installing Linux

Paul Cobbaut

installing Linux Paul Cobbaut

lt-2.0

Publication date Wed 12 Nov 2014 03:59:02 PM CET

Table of Contents

1. installing Debian 8 1
1.1. Debian 2
1.2. Downloading
1.3. virtualbox networking
1.4. setting the hostname
1.5. adding a static ip address
1.6. Debian package management
2. installing CentOS 7
2.1. download a CentOS 7 image
2.2. Virtualbox
2.3. CentOS 7 installing
2.4. CentOS 7 first logon
2.5. Virtualbox network interface
2.6. configuring the network
2.7. adding one static ip address
2.8. package management
2.9. logon from Linux and MacOSX
2.10. logon from MS Windows
Index

List of Tables

1.1. Debian releases 2

Chapter 1. installing Debian 8

This module is a step by step demonstration of an actual installation of **Debian 8** (also known as **Jessie**).

We start by downloading an image from the internet and install **Debian 8** as a virtual machine in **Virtualbox**. We will also do some basic configuration of this new machine like setting an **ip address** and fixing a **hostname**.

This procedure should be very similar for other versions of **Debian**, and also for distributions like **Linux Mint**, **xubuntu/ubuntu/kubuntu** or **Mepis**. This procedure can also be helpful if you are using another virtualization solution.

Go to the next chapter if you want to install CentOS, Fedora, Red Hat Enterprise Linux,

1.1. Debian

Debian is one of the oldest Linux distributions. I use Debian myself on almost every computer that I own (including **raspbian** on the **Raspberry Pi**).

Debian comes in **releases** named after characters in the movie **Toy Story**. The **Jessie** release contains about 36000 packages.

name	number	year
Woody	3.0	2002
Sarge	3.1	2005
Etch	4.0	2007
Lenny	5.0	2009
Squeeze	6.0	2011
Wheezy	7	2013
Jessie	8	2015

 Table 1.1. Debian releases

There is never a fixed date for the next **Debian** release. The next version is released when it is ready.

1.2. Downloading

All these screenshots were made in November 2014, which means **Debian 8** was still in 'testing' (but in 'freeze', so there will be no major changes when it is released).

Download Debian here:



After a couple of clicks on that website, I ended up downloading **Debian 8** (testing) here. It should be only one click once **Debian 8** is released (somewhere in 2015).

🖉 Index of /cdima	age/weekly-builds/a	amd64/iso-cd - Iceweasel		↑ _ □ >	×
File Edit View History Bookmarks T	ools <u>H</u> elp				
🗲 🔶 🛞 debian.org/cdimage/weekly-bui	lds/amd64/iso-cd/ 🔻	C 🔞 TuckDuckGo	🗟 🏠 🗎	🕹 🏫 🚇 🔻 🗄	≡
🛕 Index of /cdimage/wee 🗙 🕂				_	
SHA512SUMS	2014-11-03 08:24	14K			•
SHA512SUMS.sign	2014-11-03 08:24	836			
debian-testing-amd64-CD-1.iso	2014-11-03 08:24	616M			
debian-testing-amd64-CD-2.iso	2014-11-03 08:24	642M			
debian-testing-amd64-CD-3.iso	2014-11-03 08:24	644M			
debian-testing-amd64-CD-4.iso	2014-11-03 08:24	647M			
debian-testing-amd64-CD-5.iso	2014-11-03 08:24	555M			
debian-testing-amd64-CD-6.iso	2014-11-03 08:24	605M			
debian-testing-amd64-CD-7.iso	2014-11-03 08:24	625M			
debian-testing-amd64-CD-8.iso	2014-11-03 08:24	644M			
debian-testing-amd64-kde-CD-1.iso	2014-11-03 07:35	610M			
debian-testing-amd64-lxde-CD-1.iso	2014-11-03 07:35	640M			
debian-testing-amd64-netinst.iso	2014-11-03 07:34	231M			
debian-testing-amd64-xfce-CD-1.iso	2014-11-03 07:35	641M			
Anache/2 4 9 (Unix) Server at cd	imaae debian o	ra Port 80			
Apache/2.4.5 (Chix) Server at co	inage.debiun.or	9101100			7
X				4	6

You have many other options to download and install **Debian**. We will discuss them much later.

This small screenshot shows the downloading of a **netinst** .iso file. Most of the software will be downloaded during the installation. This also means that you will have the most recent version of all packages when the install is finished.



I already have Debian 8 installed on my laptop (hence the **paul@debian8** prompt). Anyway, this is the downloaded file just before starting the installation.

paul@debian8:~\$ **ls -hl debian-testing-amd64-netinst.iso** -rw-r--r-- 1 paul paul 231M Nov 10 17:59 debian-testing-amd64-netinst.iso Create a new virtualbox machine (I already have five, you might have zero for now). Click the **New** button to start a wizard that will help you create a virtual machine.



The machine needs a name, this screenshot shows that I named it server42.

	Create Virtual Machine	↑ □ ×
	Create Virtual Machine Name and operating system Please choose a descriptive name for the I virtual machine and select the type of oper system you intend to install on it. The nam choose will be used throughout VirtualBox identify this machine. Name: server42 Type: Linux Version: Debian (64 bit)	
Hic	le Description < Back Next >	Cancel

Most of the defaults in Virtualbox are ok.

512MB of RAM is enough to practice all the topics in this book.



We do not care about the virtual disk format.

2	Create Virtual Hard Drive 🔶 🛧	□ ×
	Hard drive file type	
	Please choose the type of file that you would like to use for the new virtual hard drive. If you do not need to use it with other virtualization software you can leave this setting unchanged.	r
	VDI (VirtualBox Disk Image)	
	C VMDK (Virtual Machine Disk)	
	C VHD (Virtual Hard Disk)	
	C HDD (Parallels Hard Disk)	
	C QED (QEMU enhanced disk)	
	C QCOW (QEMU Copy-On-Write)	
	Hide Description < Back Description Cano	el

Choosing **dynamically allocated** will save you some disk space (for a small performance hit).



8GB should be plenty for learning about Linux servers.



This finishes the wizard. You virtual machine is almost ready to begin the installation.

First, make sure that you attach the downloaded .iso image to the virtual CD drive. (by opening **Settings**, **Storage** followed by a mouse click on the round CD icon)

*	server42 - Settings	+ □ ×
General System Display Storage Audio Network Serial Ports USB Shared Folders	Storage Storage Tree Controller: IDE @ @ @ Gotroller: SATA Server42.vdi	+ □ × Attributes Name: IDE Type: PIIX4 ✓ Use Host I/O Cache
	2 - 4	OK Cancel <u>H</u> elp

Personally I also disable sound and usb, because I never use these features. I also remove the floppy disk and use a PS/2 mouse pointer. This is probably not very important, but I like the idea that it saves some resources.

Now boot the virtual machine and begin the actual installation. After a couple of seconds you should see a screen similar to this. Choose **Install** to begin the installation of Debian.



First select the language you want to use.

M) achine View Devices H	server42 [Running] -	Oracle VM VirtualBox	↑ _ □	×
	achine View Devices H Choose the languag also be the defaul Language:	server42 [Running] - elp [11] Sele to be used for the inst t language for the instal C Albanian Arabic Asturian Basque Belarusian Bosnian Bulgarian Catalan Chinese (Simplified) Chinese (Simplified) Chinese (Traditional) Croatian Czech Danish Dutch Esperanto Estonian Finnish French	Oracle VM VirtualBox ect a language - No localization - Shaip - Asturianu - Euskara - Беларуская - Возапski - Български - Català - 中文(简体) - 中文(驚體) - Hrvatski - Čeština - Dansk - English - Esperanto - Eesti - Suomi - Francais	+ - □	×
		Galician German Greek	– Galego – Deutsch – Ελληνικά	÷	
	<go back=""></go>				
<т	ab> moves; <space> s</space>	elects; <enter> activates</enter>	s buttons		
				💿 🗗 🗀 🖷 🛄 🛛 🔗 Left WinKe	y /

Choose your country. This information will be used to suggest a download mirror.

ic	server42 [Running] - Oracle VM VirtualBox	↑ _ □ X
M	achine View Devices Help	
	[11] Select your location	
	The selected location will be used to set your time zone and also for example to help select the system locale. Normally this should be the country where you live.	
	This is a shortlist of locations based on the language you selected. Choose "other" if your location is not listed.	
	Country, territory or area:	
	Antigua and Barbuda Australia Botswana Canada Hong Kong India Ireland New Zealand Nigeria Philippines Singapore South Africa United Kingdom United States Zambia Zimbabue other	
	<go back=""></go>	
<т;	ab> moves; <space> selects; <enter> activates buttons</enter></space>	
	S 💿 🗗 🗔 🖷 🛛 [] 🖉 🕞 Li	eft WinKey 🏾

Choose the correct keyboard. On servers this is of no importance since most servers are remotely managed via **ssh**.

5	server42 [Running] - Oracle VM VirtualBox	+ _ □ ×
Machine View Devices Help		
<tab> moves; <space> select</space></tab>	<pre>[!!] Configure the keyboard Keymap to use: American English Albanian Arabic Asturian Bangladesh Belarusian Bengali Belgian Bosnian Brazilian British English Bulgarian (phonetic layout) Canadian French Canadian Multilingual Catalan Chinese Croatian Czech Danish Dutch Dvorak Dzongkha Esperanto Estonian Ethiopian * <go back=""></go></pre>	
		🛛 🕑 🗗 🗀 💷 🛄 🛛 🕑 Left WinKey 🏑

Enter a hostname (with fqdn to set a dnsdomainname).



Give the **root** user a password. Remember this password (or use **hunter2**).

Ма	server42 [Running] - Oracle VM VirtualBox 🔶 🗖 🗆 🗙
	[!!] Set up users and passwords
	You need to set a password for 'root', the system administrative account. A malicious or unqualified user with root access can have disastrous results, so you should take care to choose a root password that is not easy to guess. It should not be a word found in dictionaries, or a word that could be easily associated with you.
	A good password will contain a mixture of letters, numbers and punctuation and should be changed at regular intervals.
	The root user should not have an empty password. If you leave this empty, the root account will be disabled and the system's initial user account will be given the power to become root using the "sudo" command.
	Note that you will not be able to see the password as you type it.
	Root password:
	<go back=""> <continue></continue></go>
<ta< th=""><td>b> moves; <space> selects; <enter> activates buttons</enter></space></td></ta<>	b> moves; <space> selects; <enter> activates buttons</enter></space>
	🔊 📀 🗗 🗔 💷 💟 [🔗 🕒 Left WinKey

It is adviced to also create a normal user account. I don't give my full name, Debian 8 accepts an identical username and full name **paul**.

🔞 server42 [Running] - Oracle VM VirtualBox	↑ _ □ X
Machine View Devices Help	
[!!] Set up users and passwords	
A user account will be created for you to use instead of the root account non-administrative activities.	for
Please enter the real name of this user. This information will be used for default origin for emails sent by this user as well as any program which o the user's real name. Your full name is a reasonable choice.	r instance as displays or uses
Full name for the new user:	
neu l	
<go back=""></go>	<continue></continue>
<tab> moves; <space> selects; <enter> activates buttons</enter></space></tab>	
🛛 💿 🗗 🗔 🦷	🖬 🔟 🛛 🎯 🛃 Left WinKey 🏼 🏾

The use entire disk refers to the virtual disk that you created before in Virtualbox..

K	server42 [Running] - Oracle VM VirtualBox	+ _ □ X
IVI	achine view Devices Help	
	[!!] Partition disks	
	The installer can guide you through partitioning a disk (using different standard schemes) or, if you prefer, you can do it manually. With guided partitioning you will still have a chance later to review and customise the results.	
	If you choose guided partitioning for an entire disk, you will next be asked which disk should be used.	<
	Partitioning method:	
	<mark>Guided – use entire disk</mark> Guided – use entire disk and set up LVM Guided – use entire disk and set up encrypted LVM Manual	
	<go back=""></go>	
< T	ab> moves: <space> selects: <enter> activates buttons</enter></space>	
	S 📀 🗗 🚍 🔟 🛛 S 🖉	ft WinKey

Again the default is probably what you want. Only change partitioning if you really know what you are doing.



Accept the partition layout (again only change if you really know what you are doing).

<mark>ю</mark> Ма	server42 [Running] - Oracle VM VirtualBox 🔶 🕇 🗖 🗆 🗙
1*16	
	[!!] Partition disks
	This is an overview of your currently configured partitions and mount points. Select a partition to modify its settings (file system, mount point, etc.), a free space to create partitions, or a device to initialize its partition table.
	Guided partitioning Configure software RAID Configure the Logical Volume Manager Configure encrypted volumes Configure iSCSI volumes
	SCSI3 (0,0,0) (sda) – 8.6 GB ATA VBOX HARDDISK #1 primary 8.2 GB f ext4 / #5 logical 401.6 MB f swap swap
	Undo changes to partitions Finish partitioning and write changes to disk
	<pre><go back=""></go></pre>
<f.:< td=""><td>L> for help; <tab> moves; <space> selects; <enter> activates buttons</enter></space></tab></td></f.:<>	L> for help; <tab> moves; <space> selects; <enter> activates buttons</enter></space></tab>
	🛛 💿 🖓 🗂 🖙 🔟 Left WinKey

This is the point of no return, the magical moment where pressing **yes** will forever erase data on the (virtual) computer.



Software is downloaded from a mirror repository, preferably choose one that is close by (as in the same country).

i server	42 [Running] - Oracle VM VirtualBox	↑ _ □ X
Machine View Devices Help		
Machine View Devices Help	Il Configure the package manager if the Debian archive that is close to you on the network, or even your own, may not be the best choice. enter information manually * Algeria Argentina Australia Australia Bangladesh Belgium Bosnia and Herzegovina Brazil Bulgaria Canada China Colombia Costa Rica Croatia Czech Republic Denmark El Salvador	
<go back=""> <tab> moves; <space> selects; <ent< th=""><th>France + er> activates buttons</th><th></th></ent<></space></tab></go>	France + er> activates buttons	
	🛛 💿 🗗 🥅 🔍 🛇 L	eft WinKey //

This setup was done in Belgium.

Î	C server42 [Running] - Oracle VM VirtualBox ↑ - □ × Machine View Devices Help
	[!] Configure the package manager
	Please select a Debian archive mirror. You should use a mirror in your country or region if you do not know which mirror has the best Internet connection to you.
	Usually, ftp. <your code="" country="">.debian.org is a good choice.</your>
	Debian archive mirror:
	ftp.belnet.be <mark>ftp.be.debian.org</mark> mirror.as35701.net http.debian.net cdn.debian.net ftp.debian.skynet.be be.mirror.eurid.eu
	<go back=""></go>
,	Tabl maural (Space) colocter (Entabl activates buttabl
<	🛛 🖸 🖓 🐨 🖓 🐨 🖓 🐨 🖓 🐨 🖓 🐨 🖓 🐨 🖓
_	



Leave the proxy field empty (unless you are sure that you are behind a proxy server).

Choose whether you want to send anonymous statistics to the Debian project (it gathers data about installed packages). You can view the statistics here **http://popcon.debian.org**/.



Choose what software to install, we do not need any graphical stuff for this training.

server42 [Running] - Oracle VM VirtualBox	+ _ □ ×
Machine View Devices Help	
[!] Software selection	
At the moment, only the core of the system is installed. To tune the system to needs, you can choose to install one or more of the following predefined colle software.	(your ctions of
Choose software to install:	
<pre>[] Debian desktop environment [] GNOME [] Xfce [] KDE [] Cinnamon [] LXDE [] web server [] print server [] standard system utilities</pre>	
<go back=""></go>	Continue>
<tab> moves; <space> selects; <enter> activates buttons</enter></space></tab>	
	🛛 🕜 🛃 Left WinKey 🎾

The latest versions are being downloaded.



Say yes to install the bootloader on the virtual machine.



Booting for the first time shows the grub screen



A couple seconds later you should see a lot of text scrolling of the screen (**dmesg**). After which you are presented with this **getty** and are allowed your first logon.



You should now be able to log on to your virtual machine with the **root** account. Do you remember the password ? Was it **hunter2** ?



The screenshots in this book will look like this from now on. You can just type those commands in the terminal (after you logged on).

```
root@server42:~# who am i
root tty1 2014-11-10 18:21
root@server42:~# hostname
server42
root@server42:~# date
Mon Nov 10 18:21:56 CET 2014
```

1.3. virtualbox networking

You can also log on from remote (or from your Windows/Mac/Linux host computer) using **ssh** or **putty**. Change the **network** settings in the virtual machine to **bridge**. This will enable your virtual machine to receive an ip address from your local dhcp server.

The default virtualbox networking is to attach virtual network cards to **nat**. This screenshiot shows the ip address **10.0.2.15** when on **nat**:

```
root@server42:~# ifconfig
         Link encap:Ethernet HWaddr 08:00:27:f5:74:cf
eth0
          inet addr:10.0.2.15 Bcast:10.0.2.255 Mask:255.255.255.0
          inet6 addr: fe80::a00:27ff:fef5:74cf/64 Scope:Link
         UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
         RX packets:11 errors:0 dropped:0 overruns:0 frame:0
         TX packets:19 errors:0 dropped:0 overruns:0 carrier:0
         collisions:0 txqueuelen:1000
         RX bytes:2352 (2.2 KiB) TX bytes:1988 (1.9 KiB)
lo
         Link encap:Local Loopback
         inet addr:127.0.0.1 Mask:255.0.0.0
         inet6 addr: ::1/128 Scope:Host
         UP LOOPBACK RUNNING MTU:65536 Metric:1
         RX packets:0 errors:0 dropped:0 overruns:0 frame:0
         TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)
```



By shutting down the network interface and enabling it again, we force Debian to renew an ip address from the bridged network.

```
root@server42:~# # do not run ifdown while connected over ssh!
root@server42:~# ifdown eth0
Killed old client process
Internet Systems Consortium DHCP Client 4.3.1
Copyright 2004-2014 Internet Systems Consortium.
All rights reserved.
For info, please visit https://www.isc.org/software/dhcp/
Listening on LPF/eth0/08:00:27:f5:74:cf
Sending on LPF/eth0/08:00:27:f5:74:cf
```

```
Sending on Socket/fallback
DHCPRELEASE on eth0 to 10.0.2.2 port 67
root@server42:~# # now enable bridge in virtualbox settings
root@server42:~# ifup eth0
Internet Systems Consortium DHCP Client 4.3.1
Copyright 2004-2014 Internet Systems Consortium.
All rights reserved.
For info, please visit https://www.isc.org/software/dhcp/
Listening on LPF/eth0/08:00:27:f5:74:cf
Sending on LPF/eth0/08:00:27:f5:74:cf
Sending on
            Socket/fallback
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 8
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 8
DHCPREQUEST on eth0 to 255.255.255.255 port 67
DHCPOFFER from 192.168.1.42
DHCPACK from 192.168.1.42
bound to 192.168.1.111 -- renewal in 2938 seconds.
root@server42:~# ifconfig eth0
         Link encap:Ethernet HWaddr 08:00:27:f5:74:cf
eth0
          inet addr:192.168.1.111 Bcast:192.168.1.255 Mask:255.255.255.0
          inet6 addr: fe80::a00:27ff:fef5:74cf/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
          RX packets:15 errors:0 dropped:0 overruns:0 frame:0
          TX packets:31 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:3156 (3.0 KiB) TX bytes:3722 (3.6 KiB)
root@server42:~#
```

Here is an example of **ssh** to this freshly installed computer. Note that **Debian 8** has disabled remote root access, so i need to use the normal user account.

```
paul@debian8:~$ ssh paul@192.168.1.111
paul@192.168.1.111's password:
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
paul@server42:~$
paul@server42:~$
su -
Password:
root@server42:~#
```

TODO: putty screenshot here...

1.4. setting the hostname

The hostname of the server is asked during installation, so there is no need to configure this manually.

```
root@server42:~# hostname
server42
root@server42:~# cat /etc/hostname
server42
root@server42:~# dnsdomainname
paul.local
root@server42:~# grep server42 /etc/hosts
127.0.1.1 server42.paul.local server42
root@server42:~#
```

1.5. adding a static ip address

This example shows how to add a static ip address to your server.

You can use **ifconfig** to set a static address that is active until the next **reboot** (or until the next **ifdown**).

а

root@server42:~# ifconfig eth0:0 10.104.33.39

Adding a couple of lines to the **/etc/network/interfaces** file to enable an extra ip address forever.

```
root@server42:~# vi /etc/network/interfaces
root@server42:~# tail -4 /etc/network/interfaces
auto eth0:0
iface eth0:0 inet static
address 10.104.33.39
netmask 255.255.0.0
root@server42:~# ifconfig
         Link encap:Ethernet HWaddr 08:00:27:f5:74:cf
eth0
          inet addr:192.168.1.111 Bcast:192.168.1.255 Mask:255.255.255.0
          inet6 addr: fe80::a00:27ff:fef5:74cf/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
          RX packets:528 errors:0 dropped:0 overruns:0 frame:0
          TX packets:333 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:45429 (44.3 KiB) TX bytes:48763 (47.6 KiB)
          Link encap:Ethernet HWaddr 08:00:27:f5:74:cf
eth0:0
          inet addr:10.104.33.39 Bcast:10.255.255.255 Mask:255.0.0.0
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
lo
          Link encap:Local Loopback
          inet addr:127.0.0.1 Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING MTU:65536 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)
```

```
root@server42:~#
```

1.6. Debian package management

To get all information about the newest packages form the online repository:

```
root@server42:~# aptitude update
Get: 1 http://ftp.be.debian.org jessie InRelease [191 kB]
Get: 2 http://security.debian.org jessie/updates InRelease [84.1 kB]
Get: 3 http://ftp.be.debian.org jessie-updates InRelease [117 kB]
Get: 4 http://ftp.be.debian.org jessie-backports InRelease [118 kB]
Get: 5 http://security.debian.org jessie/updates/main Sources [14 B]
Get: 6 http://ftp.be.debian.org jessie/main Sources/DiffIndex [7,876 B]
... (output truncated)
```

To download and apply all updates for all installed packages:

```
root@server42:~# aptitude upgrade
Resolving dependencies...
The following NEW packages will be installed:
    firmware-linux-free{a} irqbalance{a} libnumal{a} linux-image-3.16.0-4-amd64{a}
The following packages will be upgraded:
    busybox file libc-bin libc6 libexpat1 libmagic1 libpaper-utils libpaper1 libsqlite3-0
    linux-image-amd64 locales multiarch-support
12 packages upgraded, 4 newly installed, 0 to remove and 0 not upgraded.
Need to get 44.9 MB of archives. After unpacking 161 MB will be used.
Do you want to continue? [Y/n/?]
... (output truncated)
```

To install new software (vim and tmux in this example):

```
root@server42:~# aptitude install vim tmux
The following NEW packages will be installed:
    tmux vim vim-runtime{a}
0 packages upgraded, 3 newly installed, 0 to remove and 0 not upgraded.
Need to get 6,243 kB of archives. After unpacking 29.0 MB will be used.
Do you want to continue? [Y/n/?]
Get: 1 http://ftp.be.debian.org/debian/ jessie/main tmux amd64 1.9-6 [245 kB]
Get: 2 http://ftp.be.debian.org/debian/ jessie/main vim-runtime all 2:7.4.488-1 [5,046 kB]
Get: 3 http://ftp.be.debian.org/debian/ jessie/main vim amd64 2:7.4.488-1 [952 kB]
```

Refer to the package management chapter in LinuxAdm.pdf for more information.

Chapter 2. installing CentOS 7

This module is a step by step demonstration of an actual installation of **CentOS 7**.

We start by downloading an image from the internet and install **CentOS 7** as a virtual machine in **Virtualbox**. We will also do some basic configuration of this new machine like setting an **ip address** and fixing a **hostname**.

This procedure should be very similar for other versions of **CentOS**, and also for distributions like **RHEL** (Red Hat Enterprise Linux) or **Fedora**. This procedure can also be helpful if you are using another virtualization solution.

2.1. download a CentOS 7 image

This demonstration uses a laptop computer with **Virtualbox** to install **CentOS 7** as a virtual machine. The first task is to download an **.iso** image of **CentOS 7**.

The **CentOS 7** website looks like this today (November 2014). They change the look regularly, so it may look different when you visit it.



You can download a full DVD, which allows for an off line installation of a graphical **CentOS 7** desktop. You can select this because it should be easy and complete, and should get you started with a working **CentOS 7** virtual machine.

But I clicked instead on 'alternative downloads', selected **CentOS 7** and **x86_64** and ended up on a **mirror list**. Each mirror is a server that contains copies of **CentOS 7** media. I selected a Belgian mirror because I currently am in Belgium.

ilo Edit View History Rockmarks Tools I	ndex of /centos/7.0.	1406/i	sos/x86_64 - Icew	veasel		↑ _ □
	Telb		- a		Side III	a 💿 -
be.minor.euna.eu/centos/7.0.1406/isos	/X00_04/		• 0			
ndex of /centos/7.0.1406/ 🗙 🛟						
index of /centos/7	0.1400	D/1 5	50S/X8t	0_64		
Name	Last modified	<u>Size</u>	Description			
			-			
A README tyt	21 101 2014 00-24	- 2 6K				
CentOS-7 0-1406-x86 64-DVD iso	21-Jul-2014 09:24	3 00				
CentOS-7.0-1406-x86_64-DVD.torrent	00-Jul-2014 19:55	155K				
Cent0S-7.0-1406-x86_64-Everything.iso	05-Jul-2014 00:16	6.66				
CentOS-7.0-1406-x86 64-Everything.torren	07-Jul-2014 14:16	264K				
Cent0S-7.0-1406-x86 64-GnomeLive.iso	04-Jul-2014 19:22	1.0G				
CentOS-7.0-1406-x86 64-GnomeLive.torrent	07-Jul-2014 14:16	42K				
Cent0S-7.0-1406-x86 64-KdeLive.iso	04-Jul-2014 19:44	1.2G				
CentOS-7.0-1406-x86 64-KdeLive.torrent	07-Jul-2014 14:16	49K				
Cent0S-7.0-1406-x86 64-livecd.iso	04-Jul-2014 19:00	687M				
Cent0S-7.0-1406-x86_64-livecd.torrent	07-Jul-2014 14:16	27K				
Cent0S-7.0-1406-x86_64-Minimal.iso	17-Jul-2014 16:16	566M				
<u>CentOS-7.0-1406-x86_64-NetInstall.iso</u>	04-Jul-2014 17:59	362M				
<u>CentOS-7.0-1406-x86_64-NetInstall.torrent</u>	07-Jul-2014 14:16	15K				
<u>md5sum.txt</u>	21-Jul-2014 09:24	486				
md5sum.txt.asc	21-Jul-2014 09:24	1.3K				
shalsum.txt	21-Jul-2014 09:24	542				
<u>shalsum.txt.asc</u>	21-Jul-2014 09:24	1.4K				
sha256sum.txt	21-Jul-2014 09:24	1.3K				
sha256sum.txt.asc	21-Jul-2014 09:24	2.2K				

There is again the option for full DVD's and more. This demonstration will use the **minimal** .iso file, because it is much smaller in size. The download takes a couple of minutes.

<u> </u>	Library 🔶 🔤					
🧼 🗼 <u>O</u> rganize ▼ Clear Do	ownloads	Search Downloads	Ī,			
G History Downloads Tags All Bookmarks	CentOS-7.0-1406-x86_64-M	linimal.iso B of 566 MB (596 KB/sec)				

Verify the size of the file after download to make sure it is complete. Probably a right click on the file and selecting 'properties' (if you use Windows or Mac OSX).

I use Linux on the laptop already:

```
paul@debian8:~$ ls -lh CentOS-7.0-1406-x86_64-Minimal.iso
-rw-r--r-- 1 paul paul 566M Nov 1 14:45 CentOS-7.0-1406-x86_64-Minimal.iso
```

Do not worry if you do no understand the above command. Just try to make sure that the size of this file is the same as the size that is mentioned on the **CentOS 7** website.

2.2. Virtualbox

This screenshot shows up when I start Virtualbox. I already have four virtual machines, you might have none.



Below are the steps for creating a new virtual machine. Start by clicking **New** and give your machine a name (I chose **server33**). Click **Next**.



A Linux computer without graphical interface will run fine on **half a gigabyte** of RAM.



A Linux virtual machine will need a **virtual hard drive**.





Any format will do for our purpose, so I left the default **vdi**.

The default **dynamically allocated** type will save disk space (until we fill the virtual disk up to 100 percent). It makes the virtual machine a bit slower than **fixed size**, but the **fixed size** speed improvement is not worth it for our purpose.



The name of the virtual disk file on the host computer will be **server33.vdi** in my case (I left it default and it uses the vm name). Also 16 GB should be enough to practice Linux. The file will stay much smaller than 16GB, unless you copy a lot of files to the virtual machine.



You should now be back to the start screen of **Virtualbox**. If all went well, then you should see the machine you just created in the list.

			Oracle VM VirtualBox M	Manager	†	- • ×
<u>F</u> ile <u>M</u> achi	ine <u>H</u> elp					
New Sett	ings Start	Discard			🙆 <u>D</u> etails 💿 <u>S</u> napsl	hots
🚰 deb	ian7		📃 General		Preview	<u> </u>
🥂 🔍 🖤 🖓 🕅	vowered om		Name: server33 Operating System: Red Hat (6	64 bit)		
🚺 🕐 F	owered Off		🔝 System			
647 RHE () F	L 7 Powered Off		Base Memory: 512 MB Boot Order: CD/DVD, Hard	Disk	server33	
64 cen () F	tos7 Powered Off		PAE/NX	asted Faging,		
64 3 ser () F	ver33 Powered Off		😐 Display			
			Video Memory: 12 M Remote Desktop Server: Disa Video Capture: Disa	MB abled abled		
			😥 Storage			
			Controller: IDE IDE Secondary Master: [CD/ Controller: SATA	/DVD] CentOS-7.0-1406	-x86_64-Minimal.iso (566.00) мв)
			SATA Port 0: serv	er33.vdi (Normal, 16.0	0 GB)	
			🕒 Audio			•
						/

After finishing the setup, we go into the **Settings** of our virtual machine and attach the **.iso** file we downloaded before. Below is the default screenshot.

*	server33 - Settings	+ □ X
 General System Display Storage Audio Network Serial Ports USB Shared Folders 	Storage Storage Tree Controller: IDE Controller: SATA Server33.vdi	Attributes <u>N</u> ame: IDE Jype: PIIX4 Vise Host I/O Cache
	🛃 🗔 🕹 🔶	
		OK Cancel <u>H</u> elp

This is a screenshot with the **.iso** file properly attached.

*	server33 - Settings	↑ □ X
 General System Display Storage Audio Network Serial Ports USB Shared Folders 	server33 - Settings Storage Storage Tree Controller: IDE Controller: SATA Controller: SATA Server33.vdi	Attributes CD/DVD Drive: IDE Secondary M:▼ ④ □ Live CD/DVD Information Type: Information Size: 566.00 MB Location: /home/paul/Download Attached to:
Shared Folders		OK Cancel <u>H</u> elp

2.3. CentOS 7 installing

The screenshots below will show every step from starting the virtual machine for the first time (with the .iso file attached) until the first logon.

You should see this when booting, otherwise verify the attachment of the .iso file form the previous steps. Select **Test this media and install CentOS 7**.

server33 [Running] - Oracle VM VirtualBox	↑ _ □ X
Machine View Devices Help	
CentOS 7	
Install CentOS 7	
Test this media & install CentOS 7	
Troubleshooting	>
Press Tab for full configuration options on menu items	
Automatic boot in 59 seconds	
	😔 Left WinKey 🏼 🏸

Carefully select the language in which you want your **CentOS**. I always install operating systems in English, even though my native language is not English.

Also select the right keyboard, mine is a US qwerty, but yours may be different.

Contraction View Devices Help	server33 [Rur	nning] - Oracle VM VirtualBox		↑ _ □ X
				CENTOS 7 INSTALLATION
CentOS	What langu	WELCOME TO C	ENTOS 7.	ss?
	English Afrikaans মলেক্ট অসমীয়া Asturianu Беларуская Български বাংলা Bosanski Català Čeština Cymraeg Dansk	English > Afrikaans Amharic Arabic Assamese Asturian Belarusisn Bulgarian Bengali Bosnian Catalan Czech Welsh Danish	English (United States) English (United Kingdor English (India) English (Australia) English (Canada) English (Canada) English (Canada) English (Ireland) English (New Zealand) English (Nigeria) English (Nigeria) English (Philippines) English (Singapore) English (Singapore) English (Zambia) English (Zambia) English (Zambabwe) English (Botswana)	n) R China)

You should arrive at a summary page (with one or more warnings).

2		server33 [Running] - Oracle VM \	/irtualBox	+ _ □ ×
Machine View Device	s Help			
*	INSTALLATION	SUMMARY		CENTOS 7 INSTALLATION
CentOS	LOCALIZA	TION		
	Θ	DATE & TIME Americas/New York timezone		KEYBOARD English (US)
de la Alla	á	LANGUAGE SUPPORT English (United States)		
Statistic in the	SOFTWAR	E		
	\odot	INSTALLATION SOURCE		SOFTWARE SELECTION Minimal Install
	SYSTEM			
	5	INSTALLATION DESTINATION Automatic partitioning selected	27	NETWORK & HOSTNAME Not connected
		ħ		
				Quit Begin Installation
			We v	von't touch your disks until you click 'Begin Installation'.
	A Please complete	e items marked with this icon before continuin	g to the next step.	
				👂 💿 🖶 🚞 📟 💟 🛛 🔗 Left WinKey 🎢

Start by configuring the network. During this demonstration I had a DHCP server running at 192.168.1.42, yours is probably different. Ask someone (a network administator ?) for help if this step fails.

2	server33 [Running] - Oracle VM VirtualBox	+ _ □ ×
Machine View Devices Help		
NETWORK & HOSTNAME		CENTOS 7 INSTALLATION
Done		🖽 us
Ethernet (enpOs3)	Ethernet (enpOs3)	ON III
	Connected	
	Hardware Address 08:00:27:1C:F5:AB	
	Speed 1000 Mb/s	
	IP Address 10.0.2.15	
	Subnet Mask 255.255.255.0	
	Default Route 10.0.2.2	
	DNS 192.168.1.42	
	k	t.
+ -		Configure
Hostname: localhost.localdomain		
		😡 💿 🗗 🗀 📾 🔟 🛯 🐼 💽 Left WinKey

Select your time zone, and activate **ntp**.



Choose a mirror that is close to you. If you can't find a local mirror, then you can copy the one from this screenshot (it is a general **CentOS** mirror).

Mashina Maw Davisas Halp	server33 [Running] - Oracle VM VirtualBox	+ _ □ ×
INSTALLATION SOURCE		CENTOS 7 INSTALLATION
Which installation source would you like to us O Auto-detected installation media: Device: sr0 Verify	se?	
On the network:		
http:// v mirror.centos.org/centos/7/os	:/x86_64/	Proxy setup
This URL refers to a mirror	list.	
Additional repositories		
Enabled Name	Name:	
	http:// 🗸	
	This URL refers to a mirror list.	
	Proxy URL:	
+ - C	Password:	
	0 0 5	🗆 📼 🔟 [🖉 🖪 Left WinKey

It can take a couple of seconds before the mirror is verified.



I did not select any software here (because I want to show it all in this training).



After configuring network, location, software and all, you should be back on this page. Make sure there are no warnings anymore (and that you made the correct choice everywhere).

2		server33 [Running] - Oracle VM Virtua	lBox		+ _ □ ×
Machine View Devic	es Help				
	INSTALLA	TION SUMMARY		CENTOS 7	INSTALLATION
				🖽 us	
CentOS		TION			
Centos	LOCALIZA	TION			
		DATE & TIME		KEYBOARD	
		Europe/Brussels timezone		English (US)	
		ANGUAGE SUPPORT			
	la	English (United States)			
		_			
Maria India	SOFTWAR	RE			
		INSTALLATION SOURCE		SOFTWARE SELECTION	
	0	http://mirror.centos.org/centos/7/os/x86_64/		Minimal Install	
Marine Marine	OVETEM				
	STSTEM				
		INSTALLATION DESTINATION		NETWORK & HOSTNAME	
		Automatic partitioning selected		Wired (enp0s3) connected	
				Quit	Begin Installation
			We w	von't touch your disks until you clici	k 'Begin Installation'.
	-			🛛 🗿 🗗 🗔 💷 🚺	🏾 🕙 Left WinKey

You can enter a **root password** and create a **user account** while the installation is downloading from the internet. This is the longest step, it can take several minutes (or up to an hour if you have a slow internet connection).

2	server33 [Running] - Oracle VM Virtu	alBox	+ _ 🗆 × 🤇
Machine View Device	s Help		
3 *	CONFIGURATION		CENTOS 7 INSTALLATION
CentOS	USER SETTINGS		
	ROOT PASSWORD Root password is set		USER CREATION User paul will be created
	😳 Starting package installation process		
	CentOS Core SIG Produces the CentOS Linux Distribution. wiki.centos.org/SpecialInterestGroup		-
			🔀 😪 🛃 🗀 🛥 🔟 [🎯 🕭 Left WinKey 🏾

If you see this, then the installation was successful.

Time to reboot the computer and start CentOS 7 for the first time.



This screen will appear briefly when the virtual machines starts. You don't have to do anything.



After a couple of seconds, you should see a logon screen. This is called a **tty** or a **getty**. Here you can type **root** as username. The **login process** will then ask your password (nothing will appear on screen when you type your password).



And this is what it looks like after logon. You are logged on to your own Linux machine, very good.



All subsequent screenshots will be text only, no images anymore.

For example this screenshot shows three commands being typed on my new CentOS 7 install.

```
[root@localhost ~]# who am i
root pts/0 2014-11-01 22:14
[root@localhost ~]# hostname
localhost.localdomain
[root@localhost ~]# date
Sat Nov 1 22:14:37 CET 2014
```

When using **ssh** the same commands will give this screenshot:

```
[root@localhost ~]# who am i
root pts/0 2014-11-01 21:00 (192.168.1.35)
[root@localhost ~]# hostname
localhost.localdomain
[root@localhost ~]# date
Sat Nov 1 22:10:04 CET 2014
[root@localhost ~]#
```

If the last part is a bit too fast, take a look at the next topic **CentOS 7 first logon**.

2.4. CentOS 7 first logon

All you have to log on, after finishing the installation, is this screen in Virtualbox.



This is workable to learn Linux, and you will be able to practice a lot. But there are more ways to access your virtual machine, the next chapters discuss some of these and will also introduce some basic system configuration.

2.4.1. setting the hostname

Setting the hostname is a simple as changing the **/etc/hostname** file. As you can see here, it is set to **localhost.localdomain** by default.

```
[root@localhost ~]# cat /etc/hostname
localhost.localdomain
```

You could do **echo server33.netsec.local** > /**etc/hostname** followed by a **reboot**. But there is also the new **CentOS 7** way of setting a new hostname.

```
[root@localhost ~]# nmtui
```

The above command will give you a menu to choose from with a **set system hostname** option. Using this **nmtui** option will edit the **/etc/hostname** file for you.

```
[root@localhost ~]# cat /etc/hostname
server33.netsec.local
[root@localhost ~]# hostname
server33.netsec.local
[root@localhost ~]# dnsdomainname
netsec.local
```

For some reason the documentation on the **centos.org** and **docs.redhat.com** websites tell you to also execute this command:

[root@localhost ~]# systemctl restart systemd-hostnamed

2.5. Virtualbox network interface

By default **Virtualbox** will connect your virtual machine over a **nat** interface. This will show up as a 10.0.2.15 (or similar).

```
[root@server33 ~]# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
    link/loopback 00:00:00:00:00 brd 00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast s\
tate UP qlen 1000
    link/ether 08:00:27:1c:f5:ab brd ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic enp0s3
       valid_lft 86399sec preferred_lft 86399sec
    inet6 fe80::a00:27ff:fe1c:f5ab/64 scope link
       valid_lft forever preferred_lft forever
```

You can change this to **bridge** (over your wi-fi or over the ethernet cable) and thus make it appear as if your virtual machine is directly on your local network (receiving an ip address from your real dhcp server).



You can make this change while the vm is running, provided that you execute this command:

```
[root@server33 ~]# systemctl restart network
[root@server33 ~]# ip a s dev enp0s3
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast s\
tate UP qlen 1000
    link/ether 08:00:27:1c:f5:ab brd ff:ff:ff:ff:ff
    inet 192.168.1.110/24 brd 192.168.1.255 scope global dynamic enp0s3
      valid_lft 7199sec preferred_lft 7199sec
    inet6 fe80::a00:27ff:felc:f5ab/64 scope link
      valid_lft forever preferred_lft forever
[root@server33 ~]#
```

2.6. configuring the network

The new way of changing network configuration is through the **nmtui** tool. If you want to manually play with the files in **/etc/sysconfig/network-scripts** then you will first need to verify (and disable) **NetworkManager** on that interface.

Verify whether an interface is controlled by **NetworkManager** using the **nmcli** command (connected means managed bu NM).

[root@server33 ~]# nmcli dev status
DEVICE TYPE STATE CONNECTION
enp0s3 ethernet connected enp0s3
lo loopback unmanaged --

Disable **NetworkManager** on an interface (enp0s3 in this case):

echo 'NM_CONTROLLED=no' >> /etc/sysconfig/network-scripts/ifcfg-enp0s3

You can restart the network without a reboot like this:

[root@server33 ~]# systemctl restart network

Also, forget **ifconfig** and instead use **ip a**.

```
[root@server33 ~]# ip a s dev enp0s3 | grep inet
    inet 192.168.1.110/24 brd 192.168.1.255 scope global dynamic enp0s3
    inet6 fe80::a00:27ff:fe1c:f5ab/64 scope link
[root@server33 ~]#
```

2.7. adding one static ip address

This example shows how to add one static ip address to your computer.

[root@server33 ~]# nmtui edit enp0s3

In this interface leave the IPv4 configuration to automatic, and add an ip address just below.

<Hide>

IPv4 CONFIGURATION <Automatic> Addresses 10.104.33.32/16_____ <Remove>

Execute this command after exiting **nmtui**.

[root@server33 ~]# systemctl restart network

And verify with **ip** (not with **ifconfig**):

```
[root@server33 ~]# ip a s dev enp0s3 | grep inet
    inet 192.168.1.110/24 brd 192.168.1.255 scope global dynamic enp0s3
    inet 10.104.33.32/16 brd 10.104.255.255 scope global enp0s3
    inet6 fe80::a00:27ff:fe1c:f5ab/64 scope link
[root@server33 ~]#
```

2.8. package management

Even with a network install, **CentOS 7** did not install the latest version of some packages. Luckily there is only one command to run (as root). This can take a while.

```
[root@server33 ~]# yum update
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
* base: centos.weepeetelecom.be
* extras: centos.weepeetelecom.be
* updates: centos.weepeetelecom.be
Resolving Dependencies
--> Running transaction check
---> Package NetworkManager.x86_64 1:0.9.9.1-13.git20140326.4dba720.el7 \
will be updated
... (output truncated)
```

You can also use **yum** to install one or more packages. Do not forget to run **yum update** from time to time.

```
[root@server33 ~]# yum update -y && yum install vim -y
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
* base: centos.weepeetelecom.be
... (output truncated)
```

Refer to the package management chapter for more information on installing and removing packages.

2.9. logon from Linux and MacOSX

You can now open a terminal on Linux or MacOSX and use **ssh** to log on to your virtual machine.

```
paul@debian8:~$ ssh root@192.168.1.110
root@192.168.1.110's password:
Last login: Sun Nov 2 11:53:57 2014
[root@server33 ~]# hostname
server33.netsec.local
[root@server33 ~]#
```

2.10. logon from MS Windows

There is no **ssh** installed on MS Windows, but you can download **putty.exe** from **http:// www.chiark.greenend.org.uk/~sgtatham/putty/download.html** (just Google it).

Use **putty.exe** as shown in this screenshot (I saved the ip address by giving it a name 'server33' and presing the 'save' button).

😵 PuTTY Configuration 🛛 🔀					
Category:					
⊟- <mark>Session</mark> Logging	Basic options for your PuTTY se	ession			
Terminal	Host Name (or IP address)	Port			
── Bell ── Features ── Window	Connection type:				
Appearance Behaviour Translation Selection Colours	Load, save or delete a stored session Saved Sessions server33				
 Connection Data Proxy Telnet Rlogin 	server33	Save Delete			
ssн Serial	Close window on exit: O Always O Never O Nover				
About	Open	Cancel			

The first time you will get a message about keys, accept this (this is explained in the ssh chapter).



Enter your userid (or root) and the correct password (nothing will appear on the screen when typing a password).



Index