

A Guide to Getting Started with FreeBSD on Virtual and Real Hardware

By **Roller Angel**

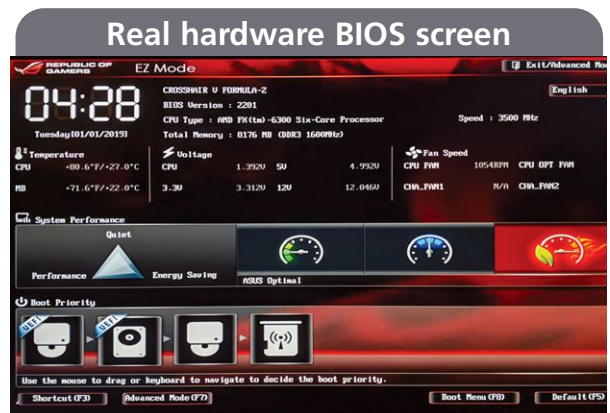
Getting started with FreeBSD is easy and there is a variety of choices as to where you can install and run FreeBSD. We will stick to two common-use cases, installation in a virtual machine and installation on real hardware— in this case an amd64 desktop computer.



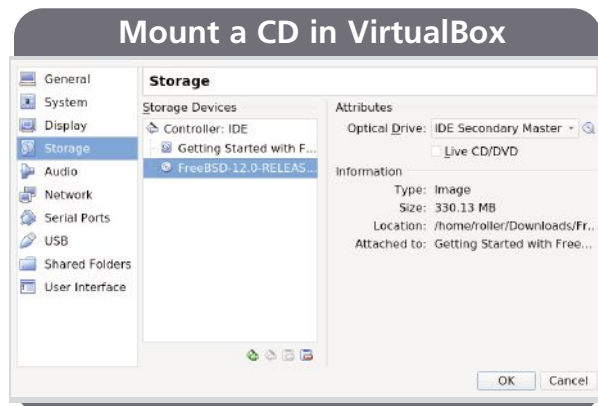
To begin, we can simply visit FreeBSD.org on a working computer and look for the big “Download FreeBSD” button near the awesome beastie logo. Once on that page, you will need to select the proper image from the list of “Installer Images.” We’ll choose “amd64.” Next, we’ll pick the image called FreeBSD-12.0-RELEASE-amd64-bootonly.iso from the list because it’s the latest RELEASE version of FreeBSD and is quite small. I highly recommend you also take a look at the CHECKSUM.SHA512-FreeBSD-12.0-RELEASE-amd64 file and do your own SHA512 checksum verification after you have downloaded the file to see if they match. If so, you know that your download worked properly.

Once the installer image has been downloaded, it is ready to be used to boot up the virtual machine. On real hardware, there are a few extra steps. Turn the .iso into a real CD by burning it and selecting a boot device on startup. We’ll assume your real hardware has a CD Drive and that you burned the .iso file to a CD and put it into the drive. When you first boot the computer, a BIOS screen controls which device is used to start the machine. To change this device to the installer CD, you may need to consult the manual for the computer. On most computers, you can try booting and then immediately pressing F8 repeatedly until a “Boot Device Selection” menu appears. Select the proper device from the list to start the Installer. We selected the UEFI version of the CD device, in this case, a Pioneer BDR-205 disc reader/writer.

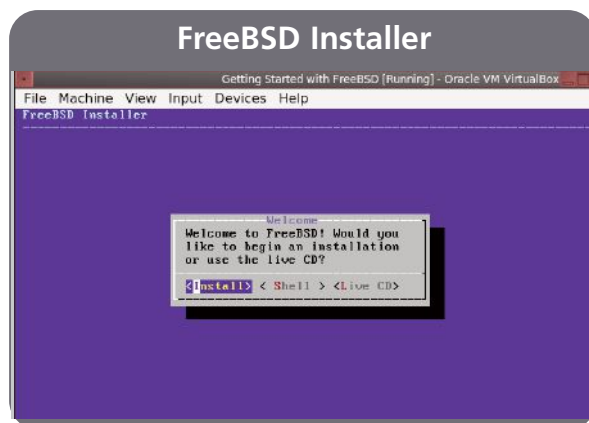
In VirtualBox, click the “New” button to start the



wizard that will walk you through creating a virtual machine. The important options to keep in mind are the type of OS—we'll choose FreeBSD 64 bit, and the amount of RAM to dedicate to the virtual machine. Use some amount greater than 512MB and less than any number that puts your virtualbox wizard "slider" into the red. Keep your "slider" in the green, and you should be fine giving the machine a decent amount of memory to work with. Accept the defaults for the other settings. Once the wizard completes, you can start up the virtual machine. Another wizard will appear asking you to point VirtualBox to the installer image for the new virtual machine. If you'd like to avoid this second wizard, simply edit the virtual machine settings before first boot, clicking on the "Storage" link, then the "Empty Disc" section, and then you can mount the virtual image on that screen. All of these steps in VirtualBox equate to assembling the hardware and inserting the installer CD. Pressing "Start" in VirtualBox is like pressing the "Power" button to boot up a real machine.



On first boot of the install CD you are welcomed to FreeBSD and asked if you would like to begin an installation. Select "Install" by pressing "Enter/Return" on the keyboard.



At this point, you will have noticed VirtualBox trying to explain it is capturing your mouse and keyboard to be used inside the virtual machine. Go ahead and dismiss these messages. To use the mouse and keyboard outside of the virtual machine again, you need to press the host key. VirtualBox displays the current host key in the bottom right of the window.

This install says "Right Ctrl," which means you need to press the right control button on the keyboard first to get back control over the mouse and keyboard from the virtual machine.

Continue through the installer with the following in mind: for this install, we'll continue with the default US keyboard layout, name the computer "getting-started-with-freebsd," and select the default settings on the "Distribution Select" screen by just pressing "ok." For the "Network Configuration" section, we went with the "em0" interface on the virtual machine and the "re0" interface on the real hardware. Yes, configure IPv4. Yes, use DHCP. Yes, use IPv6. Yes, try SLAAC. The resolver configuration should be populated with at least one DNS value. Use the "Tab" key on the keyboard to move to select "ok" to continue. For the "Mirror Configuration," we used "Main Site." Next, we need to decide how to partition the disc. On the "Partitioning" screen, there are options for Auto (ZFS) and Auto (UFS).

• ZFS Version

Select Auto (ZFS), choose stripe as the ZFS pool type and select the disc to use for the pool with the space-bar, name the pool, and proceed with installation. Finally, agree to install FreeBSD by selecting "Yes."

• UFS Version

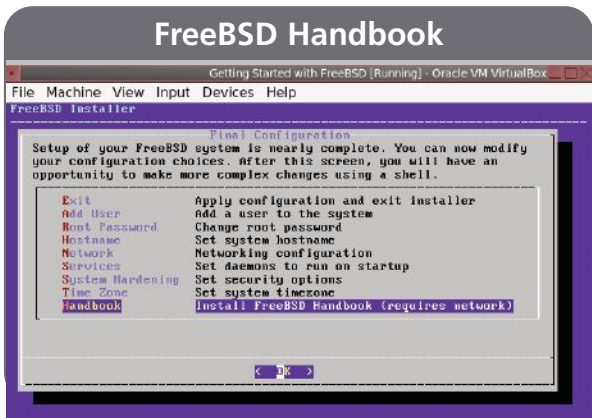
Select Auto (UFS), use the entire disc, select GPT for the partition scheme, and select "Finish" when shown the disk layout. Finally, agree to erase the computer and install FreeBSD by choosing "Commit."

• User Accounts

Set a password for the root account on the system. Don't fret when there are no *** appearing while typing in your root password. Rest assured, the keystrokes are being recorded; they're just not being shown on the screen.

For the "Time Zone" section we went with "America – North and South, United States of America," "Mountain (most areas)," "Skip" on both "Time & Date" screens.

For the "System Configuration" section, we unselected "ssh," selected "powerd" and chose "ok." On the next screen, we selected "9 secure_console" to put the root password prompt on any attempt to enter Single User Mode at the system console.



Say “yes” to the prompt about adding a new user. Use an all lowercase username. Enter the users “Full name.” Add the user account to the groups wheel operator video by responding to the question “Login group is .. Invite .. into other groups? []:” with `wheel operator video`, then press “Enter.” Users in the wheel group can run “privileged” commands. The operator group allows users to do things like shut down and restart the computer without needing to invoke the special privileges from the wheel group. It's a good idea to add users to the video group that is planning on using FreeBSD as a desktop. We chose “tcsh” for our shell and used defaults for the other fields while finally providing an account password. If all looks ok, proceed without creating any more user accounts.

For the “Final Configuration” section, select “Handbook.”

We went with the default of “en” and chose “ok.” Once back on the configuration screen, select “Exit” to finish and “yes” to proceed with doing manual configuration. The only manual configuration we need to do is to shut down the machine so we can take out the CD. On the real machine, you will need power to take out the CD, so go ahead and remove the CD now. On the virtual machine, the power needs to be off to not get an error when removing the CD, so we'll issue the shutdown command below to turn off the computer.

Type either “init 0” or “shutdown -p now” to shut down.

To take a CD out of a virtual machine in VirtualBox, click on the name of the virtual machine, click on “Settings,” click on “Storage,” and click on the tiny CD icon. Notice another tiny CD icon with a tiny down arrow below it next to the “Optical Drive” section. Use this second CD icon to “Remove Disk from Virtual Drive.” Now “Start” the machine and continue.

● Package Installation / Text Configuration

Boot up the computer and log in as the root user.

Type the following commands on the virtual machine:

```
pkg install -y xorg sudo lumina sakura virtualbox-ose-additions firefox
sysrc vboxquest_enable=YES
sysrc vboxservice_enable=YES
```

Type the following command on the real machine:

```
pkg install -y xorg sudo lumina sakura firefox
```

Type the following commands on either machine:

```
visudo (this command launches the vi text editor).
```

Type the following to edit the one line of text and get out of the editor:

```
/wheel
```

Type enter or hit return and then type

```
j0xxZZ (once you hit the first search term, j goes down, 0 goes to the beginning of the line,
xx deletes the comment, ZZ saves and quits vi)
sysrc dbus_enable=YES
dbus-uuidgen > /etc/machine-id
service dbus start
```

Change to regular user by holding down “control” and pressing “d” on the keyboard which will log out the current user. Log in again, this time as the regular user account that was created. Next type the following commands.

```
vi .xinitrc
```

Again the vi editor, and to begin typing you need to be in “insert mode” and must press “I” to enter insert mode and begin typing in text. Type in the following one-line configuration:

```
exec start-lumina-desktop
```

Exit vi by pressing “Esc” on the keyboard, then type ZZ or :wq followed by “Enter/Return.” At this point the virtual machine desktop can be started with the following command

```
startx
```

To get the real machine working, you will need to choose a display driver that works with the real hardware. We went with a basic non-3D accelerated graphics setup using the scfb display driver. To set it

up, type the following:

```
vi /usr/local/etc/X11/xorg.conf.d/  
driver-scfb.conf
```

Add the following lines of configuration to the file using "Esc" ZZ to exit when finished.

```
Section "Device"  
    Identifier "Card0"  
    Driver "scfb"  
EndSection
```

Now the real hardware machine's desktop can be started with the following command:

```
startx
```



• Desktop Configuration

Right click on the desktop > Preferences > All Desktop Settings

Under Appearance click on "Theme," then select "Icons" from the sidebar, then select "Material Design (light)," and click on "Apply." Close the "Theme Settings" window.

Go back to the "Desktop Settings" window and select "Window Manager." In the "Window Theme" drop-down menu, select "Twice." Click on "Save." Close the "Window Manager Settings" window.

Go back to the "Desktop Settings" window and select "Applications." Set the "E-mail Client" to Firefox and "Virtual Terminal" to Sakura. Close all the settings windows.

Right click on the desktop and select "Preferences" then "Wallpaper," click on the "+," and choose "solid color." We chose red for our color. Click "ok," then "Save."

• FreeBSD Handbook

Here is how to open a local copy of the handbook we installed in the Final Configuration:

Look for Firefox in the applications menu in Lumina.

Right click on the desktop > Applications > Network > Firefox Web Browser

Open Firefox and navigate to the following URL: <file:///usr/local/share/doc/freebsd/handbook/index.html>

This is a local copy of the FreeBSD Handbook, and it will always be available as it doesn't require an active internet connection.

That should get you started using FreeBSD. The next recommended step is to choose a firewall and configure it. There is a great FreeBSD Journal article in the May/June 2014 issue called "IPFW An Overview," which will help guide you through the process. Also, pick up a copy of the book *BSD Hacks* to get more familiar with the "tosh" shell as well as to acquire several new skills. ●



ROLLER ANGEL is an avid BSD user who enjoys all the amazing things that can be done with BSD technology. He has taught programming workshops based on FreeBSD and is working on building an online training platform for teaching BSD and related technologies. See [BSD.pw](#) for more information.



Contact Jim Maurer
with your article ideas.

(jmaurer@freebsdjournal.com)