

Create Ubuntu1 VM

Open VirtualBox

Create a new virtual machine

Use Ubuntu as the OS

128 MB of RAM

Dynamically expanding 8GB hard drive (default)

Make sure that "Use host I/O cache" is checked for the SATA controller

Edit configuration of VM

Leave Adapter 1 as NAT

Adapter 2 should be internal network intnet1

Disable USB controller

Disable audio

Install Ubuntu Server

Click start to boot for the first time and use Ubuntu Server 12.04 ISO file

Select Language

Install Ubuntu Server

Detect Keyboard Layout → No

Choose eth0 as the primary network interface

Host Name → ubuntu1

Username and password → Your First Name

Encrypt your home directory → No

Choose "Guided – use entire disk", no need for LVM

Write the changes to disk → Yes

Just hit enter when it asks about an HTTP proxy

No automatic updates

Choose to install the OpenSSH server

Install the grub boot loader → Yes

Create Ubuntu2 VM

If you know how to clone a VM and change MAC addresses of your network interfaces, do it.

Otherwise :

Do the same as VM Ubuntu1. Just set Adapter3 internal networking intnet2 and its Host Name ubuntu2.

On both Ubuntu VMs run these two commands:

"lshw -class network"

"cat /etc/udev/rules.d/70-persistent-net.rules"

Create FreeBSD VM

Create a new virtual machine

Use BSD as the OS and FreeBSD as the version

128 MB of RAM

Dynamically expanding 2GB hard drive (default)

After it is created, go to Setting → System → Check “Enable IO APIC”

Leave Adapter 1 as NAT

Adapter 2 should be internal network intnet2

Install FreeBSD

Click start to boot for the first time and use FreeBSD 9 ISO file

Boot FreeBSD

Select Install

Non default keyboard → No

Host name → freebsd

Partitioning → Guided , Entire Disk

Choose “Finish”

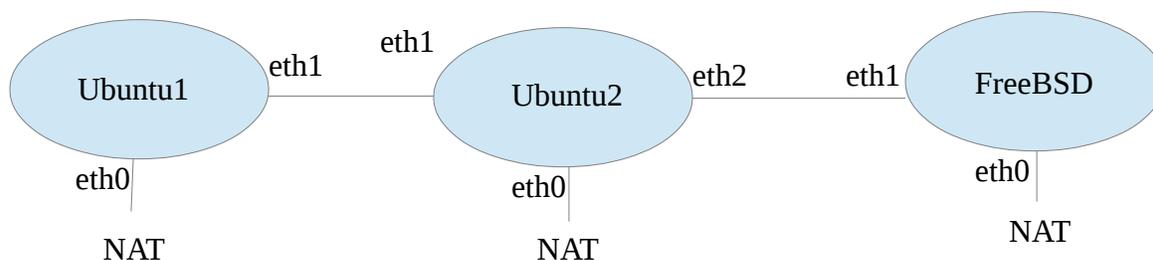
Choose “Commit”

Choose “Shell” on the next boot.

The Ubuntu Server 12.04.2 32-bit and FreeBSD 9 ISO files can be found in:

`/nfs/faculty/crandall/Public/`

No need to copy them, you can install from them directly as read-only CD images.



Leave eth1 and eth2 un-configured for now, each of your virtual machines should be able to get on the Internet using the NAT interface on eth0. You can test this with something like:

```
cd /tmp; wget google.com && less index.html
```

Once all three machines are on the Internet, make sure to install the updates. For Ubuntu the sequence is:

```
sudo apt-get update  
sudo apt-get dist-upgrade
```

For FreeBSD, do:

```
su root  
freebsd-update fetch  
freebsd-update install
```