Get VirtualBox

Go to www.virtualbox.org and select Downloads.

Download the current release* of VirtualBox for the OS on which you will install VirtualBox. In these notes, that's Windows 7.

Note:

- the OS on which you will install VirtualBox is called the host OS.
- the OS you will install on VirtualBox (later) is called the *guest OS*.

In these notes, I have a Windows 7 host and a CentOS guest.

Download the VirtualBox Extension Pack.

* These notes are based on VirtualBox 4.3.28 and CentOS 7.

Begin the VirtualBox Installation

Run the VirtualBox installer. The first few screens are typical and probably do not require you to make any changes to the default options:



📴 Oracle VM VirtualBox 4.3.28 Setup	×
Custom Setup Select the way you want features to be installed.	
Click on the icons in the tree below to change the way features will be installed.	
VirtualBox Application VirtualBox USS Support VirtualBox Network VirtualBox Provide VirtualBox Provide	
Version 4.3.28 Disk Usage < Back Next > Cancel	

글 Oracle VM VirtualBox 4.3.28 Setup	×
Custom Setup	
Select the way you want features to be installed.	
Please choose from the options below:	
Create a shortcut on the desktop	
Create a shortcut in the Quick Launch Bar	
Register file associations	
Version 4.3.28	ancel



📴 Oracle VM VirtualBox 4.3.28 Setup	
Ready to Install	
The Setup Wizard is ready to begin the Custom installation.	
Click Install to begin the installation. If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.	
Version 4.3.28 Cancel	

🖶 Oracle VM VirtualBox 4.3.28 Setup	
Oracle VM VirtualBox 4.3.28	
Please wait while the Setup Wizard installs Orade VM VirtualBox 4.3.28. take several minutes. Status: Validating install	This may
Version 4.3.28	Cancel

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You may be prompted about installing various components relating to USB support and networking:



My advice is to just select "Always trust..." and let it go...

Begin the VirtualBox Installation

Once the base installation is complete, VirtualBox will start:

r iie	wachine	Theip			1
-M3	<u></u>	**	Contents	F1	
New	Settings	٢	VirtualBox Web Site		Details 🔮 Snapshots
	Ubuntu1		Reset All Warnings		eneral 📃 Preview
\sim	Power	₽	Network Operations Manager		CentOS 6.4 64-bit
64	CentOS (G	Check for Updates		ng System: Red Hat (64 bit)
	O Power	1	About VirtualBox		ystem
	l	_		Base M Boot O Acceler	wemory: 2048 MB Tofer: Flopy, CD/DVD, Hard Disk ration: VT-X/AMD-V, Nested Paging, PAE/NX
					Display
				Video M Acceler Remoti Video (Memory: 128 MB ration: 3D te Desktop Server: Disabled Capture: Disabled
				🙆 s	Storage
				Contro IDE S Contro SATA	oller: IDE econdary Master: [CD/DVD] Empty Dier: SATA Port 0: CentOS 6.4 64-bit.vdi (Normal, 32.00 GB)
				D .	Audio
				Host D Contro	Driver: Windows DirectSound oller: ICH AC97
				🗗 N	Network
				Adapte	er 1: Intel PRO/1000 MT Desktop (NAT)
				🤌 u	USB
				Device	e Filters: 0 (0 active)
				_ s	Shared folders
				Shared	d Folders: 1
				9 0	Description
				None	

Choose Help/Check for Updates... this should offer to download the current version of the VirtualBox Extension Pack... do so...



... and install it...

If this doesn't happen automatically, go to the VirtualBox site, download the Extension Pack, and run the installer manually... see next slide...

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Computer Organization

Install the VirtualBox Extensions

VirtualBox/CentOS Setup 5

Select File/Preferences...

🮯 Oracle VM Virtu	ialBox Manager 📃 💻 🌉
File Machine H	lelp
Virtual Media	Manager Ctrl+D
🔊 Import Applia	ance Ctrl+I
🚯 Export Applia	ance Ctrl+E
& Preferences.	Ctrl+G CentOS65
vs v Exit	Ctrl+Q Red Hat (64 bit)
	Base Memory: 4096 MB Boot Order: Floppy, CD/DVD, Hard Disk Acceleration: VT-x/AMD-V, Nested Paging, PAE/NX
	Display
	Video Memory: 128 MB Acceleration: 3D Remote Desktop Server: Disabled Video Capture: Disabled
	Storage
	Controller: IDE IDE Secondary Master: [CD/DVD] Empty Controller: SATA SATA Port 0: CentOS65.vdi (Normal, 32.00 GB)
	🚱 Audio
	Host Driver: Windows DirectSound Controller: ICH AC97
	P Network
	Adapter 1: Intel PRO/1000 MT Desktop (NAT)
	🖉 USB
	Device Filters: 1 (1 active)
	Shared folders
	Shared Folders: 1
	Description
	None
Display the global	settings window

Select Extensions...

🄗 VirtualBox - Se	ettings ? X
📃 General	General
🖲 Input	Default Marking Falders
🕑 Update	
Language	VRDP Authentication Library: 🔤 VBoxAuth 🔻
🗵 Display	
P Network	
Extensions	
Proxy	
	OK Cancel Help

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Select Add Package (not shown) and find the VirtualBox Extensions file you downloaded earlier.

Select Upgrade and let the installation proceed...





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Starting VirtualBox

When the installation completes, you can run VirtualBox for the first time:



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Computer Organization

Creating a Virtual Machine

VirtualBox/CentOS Setup 8



Computer Organization

Configuring Memory for the VM

Specify the amount of memory you'll give the VM.

In this example, I'm installing on a host machine with 8GB of RAM; with less, I'd probably given the VM 1GB.

On my current working laptop, I have 10GB of RAM and gave my VM 4GB.



Computer Organization

Configuring a Virtual Hard Disk

In the next dialog, select the option to create a new virtual hard drive now.

Take the default hard drive file type in the next dialog unless you're concerned about being compatible with some other virtualization tool like VMWare.



Next, I recommend choosing a fixed-size hard disk.

Computer Organization

Configuring a Virtual Hard Disk

I generally make this 32GB, but make it smaller if you're short on space.



🧊 Create Virtual	Hard Drive: Creating fixed medium storage unit 'C:\Users\in\VirtualBox VMs\CentOS	; 7	×
	Creating fixed medium storage unit 'C:\Users\in\VirtualBox VMs\CentOS 7 64-bit\CentOS 7	64-bit.\ 3%	′di' ★

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An Empty VM

Now, you have an empty virtual machine (I already had other VMs fully set up).

That is, a formatted (virtual) hard disk and no OS.



VM Settings

There are a couple of crucial VM settings; right-click on your VM and bring up the Settings dialog:

🥝 CentOS 7 64-bit - S	ettings	? ×	Under Display, enable 3D
 General System Display Storage Audio Network Serial Ports USB Shared Folders 	General Basic Advanced Description Snapshot Folder: Image: C:\Users\in\VirtualBox VMs\CentOS 7 64-bit\Snapshots Shared Clipboard: Bidirectional ▼ Drag'n'Drop: Host To Guest ▼ Removable Media: Image: Remember Runtime Changes Mini ToolBar: Show in Fullscreen/Seamless Show at Top of Screen	• 54-bit - Se	Acceleration.
	OK Cancel	Help k	Display Video Remote Display Video Capture Video Memory: 128 * MB 1MB 128 MB 1 Monitor Count: 1 8 1 8 8
Under C make th Bidirect	General/Advanced, he shared clipboard ional, and enable	 USB Shared Folders 	Charles Cancel 20 Video Acceleration OK Cancel Help

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CentOS matches the department's servers, including the rlogin cluster, so that is what you should install.

You'll have to select a 32-bit or a 64-bit version.

A 64-bit version gives you a few more options, and that's what we're running on our servers, so I recommend the 64-bit version.

If you install a 32-bit version, you won't be able to run any 64-bit code on it.

If you install a 64-bit version, you won't be able to build any 32-bit executables on it unless you install some additional packages.

Whatever you choose, download an ISO file (CD or DVD). You don't need to burn a physical disk.

Disclaimer: the following notes illustrate one session installing CentOS 7 on VirtualBox 4.3.28, running on Windows 7 Enterprise, on a particular underlying hardware system. YMMV. Mine certainly has...

Preparation

Go to centos.org, use the Get CentOS link at the top of the page, and select the link for the distribution option you want (I recommend DVD ISO):



Choose a mirror for downloading; I recommend one from VT:

http://mirror.compevo.com/centos/7/isos/x86_64/CentOS-7-x86_64-DVD-1503-01.iso http://mirror.trouble-free.net/centos/7/isos/x86_64/CentOS-7-x86_64-DVD-1503-01.iso http://mirror.supremebytes.com/centos/7/isos/x86_64/CentOS-7-x86_64-DVD-1503-01.iso http://mirror.hmc.edu/centos/7/isos/x86_64/CentOS-7-x86_64-DVD-1503-01.iso http://mirror.vtti.vt.edu/centos/7/isos/x86_64/CentOS-7-x86_64-DVD-1503-01.iso ftp://ftp.uci.edu/mirrors/centos/7/isos/x86_64/CentOS-7-x86_64-DVD-1503-01.iso

Beginning the Installation



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VirtualBox will recognize the empty system and prompt you to select an installation disk.

Click the folder icon and select your CentOS ISO file; then click Start...

CentOS 7 64-bit [Powered Off] - Oracle VM VirtualBox		-		
Machine View Devices Help				
Select start-up disk Please select a virtual optical disk file or a physical optical drive containing a disk to start your new virtual machine from. The disk should be suitable for starting a computer from and should contain the operating system you wish to install on the virtual machine if you want to do that now. The disk will be ejected from the virtual drive automatically next time you switch the virtual machine off, but you can also do this yourself if needed using the Devices menu. Host Drive 'V:'	ne		Select Please contair The dis contair if you to drive a you ca CentO	t start-up disk select a virtual optical disk file or a physical optical drive ing a disk to start your new virtual machine from. k should be suitable for starting a computer from and should the operating system you wish to install on the virtual machine want to do that now. The disk will be ejected from the virtual utomatically next time you switch the virtual machine off, but n also do this yourself if needed using the Devices menu. S-7-x86_64-DVD-1503-01.iso (4.01 GB)
🛛 💿 💿 🖉 🖓 🖓	🔳 🛄 [3	Right Ctrl	

Computer Organization

Running the Installation Code

The following sequence of screen shots are mostly self-explanatory...



Select Install CentOS 7...

... and it grinds away awhile...

Computer Organization

Running the Installation Code



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Computer Organization

This will be the virtual harddrive you just created... take the defaults.

CentOS 7 64-bit [Running] - Oracle VM VirtualBox		
Machine View Devices Help		
The Virtual Machine reports that the guest QS does not support mouse pointer integration in the current video mode. You need to capture the	e mouse (by clicking over the VM	display or pressing A T 🙆 🕅
Done	🖽 us	Help!
Device Selection		
Select the device(s) you'd like to install to. They will be left untouched until you click on the main me	enu's "Begin Installatio	n" button.
Local Standard Disks		
32 GiB		
ATA VBOX HARDDISK		
sda / 32 GiB free		
	Disks left unselected h	ere will not be touched.
Specialized & Network Disks		
Add a disk		
	Disks left unselected h	ere will not be touched.
Other Storage Options		
Partitioning		
O Automatically configure partitioning. I will configure partitioning.		
I would like to make additional space available.		
Encryption		
Encrypt my data. You'll set a passphrase later.		
Full disk summary and boot loader	1 disk selected; 32 G	iB capacity; 32 GiB free
	D 💿 🌶 루 🗔	📾 🔟 🛛 🎯 💽 Right Ctrl

Here, I prefer the GNOME desktop and I want to be sure that I install the development tools (compiler, etc).



Make other choices as you like... more packages can be installed later.

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Continue Installation

Fire up the installat	ion routine		
CentOS 7 64-bit [Run Machine View Devi	ning] - Oracle VM VirtualBox ces Help		
The Virtual Machine report	s that the guest OS does not support mouse pointer integration in the current video mode	. You need to capture the mouse (by dicking over the VM) display or pressing A T a two	
CentOS	LOCALIZATION	us Help:	
	DATE & TIME Americas/New York timezone	KEYBOARD English (US)	
	LANGUAGE SUPPORT English (United States)		
	SOFTWARE		/
	INSTALLATION SOURCE Local media	SOFTWARE SELECTION GNOME Desktop	
	SYSTEM		
	INSTALLATION DESTINATION Automatic partitioning selected	KDUMP Kdump is enabled	
	Network & Host Name Not connected		
		Quit Begin Installation	
		We won't touch your disks until you click 'Begin Installation'.	

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Computer Organization

root and User Account Setup



Other Settings

Eventually you should see the completion screen (it takes awhile, depending on how many software packages you chose, the speed of your machine, etc).



Now, you need to restart the virtual machine...

Login Screen

The restart will bring you to the login screen:





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Initial Options

CentOS starts with some basic language and keyboard configuration:



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GNOME Help

On first startup, you'll be offered help for the Linux environment:



Ignore this or explore it, as you like...

Starting the Network



Computer Organization

I recommend running a general software update at this point.

Go to the Application/?? menu and pick software update...



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Software Updates

I'd just install ALL of them at this point... it will take awhile...



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Authorizing Updates

Now, you DO remember the root password you set earlier... right?



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First Completion...

Things should proceed automatically until a restart is needed.

To restart or shutdown, go to the user menu and select Power Off...



Computer Organization

The VirtualBox Guest Additions provide additional functionality for your VM.

One note: until you install the VirtualBox Extension Pack (slide 5) and the Guest Additions, some things like mouse capture and scaled displays may not work.

Another note: if you run the system updater or install other software on your VM, you may have to reinstall the Guest Additions.

VirtualBox Guest Additions

The CD image is included in the VirtualBox installation package.

You must mount the CD image:



CentOS should recognize the installer once the image is mounted:



Computer Organization

Pay attention to the console window during the installation.

If there are error messages, the Guest Addition may not have been installed properly.



As you use your CentOS system, you'll probably discover new tools you'd like that are not included by default.

In most cases, if you know the name of the software package you'd like to install, you can do so by running the yum tool. yum has many options and you should skim its man page.

For instance, we can use yum to determine what version of a package is installed:

```
wdm@Centos65 ~]$ yum list installed gcc
Loaded plugins: fastestmirror, refresh-packagekit, security
Determining fastest mirrors
 * base: mirror.trouble-free.net
 * extras: mirrors.einstein.yu.edu
 * updates: mirrors.advancedhosters.com
                                              | 3.7 kB
base
                                                           00:00
                                              | 3.4 kB 00:00
extras
updates
                                              | 3.4 kB
                                                           00:00
Installed Packages
gcc.x86 64 4.4.7-4.el6
                           @anaconda-CentOS-201311272149.x86 64/6.5
[wdm@Centos65 ~]$
```

We can use yum to install or update a package:

```
[wdm@Centos65 ~]$ yum install tree
                                                  You need to be
                                                  root to install or
You need to be root to perform this command.
[wdm@Centos65 ~]$ su
                                                  update a package:
Password:
                                                  Now I am root ...
[root@Centos65 wdm]# yum install tree
                                                  bwa ha ha!
Setting up Install Process
Resolving Dependencies
--> Running transaction check
---> Package tree.x86 64 0:1.5.3-2.el6 will be installed
--> Finished Dependency Resolution
Transaction Summary
_____
Install 1 Package(s)
                                            yum has determined what
Total download size: 36 k
                                            needs to be installed.
Installed size: 65 k
                                            shown me that info, and
Is this ok [y/N]: y
                                            now wants confirmation...
```

VirtualBox/CentOS Setup 38

We can use yum to install or update a package:

```
Downloading Packages:
tree-1.5.3-2.el6.x86 64.rpm
   36 kB
             00:00
Running rpm check debug
Running Transaction Test
Transaction Test Succeeded
Running Transaction
  Installing : tree-1.5.3-2.el6.x86 64
1/1
 Verifying : tree-1.5.3-2.el6.x86 64
1/1
Installed:
  tree.x86 64 0:1.5.3-2.el6
Complete!
[root@Centos65 wdm] # exit
exit
[wdm@Centos65 ~]$
```

yum triggers the installation..

Now I will cease to be root

that much privilege can be

dangerous.

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Sometimes yum cannot find a package:

```
[root@Centos65 wdm]# yum install geany
Loaded plugins: fastestmirror, refresh-packagekit, security
. . .
No package geany available.
Error: Nothing to do
[root@VMCentOS64 wdm]#
yum queries a collection of online
repositories... in this case it doesn't
find the package I wanted.
```

It's possible to direct yum to search additional repositories. See a good Linux reference or the man pages for more information.

Adding a Repository

<pre>[wdm@localhost ~]\$ su Password: [root@localhost wdm]# yum i</pre>	nstall	epel-release	
Package Repository	Size	Arch	Version
Installing: epel-release extras	14 k	noarch	7-5
Transaction Summary			
Install 1 Package Total download size: 14 k Installed size: 24 k		Here, I'm adding and repository to those y	o <mark>ther common</mark> rum queries.
Is this ok $[y/d/N]$: y			

Installing Geany

<pre>[root@localhost wdm]# yum install geany Dependencies Resolved</pre>			Here, I'm installing a programmer's editor, geany.			
Package	Arch	Version	Repository	Size		
Installing: geany	x86_64	1.24.1-1.el7	epel	====== 3.6 M		
Installing for vte	dependencies: x86_64	0.28.2-10.el7	epel	361 k		
Transaction Sur	nmary					
======================================						
Total download Installed size: Is this ok [y/c 	size: 3.9 M : 15 M d/N]: y					

Additional Stuff: Geany

geany is a programmer-oriented editor:



It's my (current) favorite text editor for programming on Linux.

It's also available for Windows.

Computer Organization

Additional Stuff: KDE Desktop

If CentOS 7 runs very slowly on your VM, you may find that performance is vastly enhanced if you switch from the GNOME desktop environment to KDE.

As root, issue the following command:

```
yum groupinstall "KDE Plasma Workspaces"
```

The installation takes awhile, but I found CentOS 7 ran much faster.

When you log in, you can click on the gear icon to get a drop list of choices for your desktop.

P wil	liam D McQuain
Password:	
Cancel	Sign In
	Session
	KDE Plasma Workspace
	KDE Plasma Workspace (failsafe session)
	GNOME
	GNOME Classic
	Custom
4	

Computer Organization

Shared Folders

The most efficient way to transfer files between your VM and the host OS is to set up a shared folder that both OSes can see.

Pick the folder you want to share; I'll use E:\share on my Win7 host.

In the VirtualBox Manager, click on Shared Folders and select the Add Folder button, then enter the path to the shared folder and make it permanent:

Folder Path: E:\share Folder Name: share Read-only Auto-mount Audio Make Permanent OK Cancel Shared Folders Shared Folders Eders List Machine Folders Share E\share Full Transient Folders	Add Share	CentOS 7 64-bit - Settings	? X
OK Cancel Help	Folder Path: E:\share Folder Name: share Read-only Auto-mount Make Permanent OK Cancel	 General System Display Storage Audio Network Serial Ports ✓ USB Shared Folders 	Access

Computer Organization

Shared Folders

Then, in CentOS become root and execute the commands:

```
mkdir /media/windows-share
mount.vboxsf share /media/windows-share
```

The first command creates a directory on your CentOS installation.

The second command links that directory to the one you selected earlier.