The Crux

Physical Components

To start with let me give some detail about my setup. In addition you should know that it does not matter one little bit about my setup. You will be able to use the commands and tweak configs to match whatever you are trying to accomplish. To repeat what I said in my intro page, once you have **ALL** the parts you will be able to do whatever you want, with ease.

Also keep in mind, it's going to take longer to read this page then it will be actually doing the work. Because of that, I am going to post a few scripts that I put together before I start digging in. I am able to blow my entire virtual host network away and just run these scripts, and I am back up and running in under 30 seconds. The scripts have all of the OVS commands, the host network configs, and the KVM virsh commands and xml configs to define the networks.

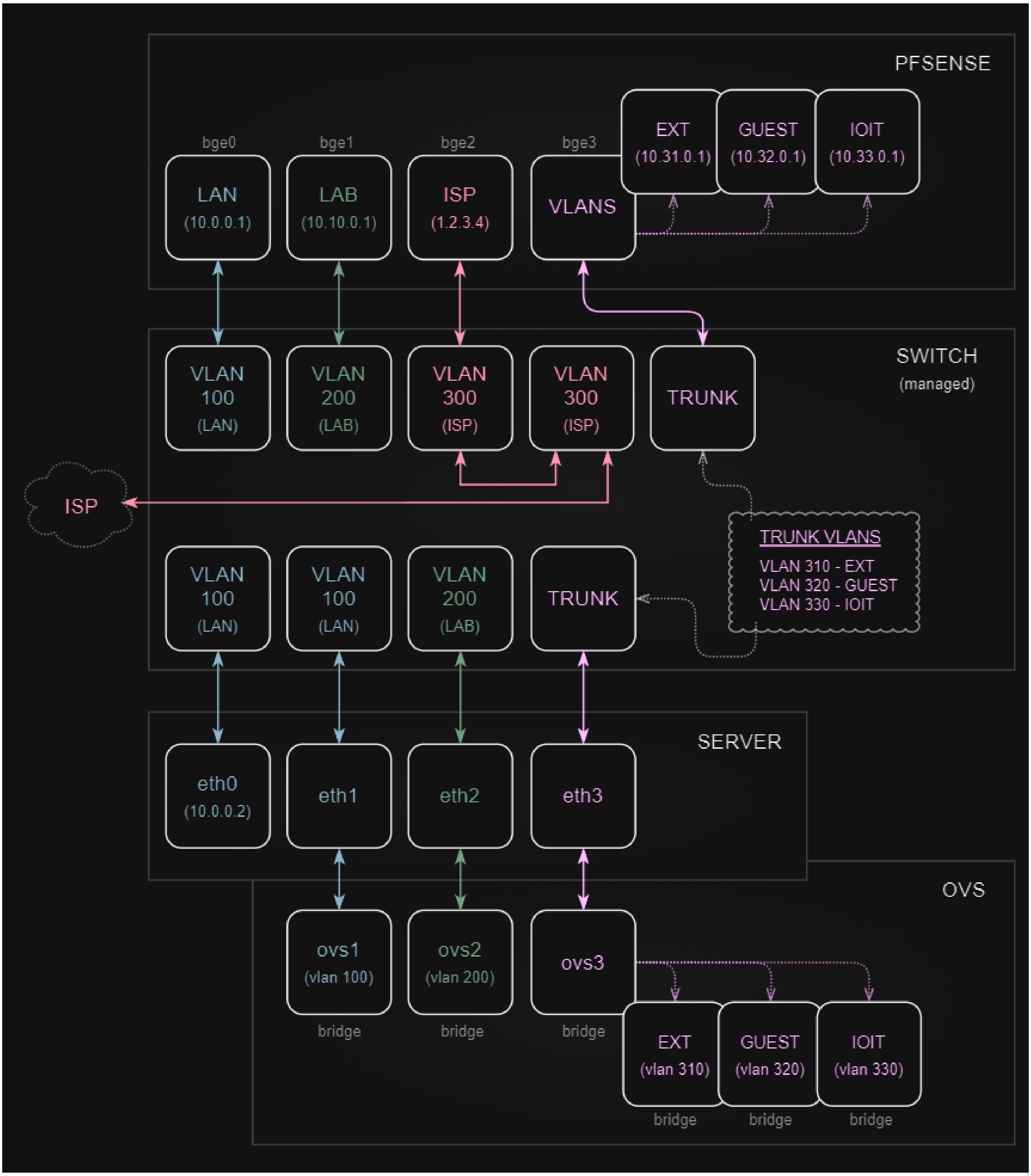
Perhaps, you just want to work the server side? Configure networks, configure OVS, and setup KVM?

Jump to **The Crux** of it.

> DO NOT JUST COPY PASTE THESE SCRIPTS AND RUN THEM!!
>
> You need to change them to fit your design, and include your specific interface names. There are also additional parts within these scripts that will try and delete ALL OVA configurations, and ALL KVM networks. You may not want that to happen.
>
> EDIT THE SCRIPTS FIRST OR JUST TAKE WHAT YOU NEED!!

Here is my network layout:

Network Layout



Here are the scripts:

rebuild-configs.sh

```
#!/bin/bash

DS=$(date "+%Y%m%d"); # DATE STAMP

mkdir -p /root/backups
gtar -czf /root/backups/${DS}_network-scripts.tar.gz -C /etc/sysconfig/network-scripts/ .

cat > /etc/sysconfig/network-scripts/ifcfg-eth0 << "EOF"
DEVICE=eth0
NAME=eth0
HWADDR=xx:xx:xx:xx:xx:xx
UUID=xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx
ONBOOT=yes
BOOTPROTO=none
TYPE=Ethernet
DEFROUTE=yes
MTU=9000
IPADDR=10.0.0.2
PREFIX=24
GATEWAY=10.0.0.1
DNS1=10.0.0.3
DOMAIN=internal
PROXY_METHOD=none
BROWSER_ONLY=no
IPV4_FAILURE_FATAL=no
IPV6_DISABLED=yes
IPV6INIT=no
CONNECTION_METERED=no
NM_CONTROLLED=no
STP=no

EOF

cat > /etc/sysconfig/network-scripts/ifcfg-eth1 << "EOF"
DEVICE=eth1
NAME=eth1
HWADDR=xx:xx:xx:xx:xx:xx
UUID=xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx
ONBOOT=yes
```

```
BOOTPROTO=none
TYPE=Ethernet
HOTPLUG=no
MTU=9000

EOF

cat > /etc/sysconfig/network-scripts/ifcfg-eth2 << "EOF"
DEVICE=eth2
NAME=eth2
HWADDR=xx:xx:xx:xx:xx:xx
UUID=xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx
ONBOOT=yes
BOOTPROTO=none
TYPE=Ethernet
HOTPLUG=no
MTU=9000

EOF

cat > /etc/sysconfig/network-scripts/ifcfg-eth3 << "EOF"
DEVICE=eth3
NAME=eth3
HWADDR=xx:xx:xx:xx:xx:xx
UUID=xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx
ONBOOT=yes
BOOTPROTO=none
TYPE=Ethernet
HOTPLUG=no
MTU=9000

EOF

cat > /etc/sysconfig/network-scripts/ifcfg-ovs1 << "EOF"
DEVICE=ovs1
NAME=ovs1
ONBOOT=yes
BOOTPROTO=none
TYPE=OVSBridge
```

```
DEVICETYPE=ovs
HOTPLUG=no
MTU=9000

EOF

cat > /etc/sysconfig/network-scripts/ifcfg-ovs2 << "EOF"
DEVICE=ovs2
NAME=ovs2
ONBOOT=yes
BOOTPROTO=none
TYPE=OVSBridge
DEVICETYPE=ovs
HOTPLUG=no
MTU=9000

EOF

cat > /etc/sysconfig/network-scripts/ifcfg-ovs3 << "EOF"
DEVICE=ovs3
NAME=ovs3
ONBOOT=yes
BOOTPROTO=none
TYPE=OVSBridge
DEVICETYPE=ovs
HOTPLUG=no
MTU=9000

EOF

cat > /etc/sysconfig/network-scripts/ifcfg-ext0 << "EOF"
DEVICE=ext0
NAME=ext0
ONBOOT=yes
BOOTPROTO=none
TYPE=OVSBridge
DEVICETYPE=ovs
HOTPLUG=no
MTU=9000
```

```
EOF

cat > /etc/sysconfig/network-scripts/ifcfg-guest0 << "EOF"
DEVICE=guest0
NAME=guest0
ONBOOT=yes
BOOTPROTO=none
TYPE=OVSBridge
DEVICETYPE=ovs
HOTPLUG=no
MTU=9000

EOF

cat > /etc/sysconfig/network-scripts/ifcfg-ioit0 << "EOF"
DEVICE=ioit0
NAME=ioit0
ONBOOT=yes
BOOTPROTO=none
TYPE=OVSBridge
DEVICETYPE=ovs
HOTPLUG=no
MTU=9000

EOF

printf "\n\n RESTART NETWORK MANUALLY \n\n"

exit
```

rebuild-ovs.sh

```
#!/bin/bash

### REMOVE AND REBUILD ALL OVS NETWORKS ###

ovs-vsctl del-br ioit0
```

```
ovs-vsctl del-br guest0
ovs-vsctl del-br ext0
ovs-vsctl del-br ovs3
ovs-vsctl del-br ovs2
ovs-vsctl del-br ovs1

ovs-vsctl emer-reset

systemctl stop openvswitch
systemctl stop ovs-vswitchd
systemctl stop ovsdb-server

rm -f /etc/openvswitch/conf.db
rm -f /etc/openvswitch/.conf.db.~lock~
rm -f /var/run/openvswitch/*
rm -f /var/log/openvswitch/*

systemctl start ovsdb-server
systemctl start ovs-vswitchd
systemctl start openvswitch

ovs-vsctl init
sleep 3

ovs-vsctl add-br ovs1
ovs-vsctl add-port ovs1 eth1
sleep 1

ovs-vsctl add-br ovs2
ovs-vsctl add-port ovs2 eth2
sleep 1

ovs-vsctl add-br ovs3
ovs-vsctl add-port ovs3 eth3
ovs-vsctl set port ovs3 trunk=310,320,330
ovs-vsctl add-br ext0 ovs3 310
ovs-vsctl add-br guest0 ovs3 320
ovs-vsctl add-br ioit0 ovs3 330
sleep 1
```

```
ovs-vsctl show

exit
```

rebuild-kvm.sh

```
#!/bin/bash

### REMOVE AND REBUILD KVM DEFINED NETWORK ###

virsh net-destroy ovs3
sleep 1
virsh net-destroy ovs2
sleep 1
virsh net-destroy ovs1
sleep 1

virsh net-undefine ovs3
sleep 1
virsh net-undefine ovs2
sleep 1
virsh net-undefine ovs1
sleep 1

cat > ./ovs1.xml << "EOF"
<network>
    <name>ovs1</name>
    <forward mode='bridge'/>
    <bridge name='ovs1'/>
    <virtualport type='openvswitch'/>
</network>

EOF

cat > ./ovs2.xml << "EOF"
<network>
    <name>ovs2</name>
    <forward mode='bridge'/>
    <bridge name='ovs2'/>
    <virtualport type='openvswitch'/>
</network>

EOF

cat > ./ovs3.xml << "EOF"
<network>
 <name>ovs3</name>
 <forward mode='bridge'/>
 <bridge name='ovs3'/>
 <virtualport type='openvswitch'/>
 <portgroup name='ext0'>
   <vlan>
     <tag id='310'/>
   </vlan>
 </portgroup>
 <portgroup name='guest0'>
   <vlan>
     <tag id='320'/>
   </vlan>
 </portgroup>
 <portgroup name='ioit0'>
   <vlan>
     <tag id='330'/>
   </vlan>
 </portgroup>
<portgroup name='TRUNK'>
   <vlan trunk='yes'>
     <tag id='310'/>
     <tag id='320'/>
     <tag id='330'/>
   </vlan>
 </portgroup>
</network>

EOF
```

```
virsh net-define ovs1.xml
sleep 1
virsh net-define ovs2.xml
sleep 1
virsh net-define ovs3.xml
sleep 1

virsh net-autostart ovs1
sleep 1
virsh net-autostart ovs2
sleep 1
virsh net-autostart ovs3
sleep 1

virsh net-start ovs1
sleep 1
virsh net-start ovs2
sleep 1
virsh net-start ovs3
sleep 1

rm -f ovs1.xml
rm -f ovs2.xml
rm -f ovs3.xml

systemctl restart libvirtd

virsh net-list

exit
```

list-networks.sh

```
#!/bin/bash

printf "\n\n ----------> HOST NETWORK INTERFACES <---------- \n\n"
ifconfig
```

```
printf "\n\n ----------> OVS NETWORKS <---------- \n\n"
ovs-vsctl show



printf "\n\n ----------> KVM DEFINED NETWORKS <---------- \n\n"
virsh net-list


exit
```

Here is my cisco config:

Cisco Config

```
### NOT A SCRIPT - JUST THE PERTINENT PARTS OF MY CONFIG ###


vrf definition LAN
 description LAN NETWORK
 !
 address-family ipv4
 exit-address-family
!
vrf definition LAB
 description LAB NETWORK
 !
 address-family ipv4
 exit-address-family
!
vrf definition ISP
 description ISP NETWORK
 !
 address-family ipv4
 exit-address-family
!
vrf definition EXT
 description EXTERNAL NETWORK
 !
 address-family ipv4
 exit-address-family
!
vrf definition GUEST
 description GUEST NETWORK
 !
 address-family ipv4
 exit-address-family
!
vrf definition IOIT
 description INSECURE NETWORK
 !
 address-family ipv4
 exit-address-family
!
!

vlan 100
 name LAN
!
vlan 200
 name LAB
!
vlan 300
 name ISP
!
vlan 310
 name EXT
!
vlan 320
 name GUEST
!
vlan 330
 name IOIT
!
!

interface GigabitEthernet1/0/1
 description PFSENSE : BGE0 : LAN (10.0.0.1)
 switchport access vlan 100
 switchport mode access
!
interface GigabitEthernet1/0/2
 description PFSENSE : BGE1 : LAB (10.10.0.1)
 switchport access vlan 200
 switchport mode access
!
interface GigabitEthernet1/0/3
 description PFSENSE : BGE2 : WAN (1.2.3.4)
 switchport access vlan 300
 switchport mode access
!
interface GigabitEthernet1/0/4
 description PFSENSE : BGE4 : TRUNK (VLANS)
 switchport trunk allowed vlan 310,320,330
 switchport mode trunk
!
interface GigabitEthernet1/0/5
 description VHOST : ETH0 : MGMT (10.0.0.2)
 switchport access vlan 100
 switchport mode access
!
interface GigabitEthernet1/0/6
 description VHOST : ETH1 : LAN (OVS1)
 switchport access vlan 100
 switchport mode access
!
interface GigabitEthernet1/0/7
 description VHOST : ETH2 : LAB (OVS2)
 switchport access vlan 200
 switchport mode access
!
interface GigabitEthernet1/0/8
 description VHOST : ETH3 : TRUNK (OVS3)
 switchport trunk allowed vlan 310,320,330
 switchport mode trunk
!
interface GigabitEthernet1/0/9
 description ISP IN
 switchport access vlan 300
 switchport mode access
!
interface GigabitEthernet1/0/10
 description MY MOCHEEN
 switchport access vlan 100
 switchport mode access
!
!

interface Vlan100
 description LAN
 vrf forwarding LAN
 ip address 10.0.0.254 255.255.255.0
!
interface Vlan200
 description LAB
 vrf forwarding LAB
 ip address 10.10.0.254 255.255.255.0
!
interface Vlan300
 description ISP
 vrf forwarding ISP
 no ip address
!
interface Vlan310
 description EXT
 vrf forwarding EXT
 ip address 10.31.0.254 255.255.255.0
!
interface Vlan320
 description GUEST
 vrf forwarding GUEST
 ip address 10.32.0.254 255.255.255.0
!
interface Vlan330
 description IOIT
 vrf forwarding IOIT
 ip address 10.33.0.254 255.255.255.0
```

```
!
!

ip route vrf LAN 0.0.0.0 0.0.0.0 10.0.0.1
ip route vrf LAB 0.0.0.0 0.0.0.0 10.10.0.1
ip route vrf EXT 0.0.0.0 0.0.0.0 10.31.0.1
ip route vrf GUEST 0.0.0.0 0.0.0.0 10.32.0.1
ip route vrf IOIT 0.0.0.0 0.0.0.0 10.33.0.1
!
!
```

> **HEY!!**   You DO NOT need a Cisco switch to understand and implement anything in this write up. To be brutally honest you don't need a switch at all, nor do you need a separate firewall. You could build out everything on just the server. To take it even a bit further, your server could have only one physical network interface and you could still make it work.
>
> The main take away from this write up is, all the commands needed for OpenVSwitch, all the commands and xml configs needed for KVM, and the dead simple network configurations for the vhost server. That's it! Once you have those parts you should be good to go. AND... all of that is in the scripts above.   Your welcome.

Alright. So, working with my network layout (above). I am going to try and simplify that in words. :) I will push all the pfSense firewall configurations to a new page. It's good stuff, but has no bearing on setting up bridges and working with vlans from a virtual hosting standpoint.

I started with a piece of paper (yep, a tangible blank piece of paper) and my super duper Pentel P209 0.9mm mechanical pencil. I started drawing and notating what I wanted and the main points for me were,

- I need my physical internal network that my family uses, to not be effected by my shenanigan's
- I want a LAB network that doesn't effect my LAN but that I can work in with ease
- I want a GUEST network that does not touch any of my networks
- I want a IOIT network that also can not touch any other networks

  (IOIT: Internet of Insecure Things - Thank you Tom Lawrence)
- I want a EXTernal network that can host production servers on the internet, and has ZERO access to anything else

- I want the ability to configure a access port on my switch and place a physical machine on any of my networks
- I want that same ability for virtual machines that I build

Is that too much to ask? It was at first :)

On my switch I created all the vlans I wanted and noodled over what those numbers were gunna be,

- VLAN 100 - LAN
- VLAN 200 - LAB
- VLAN 300 - ISP *(gunna talk about this in a minute)*
- VLAN 310 - EXT
- VLAN 320 - GUEST
- VLAN 330 - IOIT

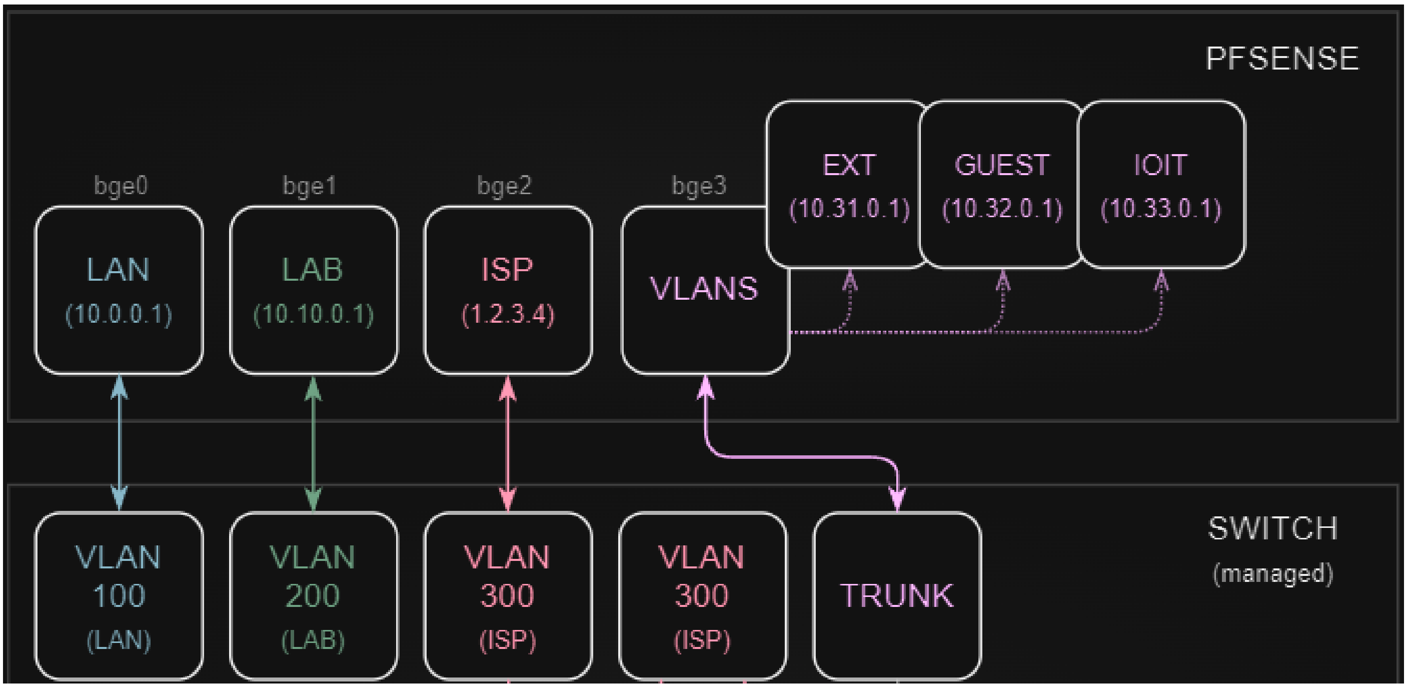
Initially I did not have a static external IP. I was handed a DHCP address from my ISP. So part of my design in the beginning had the GUEST network as part of the ISP vlan. This way, anyone coming over and getting on my wireless would get a DHCP address from the ISP, and I wouldn't need to buildout a NAT for that subnet or manage the DHCP server and scope. It's not difficult, but it was one less piece I had to worry about. Then my ISP swapped out my gear and upgraded my account, and that was pretty much the same time I moved to a static address. I left the configuration in place where it goes to my switch first, then to the firewall, but it totally does not need to be like that. The ISP link should go directly to the firewall. BUT... hopefully the idea helps someone else.

Because VLAN 300 is a external link, I also created my EXT, GUEST, and IOIT networks within the same 300 block, just to keep it visually straight when I see them. I also use the first couple digits of the vlan numbers in the subnets for each one to also help keep it straight,

Something else I did on the switch was put all my vlan networks in a VRF (virtual routing and forwarding). Doing this isolated each network as if they were each on their own switch (well it allowed for multiple routing tables on the same switch). This is not a requirement, and I totally could have just used ACLs to accomplish the same thing. Depending on your switch or the design you go with, I recommend doing what you can to separate your networks at the switch, just so it's one last thing to worry about. By doing this on my switch, I put all the policy control of my networks in the hands of my firewall (pfSense).

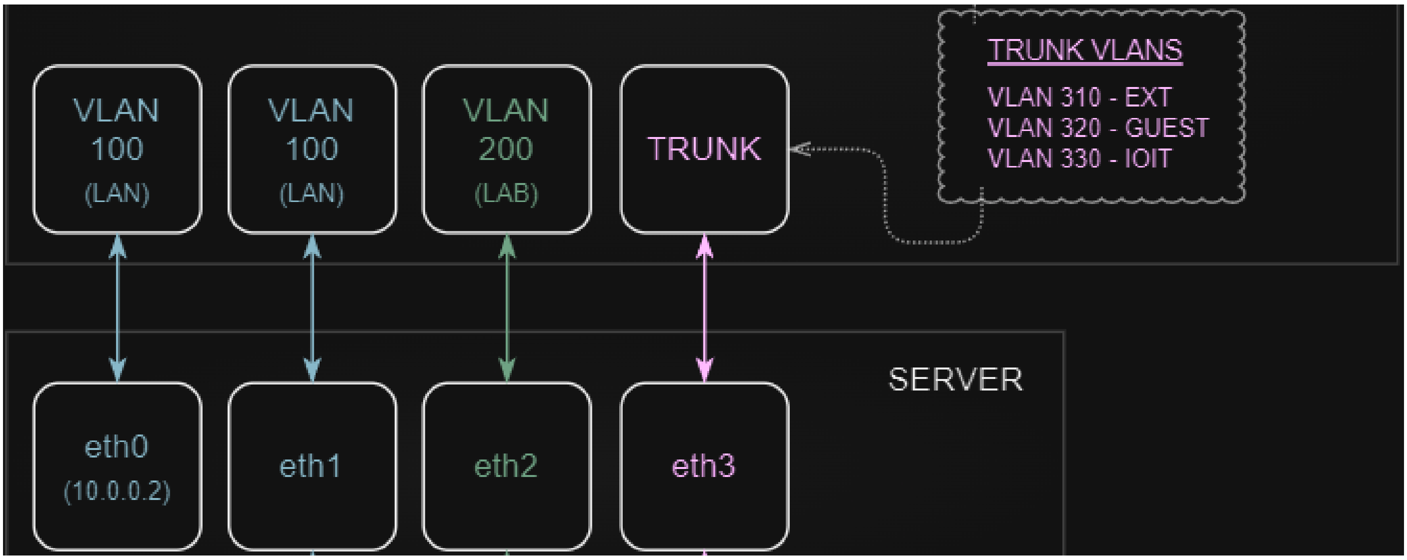
A quick blurb about the pfSense firewall. I set all the gateways for each network on the pfSense firewall. I am able to control all the in and out rules for each network, and can allow networks to interact with each other should I so choose. In addition, the LAN, LAB, GUEST, and IOIT networks all have their own DHCP servers as well. Like I mentioned previously, I will create a page that details out the pfSense configuration. But for now all that really needs said is that, my gateways are all on the pfSense, my LAN, LAB, and ISP have dedicated network interfaces, and the 4th interface on my firewall is setup to handle any VLANs I add to the TRUNK on my switch.

Ok. Now that the switch has been detailed with vlans. I assigned those vlans to ports. A set of access ports for LAN, LAB, and ISP go direct to firewall interfaces, and a trunk port was created that allows EXT, GUEST, and IOIT to be passed to the 4th port.



Another set of access ports are created for LAN and LAB. I created two access ports for LAN, and one of those is solely for the management of the server. By configuring this one network just for management (just a normal interface configuration), I am able to work with all the other interfaces and virtual configs without losing access to the server, should I just blow them all way.

The second LAN and the LAB access ports consume the next two interfaces on the server, and another trunk is created on the switch for EXT, GUEST, and IOIT then connected to the fourth interface on the server.



> **NOTE:** I had the ports available on the firewall and the server and just chose to use them in this way. I could have accomplished the same thing if I would have just created two TRUNKs, one for the firewall and one for the server, and just passed the VLANs for each over that single link. In some regards, maybe that would be cleaner.
> It was not the avenue I took, but just know that using a single TRUNK for each would be configured the same way I am doing the TRUNK in this write up. There is no difference.

Still with me? Now we have all the physical links in place for firewall, switch and server. Let's dive into the server configuration.

This part of the setup is what slayed me for the longest time. So don't get all judgey when you experience the ease of it. My headache is being compiled for your success! ;)

I am going to assume.... no. No I am not. If you don't have Open vSwitch and KVM installed on your server, here are two links to accomplish that on a Rocky Linux 8 install. You may need to dig around for directions for your OS if your not using Rocky. Go get that done, and then return so we can continue on.

Install Open vSwitch

Install KVM / QEMU

Good to go?

The Crux

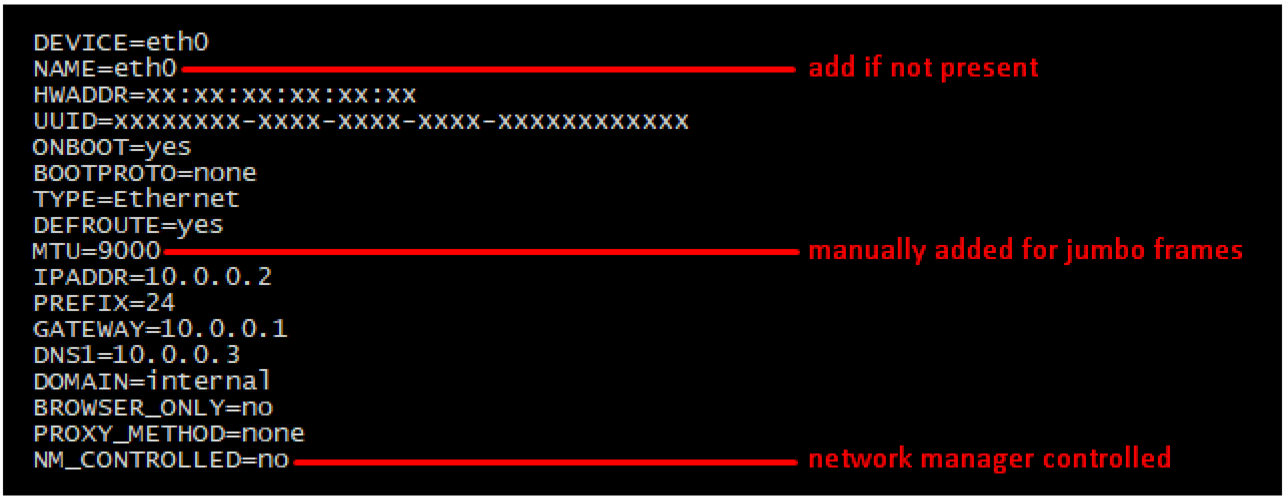
> I am not using "Network Manager" (nmcli). OVS didn't work with NM when I first started. I think even today, it still uses "network-scripts" in some form or another for the ifup/ifdown functions. As of 07/07/2023, I have Network Manager installed but disabled, and am still using network-scripts for my network configurations. You should be able to use NM to accomplish the same things, but will need to investigate that yourself. It is out of scope for the write up.

In the order that works for me.

Layout your server network interfaces. None of the interfaces will have IP space attached to them, so the configurations are simple. If you look at my "rebuild-config.sh" (at the top of the page), you will notice just how simple and similar each part is. Lay them out according to **YOUR** needs.

Here are some points:

Management Interface Image



```
DEVICE=eth0
NAME=eth0
HWADDR=xx:xx:xx:xx:xx:xx
UUID=xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx
ONBOOT=yes
BOOTPROTO=none
TYPE=Ethernet
DEFROUTE=yes
MTU=9000
IPADDR=10.0.0.2
PREFIX=24
GATEWAY=10.0.0.1
DNS1=10.0.0.3
DOMAIN=internal
BROWSER_ONLY=no
PROXY_METHOD=none
NM_CONTROLLED=no
```

1. The "management" interface (whichever port you choose that to be), should be configured as any other normal interface. You should be able to reach your server on this port without issues.
2. Your physical network interface should have a HWADDR line with its MAC address defined. The UUID is used by Network Manager only, but I chose to just keep it in the configuration.
3. The NAME line should be the same as the DEVICE line. Add it, if it missing.
4. MTU is not required, unless you want to use Jumbo Frames and have it enabled/configured at the switch.

Physical Interfaces

Only the management interface is "special". Every other interface is going to be built exactly the same.

Using my setup as an example, I will reconfigure my 3 remaining physical network interfaces like so,

```
DEVICE=eth1
NAME=eth1
HWADDR=xx:xx:xx:xx:xx:xx
UUID=xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx
ONBOOT=yes
BOOTPROTO=none
TYPE=Ethernet
HOTPLUG=no
MTU=9000
```

The only difference in the 3 physical interface configs will be the DEVICE, NAME, HWADDR, and UUID.

Bridge Interfaces

All and any new interfaces will be configured as "bridges" and will all be EXACTLY the same except for the DEVICE and NAME. They will be different from the physical interfaces because the will not have a HWADDR and UUID, and the TYPE will become "OVSBridge", in addition they will have the line "DEVICETYPE=ovs".

For each of the physical interfaces we created, now create a OVS bridge interface like so,

```
DEVICE=ovs1
NAME=ovs1
ONBOOT=yes
BOOTPROTO=none
TYPE=OVSBridge
DEVICETYPE=ovs
HOTPLUG=no
```

```
MTU=9000
```

All 3 will be exactly the same changing only the DEVICE and NAME.

VLAN Interfaces

VLAN interface configs are EXACTLY like Bridge Interfaces above. No difference. **WTF you say?**

> We are creating OVS networks for use with a KVM implementation. You need to put aside any previous knowledge you may have about configuring VLANs inside linux (ifcfg-eth0.xxx). That is not the method when dealing with OVS. ;)

For each VLAN in your TRUNK create the config like so,

```
DEVICE=ext0
NAME=ext0
ONBOOT=yes
BOOTPROTO=none
TYPE=OVSBridge
DEVICETYPE=ovs
HOTPLUG=no
MTU=9000
```

Change only the DEVICE and NAME on each.

You should restart your server to make sure all your networks come up when the server boots. Or just restart networking and save a reboot for later (`systemctl restart network`).

That's it for server interfaces.

OVS Networks

OVS network configuration is pretty simple. I think the application is convoluted and documentation sucks! But, it works and for the most part we only need a couple commands, and to understand the terminology (because that's dumb too).

So using OVS is where we will attach the OVS Bridge interfaces to the Physical interfaces. The interface names that we use in our OVS commands, must match the the server interfaces we created. Create the OVS networks like so,

```
ovs-vsctl add-br ovs1
ovs-vsctl add-port ovs1 eth1
```

The first command creates the "ovs1" bridge and adds it to the OVS database. The second command adds the Physical server interface "eth1" as the port that the "ovs1" bridge will use.

We do the same thing for another interface that we want to directly attach to a bridge, like so,

```
ovs-vsctl add-br ovs2
ovs-vsctl add-port ovs2 eth2
```

So that covers creating the bridge and attaching the physical interface. This is all that is needed for just a bridge connection back to the switch on ports configured to be "access ports" (or whatever your switch calls them).

OVS VLAN Networks

Setting up the bridge interface that will handle VLANs takes a couple more commands. We still need to create the OVS bridge and add the physical port to the bridge. That is the same as above.

```
ovs-vsctl add-br ovs3
ovs-vsctl add-port ovs3 eth3
```

In order to incorporate the VLANs on this bridge, we use the following commands,

```
ovs-vsctl set port ovs3 trunk=310,320,330
ovs-vsctl add-br ext0 ovs3 310
ovs-vsctl add-br guest0 ovs3 320
ovs-vsctl add-br ioit0 ovs3 330
```

> The bridges that are being created for each VLAN are called "FAKE BRIDGES". This is what threw me for a loop when I was trying to figure this out. I was not out looking for fake bridges. I was looking for how to configure a VLAN in OVS. I had noticed "fake bridge" being talked about, but that was not where my head went for VLANs. Hence, learning the

> ridiculous terminology might save a TON of wasted time.

To see these created networks you can use the `ovs-vsctl show` command,

```
ovs-vsctl show
```

You should see something similar to this,

ovs-vsctl show output

```
4ac8eca9-fd46-415d-acd7-02406d65ff5c
    Bridge ovs1
        Port ovs1
            Interface ovs1
                type: internal
        Port eth1
            Interface eth1
    Bridge ovs2
        Port ovs2
            Interface ovs2
                type: internal
        Port eth2
            Interface eth2
    Bridge ovs3
        Port ovs3
            trunks: [310, 320, 330]
            Interface ovs3
                type: internal
        Port eth3
            Interface eth3
        Port ext0
            tag: 310
            Interface ext0
                type: internal
        Port guest0
            tag: 320
            Interface guest0
                type: internal
        Port ioit0
        tag: 330
        Interface ioit0
          type: internal
    ovs_version: "3.1.2"
```

You should reboot the server and validate that all your settings are kept. Just performing a `systemctl restart openvswitch` is not a good test. I have ran into cases where just restarting the service worked file. But everything was all jacked up when I did a reboot. So be warned I guess.

And that is it for the OVS networks.

Define KVM Networks

I have found the easiest way to define the networks into KVM is by using a simple XML file. I have also found that when I need to update or change a already defined network, the easiest way is to delete the current network and just redefine it using the XML file. This is what makes the XML method handy... you have a backup! ;)

To define the first two bridge networks created above, I personally will create a XML file for each one. Like so,

```
cat > ./ovs1.xml << "EOF"
<network>
  <name>ovs1</name>
  <forward mode='bridge'/>
  <bridge name='ovs1'/>
  <virtualport type='openvswitch'/>
</network>

EOF


cat > ./ovs2.xml << "EOF"
<network>
  <name>ovs2</name>
  <forward mode='bridge'/>
```

```
    <bridge name='ovs2'/>
    <virtualport type='openvswitch'/>
</network>

EOF
```

This will create two XML files, "ovs1.xml" and "ovs2.xml" . Each one defines the network as a bridge, defines the name of the bridge, and also tells KVM that the network is part of "openvswitch".

In order to actually define these two networks into the KVM system, we would run the `virsh net-define` command on each file,

```
virsh net-define ovs1.xml

virsh net-define ovs2.xml
```

Defining the third bridge that holds the VLANs is the same. But the XML file has a bit more meat to it.

```
cat > ./ovs3.xml << "EOF"
<network>
 <name>ovs3</name>
 <forward mode='bridge'/>
 <bridge name='ovs3'/>
 <virtualport type='openvswitch'/>
 <portgroup name='novlan' default='yes'>
 </portgroup>
 <portgroup name='ext0'>
   <vlan>
     <tag id='310'/>
   </vlan>
 </portgroup>
 <portgroup name='guest0'>
   <vlan>
     <tag id='320'/>
   </vlan>
 </portgroup>
 <portgroup name='ioit0'>
```

```
   <vlan>
     <tag id='330'/>
   </vlan>
 </portgroup>
<portgroup name='OVS3TRUNK'>
   <vlan trunk='yes'>
     <tag id='310'/>
     <tag id='320'/>
     <tag id='330'/>
   </vlan>
 </portgroup>
</network>

EOF
```

The top part of the configuration is the same as the other two, but after that we need to define the "portgroup" information.

- The first posrtgroup is named "novlan" and is set as the default. If only "ovs3" is defined when creating a VM and portgroup or rather a VLAN will not be assigned.
- Next, for each VLAN we specify a new portgroup. Each with their "name" and a "tag id" (vlan number).
- The final "portgroup" section with the name "OVS3TRUNK", allows us to assign the entire TRUNK to a VM. Then once inside the VM we can manually configure the interface(s) to a VLAN.

Once the XML configuration is created, we would define the network the same way we did the others,

```
virsh net-define ovs3.xml
```

In order to make these networks available they need to be started, and we can also set them to auto start when our host reboots.

```
# Start the networks
virsh net-start ovs1
virsh net-start ovs2
virsh net-start ovs3

# Set networks to auto start
```

```
virsh net-autostart ovs1
virsh net-autostart ovs2
virsh net-autostart ovs3
```

To see the status of the KVM networks we can use the "net-list" command,

```
virsh net-list
```

Should see something like this,

virsh net-list output

```
 Name     State    Autostart   Persistent
--------------------------------------------
 ovs1     active   yes         yes
 ovs2     active   yes         yes
 ovs3     active   yes         yes
```

That is it!

That is how to configure your server for VLANs using Open vSwitch and making them work within KVM.

I hope this was helpful and saves you time digging around.

Additional Info

I have created another page that gives some detail on configuring these networks when building a VM or how to change an existing VM's network to these new networks. **The Net**

Revision #21
Created 6 July 2023 22:12:44 by Phatlix
Updated 3 October 2023 02:42:30 by Phatlix