org stable/updates/main webmin-core 0.94-7woody1 [1
250kB]
1% [Connecting to ftp.us.debian.org] [3 webmin-core 69997/1250kB 5%]
```


Debian package install – A quick view (7 of 8)



Debian Configuration

Configuring X-ttcidfont-conf

FontPath of TrueType and CID managed by defoma is changed

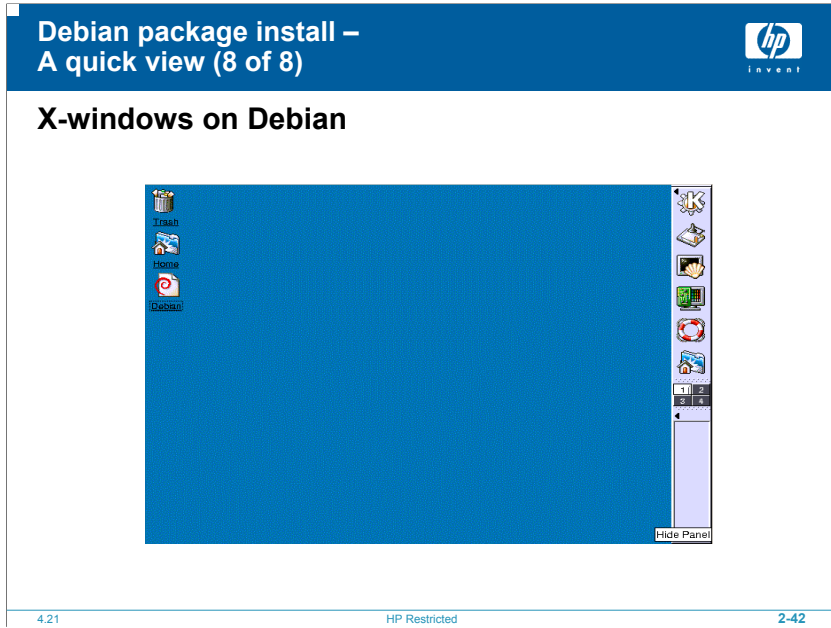
TrueType and CID font paths which defoma manages are changed again. It now becomes:

```
FontPath "/var/lib/defoma/x-ttcidfont-conf.d/dirs/CID"
```

```
FontPath "/var/lib/defoma/x-ttcidfont-conf.d/dirs/TrueType"
```

Please edit /etc/X11/XF86Config-4, /etc/X11/fs/config and/or /etc/X11/fs-xtt/config.

<Ok>



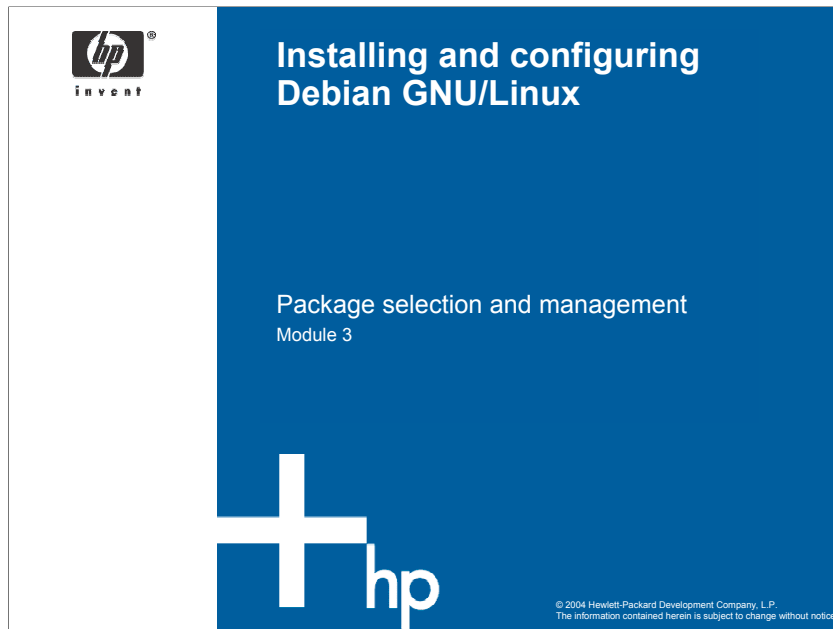


Learning check

Learning check

This is an opportunity to review the information presented in this module to ensure that you understand the material covered so far.





Module objectives



To select packages and manage them, you need to:

- Understand the naming convention for a Debian package
- Be familiar with the `control.tar.gz` file
- Understand package priorities and dependencies
- Be familiar with the package management tools
- Understand the APT system
- Know where the list of mirrors and sources are kept and what the syntax of a mirror record is
- Know how to upgrade your system
- Find package names
- Know how to troubleshoot problems
- Be familiar with the Debian GNU/Linux /etc structure

Debian package



- Debian binary package file names use the following convention:

```
<foo>_<VersionNumber>-<DebianRevisionNumber>.deb
```

- A `.deb` file is a GNU `ar` archive file (a command like `tar`) containing several mandatory files:
 - `debian-binary` (contains format version number)
 - `control.tar.gz` (contains series of plain files, of which the file `control` is mandatory and contains the core control information)
 - `data.tar.gz` (contains the files-system archive of the items to be installed)

control.tar.gz (1 of 2)

The control.tar.gz file must contain at least a file named control, a sample of which is shown below:

```
Package: hello
Priority: optional
Section: devel
Installed-Size: 45
Maintainer: Adam Heath <doogie@debian.org>
Architecture: i386
Version: 1.3-16
Depends: libc6 (>= 2.1)
Description: The classic greeting, and a good example
```

control.tar.gz (2 of 2)



The `control.tar.gz` also optionally contains the following script files:

- `preinst` – Executes before that package will be unpacked from its Debian archive (`.deb`) file
- `postinst` – Typically completes any required configuration of the package `foo` once `foo` has been unpacked from its Debian archive (`.deb`) file
- `prerm` – Typically stops any daemons which are associated with a package
- `postrm` – Typically modifies links or other files associated with `foo`, and/or removes files created by the package

Package priorities



Each package is assigned one of the following priorities:

- **Required** – Packages that are necessary for the proper functioning of the system.
- **Important** – Packages that should be found on any UNIX-like system. Other packages which the system will not run well without, or be usable without, will be here.
- **Standard** – Packages that are standard on any Linux system, including a reasonably small but not too limited character-mode system.
- **Optional** – Packages that include all those that you might reasonably want to install if you did not know what it was, or do not have specialized requirements.
- **Extra** – Packages that either conflict with others with higher priorities, are only likely to be useful if you already know what they are, or have specialized requirements that make them unsuitable for "Optional."

Package dependencies (1 of 2)



The Debian package system has a range of package "dependencies":


- Package A **depends** on Package B if B absolutely must be installed in order to run A.
- Package A **recommends** Package B, if the package maintainer judges that most users would not want A without also having the functionality provided by B.
- Package A **suggests** Package B if B contains files that are related to (and usually enhance) the functionality of A.
- Package A **conflicts** with Package B when A will not operate if B is installed on the system.
- Package A **replaces** Package B when files installed by B are removed and (in some cases) over-written by files in A.
- Package A **provides** Package B when all of the files and functionality of B are incorporated into A.

Package dependencies (2 of 2)



“Pre-depends” is a special dependency

- Some packages cannot be installed until certain dependencies are resolved. Such packages are said to **pre-depend** on the presence of some other packages.
- The Debian project provided this mechanism to support the safe upgrading of systems from `a.out` format to **ELF** format, where the **order** in which packages were unpacked was critical.

Package management tools (1 of 2)

- `dselect` – menu-driven package management tool
- `dpkg` – install package (package-file centric)
- `apt-get` – install package (package-archive centric)
- `tasksel` – install task (a set of packages)
- `aptitude` – install package (package & task, ncurses APT)
- `synaptic`, `gsynaptic` – GUI APT alternatives

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Package management tools (1 of 2)

- `dselect`, `tasksel`, and `aptitude` are simple menu-driven “front ends” to `dpkg` and `apt-get`
- `dpkg` is a medium-level tool set to install, build, remove, and manage Debian GNU/Linux packages
- `apt-get` is a high-level command line tool set for retrieving and managing Debian GNU/Linux packages from a series of mirrors and caches
- `apt-get` is part of the APT system designed to replace the `dselect/dpkg` system
- `dpkg` is package-file oriented—it does not fetch packages from a mirror or remote archive
- `apt-get` is package-archive oriented—it expects to find packages in remote archives
- `apt-get` is needed with a network install

Package management tools (2 of 4)



- When the Debian distribution was small, `dselect` and `dpkg` were adequate tools for package management.
- As the collection has grown in size and complexity, these tools are no longer provide a smooth and easy installation.
- The APT system provides a new suite of tools to augment `dpkg` and provide a better installation tool than `dselect`.
- The primary tool of the APT system is the command `apt-get`.

APT system (1 of 2)



The Debian package and APT package management system are at the heart of Debian GNU/Linux

The APT system is a collection of programs that:

- Install applications on a Debian system
- Maintain and upgrade applications
- Convert applications to/from RPM, tgz, and slp formats

APT system (2 of 2)

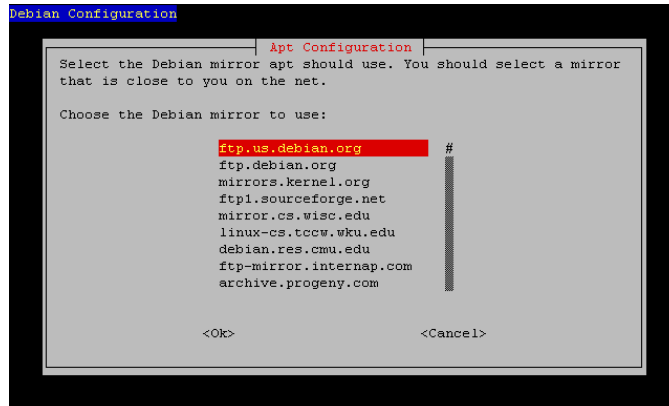


- The APT system is similar to the BSD ports system.
- The APT system can get very complex.
- You can mix and match applications from the “stable,” “testing,” and “unstable” releases and establish priorities within each release.
- We'll keep it simple. The control files are:
 - `/etc/apt/apt.conf` (Main configuration file)
 - `/etc/apt/preferences` (Selects priorities among releases)
 - `/etc/apt/sources.list` (Lists your mirrors and caches)

Mirrors (1 of 2)



During system setup, you were asked to choose a set of mirrors to be used to download applications



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Mirrors (2 of 2)



- The list of mirrors and sources are kept in `/etc/apt/sources.list`
- The syntax of a mirror record is

```
deb uri distribution [component1] [component2] [...]
```
- Examples

```
deb http://http.us.debian.org/debian stable main contrib non-free
deb ftp://ftp.debian.org/debian stable contrib
deb-src file:/home/jason/debian unstable main contrib non-free
```
- Notice
 - `deb` and `deb-src` (`deb-source`)
 - **Distribution:** `stable`, `unstable`, and `testing`
 - **Branch:** `main`, `desktop`, and so on
 - `free`, `non-free`, `contrib`

apt-cache and apt-get



The primary APT commands are `apt-cache` and `apt-get`

- `apt-cache` manipulates packages stored in the APT cache (see the man page for details)
- `apt-get` retrieves and installs applications from a source listed in `/etc/apt/sources.list`

apt-get



The Debian way of installing, removing, and maintaining packages is with the apt-get process

- `apt-get update` – updates the list of available packages
- `apt-get install foo` – gets the latest version of a package named `foo`
- `apt-get remove foo` – removes the package `foo`
- `apt-get upgrade` – upgrades any installed packages
- `apt-get dist-upgrade` – upgrades the distribution

Upgrading (1 of 2)



To keep your system current, all you have to do is periodically run the following from `cron`:

- `apt-get update`
- `apt-get upgrade`

And occasionally, run `apt-get dist-upgrade`

Upgrading (2 of 2)



Upgrading is simple!

- apt-get update
- apt-get upgrade

```
debian:/etc/apt# apt-get upgrade
+ apt-get upgrade
Reading Package Lists... Done
Building Dependency Tree... Done
1 packages upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Need to get 194kB of archives. After unpacking 0B will be used.
Do you want to continue? [Y/n] y
Get:1 http://ftp.kulnet.kuleuven.ac.be woody/main debhelper 4.0.2.openoffice [194kB]
Fetched 194kB in 6s (31.8kB/s)
(Reading database ... 62633 files and directories currently installed.)
Preparing to replace debhelper 4.0.2 (using ../debhelper_4.0.2.openoffice_all.deb) ...
Unpacking replacement debhelper ...
Setting up debhelper (4.0.2.openoffice) ...
debian:/etc/apt# █
```

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Installing a package (1 of 2)



To install a package, you only need to know its common name like `sendmail`, `gaim`, or `postgresql`.

Note: this installation of Debian installs `exim` as its MTA (Mail Transfer Agent). To replace it with `sendmail`, all you need to do is install `sendmail` with the following command:

```
apt-get install sendmail
```

Installing a package (2 of 2)



Using apt-get install:

```
debian:~# apt-get install sendmail
Reading Package Lists... Done
Building Dependency Tree... Done
The following packages will be REMOVED:
  exim
The following NEW packages will be installed:
  sendmail
0 packages upgraded, 1 newly installed, 1 to remove and 0 not upgraded.
1 packages not fully installed or removed.
Need to get 0B/918kB of archives. After unpacking 1778kB will be used.
Do you want to continue? [Y/n]
```

apt-get recognizes that `exim` must be removed and `sendmail` installed.

Collecting packages



Collecting all the packages needed to run properly is one of the challenges with Debian GNU/Linux.

When `sendmail` installs itself, it complains that `openssl` is not installed. To support secure mail, you will have to:

1. `apt-get install openssl`
2. Edit `/etc/mail/sendmail.mc`
3. Rerun `sendmailconfig` (give a valid smarthost when prompted for "Null client forward host?")
4. `apt-get install` a mail user agent (MUA) such as `mailx`, `mutt`, and so on

Note: Pine isn't "FLOSS enough" for Debian (Pine is a registered trademark of the University of Washington)

Finding package names (1 of 3)



- Another challenge of the Debian system is finding the names of the packages you want or need. The best place to start is at <http://www.debian.org/distrib/packages>.
- Available packages are listed by stable, testing, and unstable distributions.
- For example, to install OpenOffice, we need to know the package name.

Search package directories

Keyword:

Search on: Package names only Descriptions Source package names

Allow searching on subwords:

Search case sensitive:

Distribution: Section:


There are shortcuts for some searches available:


- <http://packages.debian.org/name> for the search on package names.
- <http://packages.debian.org/src:name> for the search on source package names.

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Finding package names (2 of 3) 



Package Search Results

[About](#) [News](#) [Getting Debian](#) [Support](#) [Development](#) [Site map](#) [Search](#)

Package openoffice.org

- [testing](#) (editors): high-quality office productivity suite
1.1.0-6: alpha arm hppa i386 ia64 m68k mips mipsel powerpc s390 sparc

Package openoffice.org.bin

- [testing](#) (editors): OpenOffice.org office suite binary files
1.1.0-6: i386 powerpc s390 sparc


Package openoffice.org.crashrep

- [testing](#) (utils): OpenOffice.org crash reporting tool
1.1.0-6: i386 powerpc s390 sparc

Package openoffice.org.debian-files

- [testing](#) (editors): Debian specific parts of OpenOffice.org
1.1.0-6+2: alpha arm hppa i386 ia64 m68k mips mipsel powerpc s390 sparc

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 invent

Finding package names (3 of 3)

Which package do we need? Let's look at `openoffice.org`.

Other packages related to `openoffice.org`:

● depends ◆ recommended ■ suggested

- [debiandutils](#) (>= 2.0)
Miscellaneous utilities specific to Debian
- [dictionaries-common](#) (>= 0.10)
Common utilities for spelling dictionary tools
or [openoffice.org-updatedicts](#)
Package not available
- [openoffice.org-bin](#) (>= 1.1.0-2)
OpenOffice.org office suite binary files
- [openoffice.org-debian-files](#) (> 1.1.0-2)
Debian specific parts of OpenOffice.org
- [openoffice.org-110n-en](#) (> 1.1.0)
English (US) language package for openoffice.org
or [openoffice.org-110n-1.1.0.final](#)
Virtual package
- ◆ [openoffice.org-mimelink](#)
OpenOffice.org MIME bindings for KDE

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Installing a package and its dependencies






The package `openoffice.org` **depends on** (among others) `openoffice.org-bin`. Since a Debian package will automatically install its dependencies, all we need to do is run

```
apt-get install openoffice.org
```

The `openoffice.org` package will install its dependencies including `openoffice.org-bin`.

Recommended or suggested packages

However, a Debian package will not install recommended or suggested packages.

 = depends  = recommended  = suggested

- [cupsys-bsd](#)
Common UNIX Printing System(tm) - BSD commands
- [libsane](#)
API library for scanners
- [libxrender1](#)
X Rendering Extension client library
- [menu](#)
Provides up date-menus functions for some applications
- [msttcorefonts](#)
Installer for Microsoft TrueType core fonts
- [myspell-dictionary](#)
Virtual package

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Fixing what's broken



There are times when even a carefully crafted system like the Debian apt-get system breaks. A package might not download properly, there may be a hidden dependency, and so on.

Time to get back to basics:

```
# cd /var/cache/apt/archives
# dpkg -i libc6* libdb2* perl*
# dpkg -i apt* dpkg* debconf*
# dpkg -i * # until no error occurs
```

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Fixing what's broken

Note: If you've done an `apt-get clean`, then you're out of luck—the archive has been purged. You'll have to `apt-get install` all over again.

Configuring & maintaining Debian



- GNU/Linux is patterned after standard UNIX
- Where no UNIX command exists, GNU often supplies one
- If there isn't a GNU command or UNIX command, then each distro maintainer is free to invent their own
- There are commands that supercede standard UNIX commands that co-exist with their standard counterparts
- Otherwise, GNU/Linux is GNU/Linux is GNU/Linux!

Standard Debian GNU/Linux /etc structure



- `inittab`
- `init.d/`
- `rcn.d/`
 - **Start-files** -> `/etc/init.d/files`
 - **Kill-files** -> `/etc/init.d/files`

New concepts are handled differently in Debian



For example, `chkconfig` versus `update-rc.d`

Red Hat embeds a `chkconfig` directive in `/etc/init.d` files: `# chkconfig: - 60 20`

Debian provides `update-rc.d`, a program with a similar function. `update-rc.d` automatically updates the System V style init script links `/etc/rcrunlevel.d/NNname` (for example, `/etc/rc2.d`) to scripts `/etc/init.d/name`.

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New concepts are handled differently in Debian

These are run by `init` when changing runlevels and are generally used to start and stop system services such as daemons. `runlevel` is one of the runlevels supported by `init` 0123456789S, and `NN` is the two-digit sequence code used by `init` to decide which order to run the scripts in.

`chkconfig` provides a simple command line tool for maintaining the `/etc/rc[0-6].d` directory hierarchy by relieving system administrators of the task of directly manipulating the numerous symbolic links in those directories. `chkconfig` was written by Red Hat and patterned after a similar utility found in BSD4.

APT summary



The APT package management system governs how applications are installed, upgraded, and maintained

- Most applications have install/maintenance scripts (**these include maintenance applications that are uniquely Debian, like sendmailconfig**)
- Applications are placed in specific directories
- There is a Debian way of doing things (**which is just as mysterious as the UNIX philosophy used to be**)

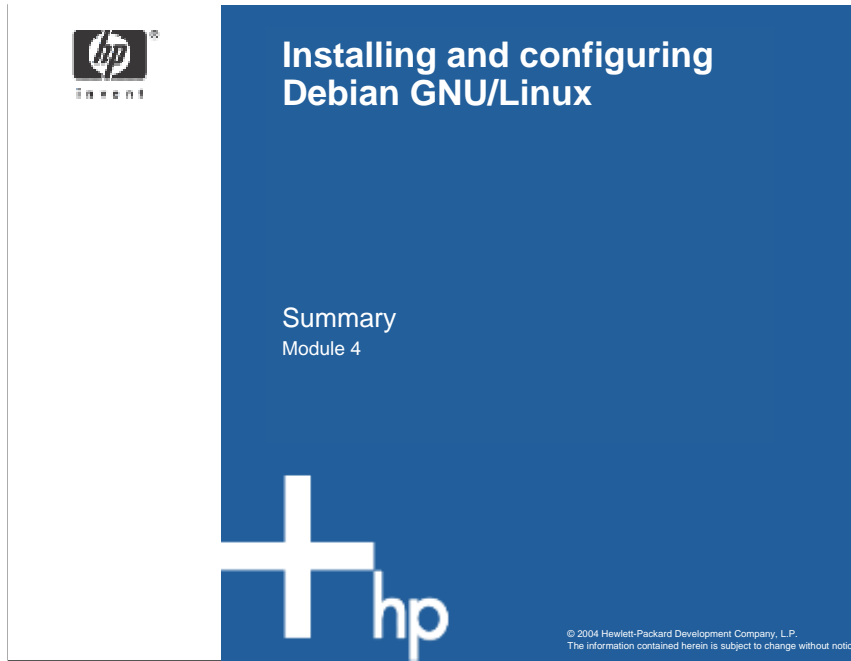


Learning check

Learning check

This is an opportunity to review the information presented in this module to ensure that you understand the material covered so far.





Module objectives



This module:

- Introduces the **lab guide** that you will use to get hands-on experience installing and configuring Debian
- Summarizes key points of the installation and configuration process
- Explains what you need to do to get credit for taking this course

Using the lab guide, you will...



1. Download a “compact” ISO CD image
2. Make a CD
3. Boot the target system with the CD
4. Install and configure Debian by following the prompts
5. Upgrade your system
 - apt-get update
 - apt-get upgrade
6. Install two packages (a Mail Transfer Agent and Mail User Agent):
 - apt-get install sendmail
 - apt-get install mailx
7. Request course credit by sending an email:

```
mail -s'debian' HPS GD eLMS Support@HP.COM <<EOF
your name
EOF
```

Lab guide requirements



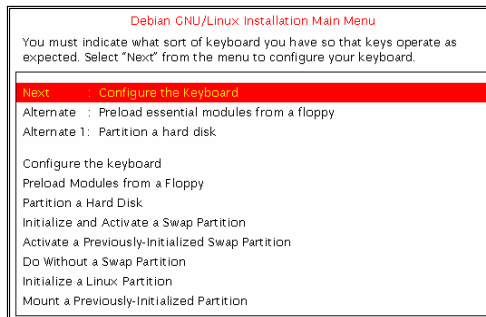
- **To create a Debian install kit, you need:**
 - PC with a CD burner and Internet connection
 - 190MB disk space

- **To install Debian, the target machine needs:**
 - CD reader
 - Internet access
 - 2GB minimum of disk space
 - 64MB RAM

Booting



Booting the target machine from a CD



While you can perform the tasks in any order, `dbbootstrap` suggests an order by placing a *Next*: task at the top of the menu and shading it.

Partitioning the disk



You **can** install Debian in one partition but the recommended minimum is:

- swap – 2X RAM size
- /boot – >20MB or enough for several kernels
- / (root) – The rest of the disk (file system type `linux` is `ext2`)

cfdisk and the three partitions



```

cfdisk 2.11n

Disk Drive: /dev/hda
Size: 40016019456 bytes
Heads: 255 Sectors per Track: 63 Cylinders: 4865

-----
Name      Flags      Part Type  FS Type      [Label]      Size (MB)
-----
hda1     Boot      Primary   Linux ext2
hda2                        Primary   Linux swap
hda3                        Primary   Linux ext2
-----

[Bootable] [ Delete ] [ Help ] [Maximize] [ Print ]
[ Quit ]  [ Type ] [ Units ] [ Write ]

Toggle bootable flag of the current partition
```

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Installation defaults you can use



Defaults should work for the following:

- Install kernel & driver modules
- Configure device drivers
- Configure the network name
- Install the base system
- Make it bootable (via LILO)
- Reboot the system

Post install configuring



- Time zone
- Password encryption (MD5, shadow)
- Root password and user accounts
- Removing unneeded packages (PCMCIA)
- Configuring Internet connectivity
 - Dialup – No
 - dhcp (if available)

Post install configuring APT



- Archive access method (configuring `/etc/apt/sources.list`)
- Non-FLOSS software
- Mirrors
- Security updates
- `tasksel`
- `dselect`
- Console-data and man-db
- Removing unneeded packages

Changing the default MTA



Common Mail Transfer Agents (MTAs)

- Red Hat: `sendmail`
- SUSE: `postfix`
- Debian: `exim`

Using the lab guide, you will install `sendmail`

- Installing `sendmail` removes `exim` automatically
- When installing `sendmail`
 - Enter a full domain name
 - When you are prompted for a `Null client forward host?`, enter a “smarter host,” an upstream SMTP host willing to forward mail
 - Be sure to `apt-get install mailx`

Receiving course credit



To receive credit for this course you must send mail from your installed Debian machine

mail to: [HPS GD eLMS Support@HP.COM](mailto:HPS_GD_eLMS_Support@HP.COM)
subject: Debian Install
body: *Your name*



Learning check

Learning check

This is an opportunity to review the information presented in this module to ensure that you understand the material covered so far.

