\* Start Open Stack

\* Deploy OpenWRT as a Vm

Bringe up DNSMASQ (on VM)

#Note: Before starting dnsmasq on VM, shutdown the DHCP-Demon.

$ /etc/init.d/dnsmasq stop

Now start dnsmasq

create a following dir in dhcp VM

/var/lib/misc

$ /usr/sbin/dnsmasq -R --no-hosts --dhcp-range=192.168.2.2,192.168.2.253,255.255.255.0,12h --log-queries --log-dhcp --log-facility=/var/log/dnsmasq.log

Command to Route the DHCP request from Ubuntu (Host for VM) to OpenWRT VM

sudo /usr/sbin/dhcrelay -d -4 -i eth1 172.16.63.10 -i vmnet1

iptables -A INPUT -i vmnet1 -s 172.16.63.0/24 -d 192.168.2.0/24 -j ACCEPT

sudo -s

iptables -N LOGGING

iptables -A INPUT -j LOGGING

iptables -A OUTPUT -j LOGGING

iptables -A LOGGING -m limit --limit 2/min -j LOG --log-prefix "IPTables-Dropped: " --log-level 7

iptables -A LOGGING -j DROP

>>>> Relay : working command (standalone VM)>>>>>

sudo /usr/sbin/dhcrelay -d -4 -i eth1 172.16.63.10 -i vmnet1

>>>> Relay : working command (OpenStack)>>>>>

sudo /usr/sbin/dhcrelay -d -4 -i eth1 192.168.120.5 -i br-mgmt0

if you are receiving the following error on dhcp relay, you have to run the following command.

“Discarding packet received on eth1 interface that has no IPv4 address assigned”

sudo -s

echo 0 > /proc/sys/net/ipv4/ip\_forward

basically when we bring up the dhcp relay, ipforward should be set to 0.

WorkArounds:

1. Openstack Dnsmasq service for each neutron network. The Dnsmasq was listening on all interfaces and exception was only loopback (lo) interface.

2. Openstack code was hardcoded to only skip loopback (lo) interface (--except-interface)

3. We changed the code and included 'eth1' (additional USB based NIC interface) along with loopback (lo) interface

File Name

“/opt/stack/neutron/neutron/agent/linux/dhcp.py" line 310 of 1243

Diff:

310 >> '--except-interface=lo,eth1',

310 << '--except-interface=lo',

**neutron-dhcpagent** controlls the creation of dnsmasq servers. If we can restart the services using “service neutron-dhcp-agent [start | stop | restart]” command

Network Configuration for Open WRT

root@OpenWrt:/etc/config# cat network

config interface 'loopback'

option ifname 'lo'

option proto 'static'

option ipaddr '127.0.0.1'

option netmask '255.0.0.0'

config interface 'lan'

option ifname 'eth0'

option proto 'dhcp'

config interface 'wan'

option ifname 'eth1'

option proto 'dhcp'

config globals 'globals'

option ula\_prefix 'fd37:880b:a5bf::/48'

Firewall (/etc/config/firewall)

root@OpenWrt:/etc/config# cat firewall

config defaults

option syn\_flood 1

option input ACCEPT

option output ACCEPT

option forward ACCEPT

# Uncomment this line to disable ipv6 rules

# option disable\_ipv6 1

config zone

option name lan

list network 'lan'

option input ACCEPT

option output ACCEPT

option forward ACCEPT

config zone

option name wan

list network 'wan'

list network 'wan6'

option input REJECT

option output ACCEPT

option forward REJECT

option masq 1

option mtu\_fix 1

config forwarding

option src lan

option dest wan

# We need to accept udp packets on port 68,

# see https://dev.openwrt.org/ticket/4108

config rule

option name Allow-DHCP-Renew

option src wan

option proto udp

option dest\_port 68

option target ACCEPT

option family ipv4

config rule

option name Allow-DHCP-Renew

option src lan

option proto udp

option dest\_port 67

option target ACCEPT

option family ipv4

# Allow IPv4 ping

config rule

option name Allow-Ping

option src lan

option proto icmp

option icmp\_type echo-request

option family ipv4

option target ACCEPT

config rule

option name Allow-Ping

option src wan

option proto icmp

option icmp\_type echo-request

option family ipv4

option target ACCEPT

# Allow DHCPv6 replies

# see https://dev.openwrt.org/ticket/10381

config rule

option name Allow-DHCPv6

option src wan

option proto udp

option src\_ip fe80::/10

option src\_port 547

option dest\_ip fe80::/10

option dest\_port 546

option family ipv6

option target ACCEPT

# Allow essential incoming IPv6 ICMP traffic

config rule

option name Allow-ICMPv6-Input

option src wan

option proto icmp

list icmp\_type echo-request

list icmp\_type echo-reply

list icmp\_type destination-unreachable

list icmp\_type packet-too-big

list icmp\_type time-exceeded

list icmp\_type bad-header

list icmp\_type unknown-header-type

list icmp\_type router-solicitation

list icmp\_type neighbour-solicitation

list icmp\_type router-advertisement

list icmp\_type neighbour-advertisement

option limit 1000/sec

option family ipv6

option target ACCEPT

# Allow essential forwarded IPv6 ICMP traffic

config rule

option name Allow-ICMPv6-Forward

option src wan

option dest \*

option proto icmp

list icmp\_type echo-request

list icmp\_type echo-reply

list icmp\_type destination-unreachable

list icmp\_type packet-too-big

list icmp\_type time-exceeded

list icmp\_type bad-header

list icmp\_type unknown-header-type

option limit 1000/sec

option family ipv6

option target ACCEPT

# include a file with users custom iptables rules

config include

option path /etc/firewall.user

Commands to enable Internet Access after Open Stack is started

>> eth0 is the physical port on the linux machine, br-ext is the OVS bridge that enables out-side connection to open stack.

>> we are bridging eth0 to br-ext

$ sudo ovs-vsctl add-port br-ext eth0

$ sudo ifconfig br-ext 10.76.190.80 promisc up # use eth0 ip here

$ sudo ifconfig eth0 0.0.0.0 promisc up # remove eth0 ip

$ sudo route add default gw 10.76.190.65 dev br-ext

Steps to Disable DHCP server on the OpenWRT in Physicall Router

1. edit /etc/config/dhcp

2. In LAN Section, add 'option ignore 1'

config dhcp 'lan'

option interface 'lan'

option start '100'

option limit '150'

option leasetime '12h'

option dhcpv6 'server'

option ra 'server'

option ignore '1'

Steps to make the Physical OpenWRT Router as a switch and stop the DHCP service and propogate all DHCP request DHCP server running on network (through WAN port)

1. edit /etc/config/network

Have LAN and WAN on same vlan

Bridge LAN and WAN

Configuration of the /etc/config/net file

|  |  |
| --- | --- |
| Old File | New |
| root@OpenWrt:/etc/config# cat network.bak  config interface 'loopback'  option ifname 'lo'  option proto 'static'  option ipaddr '127.0.0.1'  option netmask '255.0.0.0'  config globals 'globals'  option ula\_prefix 'fd50:8622:c981::/48'  config interface 'lan'  option ifname 'eth0.1'  option force\_link '1'  option type 'bridge'  option proto 'static'  option ipaddr '192.168.1.1'  option netmask '255.255.255.0'  option ip6assign '60'  config interface 'wan'  option ifname 'eth0.2'  option proto 'dhcp'  config interface 'wan6'  option ifname 'eth0.2'  option proto 'dhcpv6'  config switch  option name 'switch0'  option reset '1'  option enable\_vlan '1'  config switch\_vlan  option device 'switch0'  option vlan '1'  option ports '0t 2 3 4 5'  config switch\_vlan  option device 'switch0'  option vlan '2'  option ports '0t 1' | root@OpenWrt:~# cat /etc/config/network  config interface 'loopback'  option ifname 'lo'  option proto 'static'  option ipaddr '127.0.0.1'  option netmask '255.0.0.0'  config globals 'globals'  option ula\_prefix 'fd50:8622:c981::/48'  config interface 'lan'  option ifname 'eth0.1'  option type 'bridge'  option proto 'dhcp'  #config interface 'wan'  # option ifname 'eth0.2'  # option proto 'dhcp'  #config interface 'wan6'  # option ifname 'eth0.2'  # option proto 'dhcpv6'  config switch  option name 'switch0'  option reset '1'  option enable\_vlan '1'  config switch\_vlan  option device 'switch0'  option vlan '1'  option ports '0t 1 2 3 4 5'  #config switch\_vlan  # option device 'switch0'  # option vlan '2'  # option ports '0t 1' |

Restart DHCP reser

$ /etc/init.d/dnsmasq restart

Disabling the Firewall

$ /etc/init.d/firewall disableq

$ /etc/init.d/firewall stop

Applying All the Configuration

$ /etc/init.d/network reload

Make sure the DHCP server in the network is up and running

After Restart verify if br-lan has an IP Address assigned by DHCP server in network in the same range as configured in the DHCP server.

$ ifconfig br-lan

Running openWRT VM service and providing the service to the clients that are connected to TP Link router.

Setup in openWRT VM

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1) Create Open WRT VM in openstack with 2 interfaces( one from br-mgmnt subnet -LAN and net0 or net1 subnets - WAN) in openstack

2) Choose attach these net0 or net1 interfaces to neutron router

3) Once routerVM is created, look at the /etc/config/network to have proper lan and wan network config

config interface 'loopback'

option ifname 'lo'

option proto 'static'

option ipaddr '127.0.0.1'

option netmask '255.0.0.0'

config interface 'lan'

option ifname 'eth0'

option type 'bridge'

option proto 'dhcp'

config interface 'wan'

option ifname 'eth1'

option proto 'dhcp'

config globals 'globals'

option ula\_prefix 'fd92:7a10:80d6::/48'

reboot the VM or reload network config by running /etc/init.d/network reload

Run the ifconfig to verify the ip assigned to eth0/br-lan and eth1 interfaces.

3a) Then disable the ip spoofing for LAN and WAN interfaces in ip tables by removing it. Otherwise LAN to WAN traffic will beblocked by openstack firewall

iptables-save > iptables\_back

*remove these spoofing entries*

*sample entry for an interface :*

*-A neutron-openvswi-s1326c305-1 -s 192.168.120.8/32 -m mac --mac-source FA:16:3E:EE:7A:83 -m comment --comment "Allow traffic from defined IP/MAC pairs." -j RETURN*

*-A neutron-openvswi-s1326c305-1 -m comment --comment "Drop traffic without an IP/MAC allow rule." -j DROP*

*these entries will be created for every interface in any VM. So remove entries for openWRT VM that has LAN and WAN interfaces*

iptables-restore < iptables\_back

These spoofing entries are recreated for every when we bring the any new VM in openstack. Pls make sure that it is cleaned

4) Also make sure the default route in openWRT VM is pointing the WAN IP.

root@OpenWrt:/# route -n

Kernel IP routing table

Destination Gateway Genmask Flags Metric Ref Use Iface

0.0.0.0 10.10.1.1 0.0.0.0 UG 0 0 0 eth1

10.10.1.0 0.0.0.0 255.255.255.0 U 0 0 0 eth1

192.168.2.0 192.168.120.1 255.255.255.0 UG 0 0 0 br-lan

.

Also modify /etc/resolv.conf to have following entry only

nameserver 8.8.8.8

then try nslookup [www.google.com](http://www.google.com/). If we are able to get the success, then we are able to reach the outside network.

Forward the traffic from TP link network to OpenWRT VM

5) To do this we need make linux as router supporting mutiple default routes. Run the following commands in the ubuntu machine where openWRT physical network connected to NIC card in ubuntu machine.

*In ubuntu machine:*

*sudo echo "1 admin" >> /etc/iproute2/rt\_tables*

*sudo ip route add 192.168.2.0/24 dev eth1 src 192.168.2.1 table admin*

*sudo ip route add default via 192.168.120.30 dev br-mgmt0 table admin*

*sudo ip rule add from 192.168.2.0/24 table admin*

*sudo ip rule add to 192.168.2.0/24 table admin*

*sudo ip route flush cache*

*Note:*

*192.168.2.1 is NIC card interface IP in ubuntu machine where TP Link is connected*

*92.168.120.8 is the LAN interface of openWRT VM*

*192.168.2.0/24 is the subnet where openWRT client devices are connected*

*If you want to undo these changes:*

*sudo ip route del 192.168.2.0/24 dev eth1 src 192.168.2.1 table admin*

*sudo ip route del default via 192.168.120.8 dev br-mgmt0 table admin*

*sudo ip rule del from 192.168.2.0/24 table admin*

*sudo ip rule del to 192.168.2.0/24 table admin*

remove the row("1 admin" ) from /etc/iproute2/rt\_tables file

*sudo ip route flush cache*

6) Need to add the routing entry in openWRT VM to forward the replies coming to WAN interface to TP Link network

sudo ip route add 192.168.2.0/24 via 192.168.120.1 dev br-lan

Now you will see the TP link clients are talking to interface.

Backup:

Following are various trial and error methods to try and debug the issues arrived during these setup.

sudo echo "1 admin" >> /etc/iproute2/rt\_tables

sudo ip route add 192.168.2.0/24 dev eth1 src 192.168.2.1 table admin

sudo ip route add default via 192.168.120.8 dev br-mgmt0 table admin

sudo ip rule add from 192.168.2.0/24 table admin

sudo ip rule add to 192.168.2.0/24 table admin

deleteing the rows

sudo ip rule del from 192.168.2.1 table admin

sudo ip rule del to 192.168.2.1 table admin

sudo ip route del default via 192.168.120.7 dev br-mgmt0 table admin

sudo ip route del 192.168.2.0/24 dev eth1 src 192.168.2.1 table admin

remove "1 admin" in /etc/iproute2/rt\_tables

ip route add default via 192.168.120.8 src 192.168.120.1 table svcvm

ip rule add from 192.168.2.0/24 to 0/0 table svcvm

ip route flush cache

ip route del default via 192.168.120.8 src 192.168.120.1 table svcvm

ip rule del from 192.168.2.0/24 to 0/0 table svcvm

sudo ip route add default via 192.168.120.8 table svcvm proto kernel

sudo ip rule add from 192.168.2.22/24 to 0/0 table svcvm

sudo ip route del default via 192.168.2.1 table svcvm2 proto kernel

sudo ip rule del from 192.168.120.0/24 to 192.168.2.0/24 table svcvm2

sudo ip route flush cache

ip route add 192.168.120.0/24 dev br-lan src 192.168.120.1 table svcvm

ip route add default via 10.10.1.1 dev eth1 table svcvm

ip rule add from 192.168.120.1 table svcvm

ip rule add to 192.168.120.1 table svcvm

ip route flush cache

ip rule add from 192.168.120.0/24 table svcvm

ip rule add to 192.168.120.0/24 table svcvm

ip route flush cache

ip rule del from 192.168.120.0/24 table svcvm

ip rule del to 192.168.120.0/24 table svcvm

ip route flush cache

ip rule add from 192.168.2.0/24 table svcvm

ip rule add to 192.168.2.0/24 table svcvm

ip route flush cache

in the ubuntu machine:

sudo echo "1 admin" >> /etc/iproute2/rt\_tables

sudo ip route add 192.168.2.0/24 dev eth1 src 192.168.2.1 table admin

sudo ip route add default via 192.168.120.8 dev br-mgmt0 table admin

sudo ip rule add from 192.168.2.0/24 table admin

sudo ip rule add to 192.168.2.0/24 table admin

sudo echo "1 admin" >> /etc/iproute2/rt\_tables

sudo ip route del 192.168.2.0/24 dev eth1 src 192.168.2.1 table admin

sudo ip route del default via 192.168.120.8 dev br-mgmt0 table admin

sudo ip rule del from 192.168.2.0/24 table admin

sudo ip rule del to 192.168.2.0/24 table admin

tried in the openWRT: ( able to ping the wan ip but others are not working)

echo "1 admin" >> /etc/iproute2/rt\_tables

ip route add 192.168.120.0/24 dev eth1 src 192.168.120.8 table admin

ip route add 10.10.1.0/24 dev eth1 src 10.10.1.8 table admin

ip route add default via 192.168.120.1 dev br-lan table admin

ip rule add from 192.168.2.0/24 table admin

ip rule add to 192.168.2.0/24 table admin

ip route flush cache

ip route del 192.168.120.0/24 dev eth1 src 192.168.120.8 table admin

ip route del 10.10.1.0/24 dev eth1 src 10.10.1.8 table admin

ip route del default via 192.168.120.1 dev br-lan table admin

ip rule del from 192.168.2.0/24 table admin

ip rule del to 192.168.2.0/24 table admin

export OS\_USERNAME=admin

export OS\_TENANT\_NAME=service

$ sudo ifconfig brwan 192.168.2.189 promisc up # use eth0 ip here

$ sudo ifconfig eth0.1 0.0.0.0 promisc up # remove eth0 ip

$ sudo route add default gw 192.168.2.1 dev brwan