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Submission Date: 02/13/21
Class Name and Term: CSE468 Spring 2022

Virtual Network Setup

# Project Overview

I am altering this project a little bit. I got permission to use Proxmox VE over VirtualBox. This was granted because I daily-drive an ARM based Mac that VirtualBox does not play nice with, and Proxmox VE has the same and more capability as VirtualBox. I have also decided to use 16.0.0.0/8 over 10.0.0.0/8 as my network block, as my internal home network (or as it will be referenced the rest of this doc, the outside world) is at 10.0.0.0/24, and I did not want to get confused or deal with any overlapping. To brag a little bit, this is unrelated: My x86 machine boots to Proxmox VE and hosts OpenWRT to do my networking stuff, with my motherboards two onboard NICs passed through to it via VFIO (best performance is to just give the virtual machine the physical hardware). This provides my VMs and IRL devices network access. I then have a Windows VM (that I actually could run Virtualbox in but that is no fun) that has my GPU passed through to it using VFIO. This is what I game in. There’s lots of other stuff too but those are the coolest ☺.

# Network Setup

* The network topology is actually very well documented in the config files below.

# Software

Anything that differed from how the lab walkthrough that I had to do will be documented here. I had to import the disk using the command ‘qm importdisk 203 Ubuntu-18.04-cli-with-tools.vmdk local-lvm’ 3 times, one for each VM (201, 202, and 203). This created 3 blocks in my local-lvm, each with the data from the vmdk, and each interface with each VM. I also had to create Linux Bridge vmbr5 (interface) to act as a virtual switch. Any additional functionality was not configured. Vmbr1 is also added to the gateway, since it is serving as a bridge to the outside world. When adding the switches to adapters, I had to configure the adapters to be Intel E1000 instead of the default VirtIO Paravirtualization.

# Project Description

I created each of the VMs as a typical Proxmox VM, except I left both storage and network unconfigured. I created two Linux Bridges, to act as switches, one for client to gateway, and another for server to gateway. I added the client to just the bridge created for it. I added the server to it’s respective bridge aswell. I added the gateway to both of those bridges, as well as a third to the outside world. I used the command mentioned in software to import the respective .vmdk to each VM, and then configured the disk interface to VirtIO SCSI (standard). After that, it was a matter of booting each VM and creating each netplan, and configuring system control to allow IP forwarding on the gateway and iptables to masquarde all requests as coming from the gateway itself. After this, I was able to SSH back into my laptop, scp’ed over the necessary config files, and deleted all the VMs.

# Conclusion

I love virtualization.

# Appendix B: Attached files

Gateway-netplan:

network:

 version: 2

 renderer: networkd

 ethernets:

 ens18:

 dhcp4: no

 addresses:

 - 192.168.0.100/24

 nameservers:

 addresses: [8.8.8.8, 8.8.4.4]

 ens19:

 dhcp4: yes

 nameservers:

 addresses: [10.0.0.1, 8.8.8.8, 8.8.4.4]

 ens20:

 dhcp4: no

 addresses:

 - 16.0.0.100/8

 nameservers:

 addresses: [8.8.8.8, 8.8.4.4]

client-netplan

network:

 version: 2

 renderer: networkd

 ethernets:

 ens18:

 dhcp4: no

 addresses: [192.168.0.10/24]

 gateway4: 192.168.0.100

 nameservers:

 addresses: [8.8.8.8, 8.8.4.4]

server-netplan

network:

 version: 2

 renderer: networkd

 ethernets:

 ens18:

 dhcp4: no

 addresses:

 - 16.0.0.10/8

 gateway4: 16.0.0.100

 nameservers:

 addresses: [10.0.0.1, 8.8.8.8, 8.8.4.4]

Proxmox VE VM conf files

201.conf

boot: order=scsi0

cores: 2

ide2: none,media=cdrom

memory: 2048

meta: creation-qemu=6.1.1,ctime=1644812692

name: gateway

net0: e1000=FA:9A:86:2E:FF:A2,bridge=vmbr5

net1: e1000=DE:CD:E4:1C:52:98,bridge=vmbr1

net2: e1000=6E:29:2B:5B:08:8A,bridge=vmbr6

numa: 0

ostype: l26

parent: first

scsi0: local-lvm:vm-201-disk-0,size=15G

scsihw: virtio-scsi-pci

smbios1: uuid=bdec6f56-8578-46e7-b722-515e40b4c0e0

sockets: 1

vmgenid: e73f20c2-4abc-4f2f-88d0-fb64ed0eed5f

[first] ##this is a reference to a snapshot of the same VM

boot: order=scsi0

cores: 2

ide2: none,media=cdrom

memory: 2048

meta: creation-qemu=6.1.1,ctime=1644812692

name: gateway

net0: virtio=FA:9A:86:2E:FF:A2,bridge=vmbr5

net1: virtio=DE:CD:E4:1C:52:98,bridge=vmbr1

numa: 0

ostype: l26

runningcpu: kvm64,enforce,+kvm\_pv\_eoi,+kvm\_pv\_unhalt,+lahf\_lm,+sep

runningmachine: pc-i440fx-6.1+pve0

scsi0: local-lvm:vm-201-disk-0,size=15G

scsihw: virtio-scsi-pci

smbios1: uuid=bdec6f56-8578-46e7-b722-515e40b4c0e0

snaptime: 1644814867

sockets: 1

vmgenid: e73f20c2-4abc-4f2f-88d0-fb64ed0eed5f

vmstate: local-lvm:vm-201-state-first

202.conf

boot: order=scsi0

cores: 2

ide2: none,media=cdrom

memory: 2048

meta: creation-qemu=6.1.1,ctime=1644812724

name: client

net0: e1000=92:EE:F3:8F:44:9B,bridge=vmbr5

numa: 0

ostype: l26

parent: first

scsi0: local-lvm:vm-202-disk-0,size=15G

scsihw: virtio-scsi-pci

smbios1: uuid=98da2f44-03d8-4e0e-bf6e-e8bd1fc75258

sockets: 1

vmgenid: 7a3ee1d3-b0e5-4bfb-9af3-4c29ccd7cd6d

[first]

boot: order=scsi0

cores: 2

ide2: none,media=cdrom

memory: 2048

meta: creation-qemu=6.1.1,ctime=1644812724

name: client

net0: virtio=92:EE:F3:8F:44:9B,bridge=vmbr5

numa: 0

ostype: l26

runningcpu: kvm64,enforce,+kvm\_pv\_eoi,+kvm\_pv\_unhalt,+lahf\_lm,+sep

runningmachine: pc-i440fx-6.1+pve0

scsi0: local-lvm:vm-202-disk-0,size=15G

scsihw: virtio-scsi-pci

smbios1: uuid=98da2f44-03d8-4e0e-bf6e-e8bd1fc75258

snaptime: 1644814878

sockets: 1

vmgenid: 7a3ee1d3-b0e5-4bfb-9af3-4c29ccd7cd6d

vmstate: local-lvm:vm-202-state-first

203.conf

boot: order=scsi0

cores: 2

ide2: none,media=cdrom

memory: 2048

meta: creation-qemu=6.1.1,ctime=1644812891

name: server

net0: e1000=26:50:4D:E9:DD:58,bridge=vmbr6

numa: 0

ostype: l26

parent: first

scsi0: local-lvm:vm-203-disk-0,size=15G

scsihw: virtio-scsi-pci

smbios1: uuid=80b34b01-3d62-45c8-91d0-ff3b8c339808

sockets: 1

vmgenid: c33b7aa1-e5d4-430e-8803-f2fccf1926d8

[first]

boot: order=scsi0

cores: 2

ide2: none,media=cdrom

memory: 2048

meta: creation-qemu=6.1.1,ctime=1644812891

name: server

net0: virtio=26:50:4D:E9:DD:58,bridge=vmbr5

numa: 0

ostype: l26

runningcpu: kvm64,enforce,+kvm\_pv\_eoi,+kvm\_pv\_unhalt,+lahf\_lm,+sep

runningmachine: pc-i440fx-6.1+pve0

scsi0: local-lvm:vm-203-disk-0,size=15G

scsihw: virtio-scsi-pci

smbios1: uuid=80b34b01-3d62-45c8-91d0-ff3b8c339808

snaptime: 1644814888

sockets: 1

vmgenid: c33b7aa1-e5d4-430e-8803-f2fccf1926d8

vmstate: local-lvm:vm-203-state-first

host /etc/network/interfaces

##Only applicable sections for my security

auto vmbr5

iface vmbr5 inet manual

 bridge-ports none

 bridge-stp off

 bridge-fd 0

#for cse468 lab1- gw to client

auto vmbr6

iface vmbr6 inet manual

 bridge-ports none

 bridge-stp off

 bridge-fd 0

#gw to server

# References

1. Proxmox VE Wiki, <https://pve.proxmox.com/wiki/Qemu/KVM_Virtual_Machines>, accessed 2/13/2022 (and many many other times in the past and future)