KVM/QEMU Bridging on a bonded network

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What is a linux bridge?

A bridge is a way to connect two Ethernet segments together in a protocol independent way. Packets are forwarded based on Ethernet address, rather than IP address (like a router). Since forwarding is done at Layer 2, all protocols can go transparently through a bridge.

What is qemu?

QEMU (short for **Quick Emulator**) is a free and open-source hosted hypervisor that performs hardware virtualization (not to be confused with hardware-assisted virtualization).

What software is required to setup a bridge?

- CentOS/Redhat: yum install bridge-utils
- Debian/Ubuntu: apt-get install bridge-utils

How to configure a bridge on a bonded network?

Note: This example, will make use of a custom subnet of /29.

Adding the basic bridge configuration to the existing network configuration (Debian/Ubuntu) example below, you will see `vmbr0` has been added merely as a placeholder

```
# nano /etc/network/interfaces

auto lo
iface lo inet loopback
```

```
auto bond0
iface bond0 inet static
    address 147.75.96.218
    netmask 255.255.255.248
    gateway 147.75.96.217
    bond-downdelay 200
    bond-miimon 100
    bond-mode 4
    bond-updelay 200
    bond-xmit_hash_policy layer3+4
    bond-lacp-rate 1
    bond-slaves enp2s0 enp2s0d1
    dns-nameservers 147.75.207.207 147.75.207.208
iface bond0 inet6 static
    address 2604:1380:0:6900::5
    netmask 127
    gateway 2604:1380:0:6900::4

auto bond0:0
iface bond0:0 inet static
    address 10.99.54.5
    netmask 255.255.255.254
    post-up route add -net 10.0.0.0/8 gw 10.99.54.4
    post-down route del -net 10.0.0.0/8 gw 10.99.54.4

auto enp2s0
iface enp2s0 inet manual
    bond-master bond0

auto enp2s0d1
iface enp2s0d1 inet manual
    pre-up sleep 4
    bond-master bond0

auto vmbr0
iface vmbr0 inet static
    bridge_ports bond0
    bridge_stp off
    bridge_fd 0
```

With the above bridge place holder included in the bonded network configuration above & the use of a custom subnet of `/29` we migrate the details of `bond0` (IP etc) to `vmbr0` while keeping everything else in place, see the following example:

```
auto bond0
iface bond0 inet manual
    bond-downdelay 200
    bond-miimon 100
    bond-mode 4
    bond-updelay 200
    bond-xmit_hash_policy layer3+4
    bond-lacp-rate 1
    bond-slaves enp2s0 enp2s0d1

auto vmbr0
iface vmbr0 inet static
    address 147.75.96.218
    netmask 255.255.255.248
    gateway 147.75.96.217
    bridge_ports bond0
    bridge_stp off
    bridge_fd 0
    dns-nameservers 147.75.207.207 147.75.207.208
```

Please Note: The bridge will only function with a custom subnet size of /29 & /28. For elastic IP's, scroll to the bottom.

How to configure a bridge on a non-bonded network?

```
iface eth0 inet manual

auto br0
iface br0 inet static
    address  147.75.88.218
    netmask  255.255.255.248
    gateway  147.75.88.217
    bridge_ports eth0
    bridge_stp off
    bridge_fd 0
    bridge_maxwait 0
```

The above configuration is more for our Layer2 with the default bond broken.

How to configure a bridge with Elastic IP's?

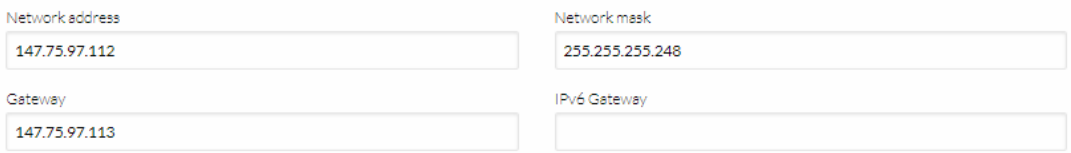
Since elastic IP's are routed directly to your machine, they don't need a bridge_port towards your bond interface.

Adding the following configuration to your /etc/network/interfaces file will work to create a bridge for KVM using Elastic IP's.

In this example, we will configure the following elastic IPv4 subnet.


```
auto vmbr1
iface vmbr1 inet static
    address 147.75.97.113
    netmask 255.255.255.248
    network 147.75.97.112
    broadcast 147.75.97.119
    bridge_ports none
    bridge_stp on
    bridge_fd 0
    bridge_maxwait 0
```

VM's using the above Elastic IP's will need the following configuration:



You can run the following command to bring the bridge up, you don't need to restart the bond0 interface since there is no changes made to that interface.

```
ifup vmbr1
```

Restart Network

Once the interfaces file has been configured you can restart the server, or use `ifdown -a && ifup -a` to restart the network in one command.

If the network fails to come back up, you can log in via SOS console and revert the changes made to restore the network.

Check Bridges

In this example, vmbr0 is the original static bridge on a bonded network, while vmbr1 is the elastic IP bridge which requires no interface attachment.

```
# brctl show
bridge name     bridge id               STP enabled     interfaces
virbr0          8000.525400ffa2f0       yes             virbr0-nic
vmbr0           8000.fe00934b6172       yes             bond0
vmbr1           8000.fe0400ffa272       yes
```

External Resources

- Bridge Network Connections (Debian)
- Setup KVM & Bridge (Ubuntu)
- Bridge Setup (CentOS/RedHat)

Tags

bridge

kvm

qemu