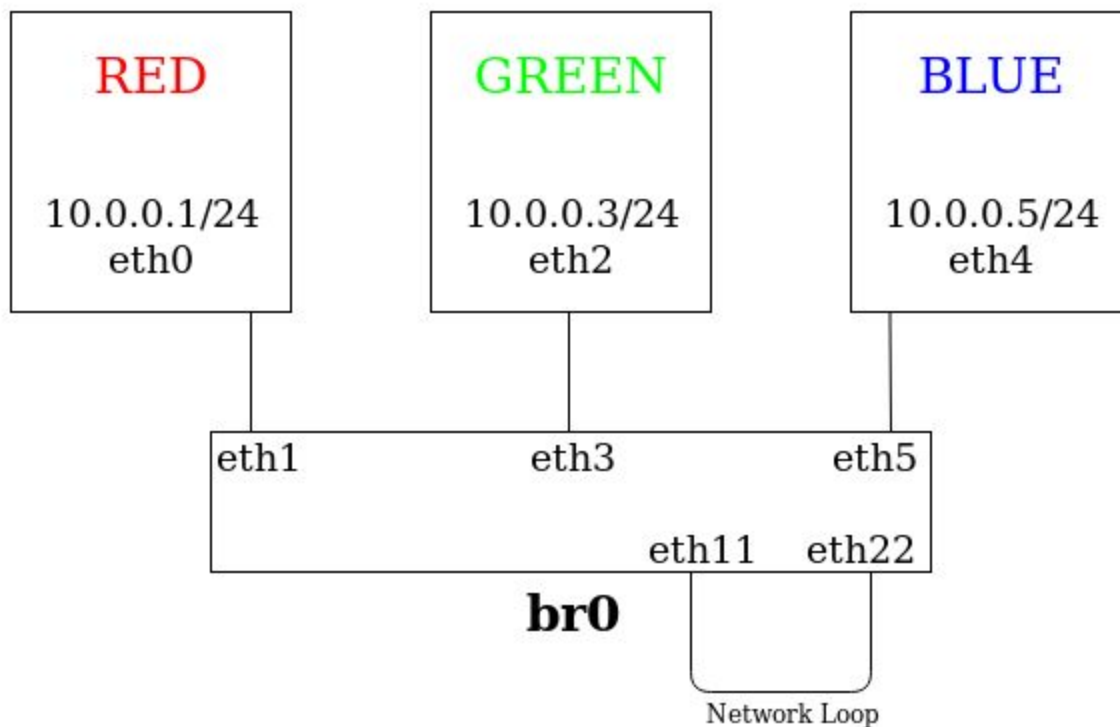


1. Star topology with three namespaces with a Linux bridge at the center.



```
// Create three namespaces
```

```
sudo ip netns add red
```

```
sudo ip netns add blue
```

```
sudo ip netns add green
```

```
// Create veth pairs
```

```
sudo ip link add eth0 type veth peer name eth1
```

```
sudo ip link add eth2 type veth peer name eth3
```

```
sudo ip link add eth4 type veth peer name eth5
```

```
// Set the veth interfaces inside the namespaces
```

```
sudo ip link set eth0 netns red
```

```
sudo ip link set eth2 netns green
```

```
sudo ip link set eth4 netns blue
```

```
// Bring loopback interfaces up
```

```
sudo ip netns exec red ip link set lo up
```

```
sudo ip netns exec green ip link set lo up
```

```
sudo ip netns exec blue ip link set lo up
```

```
// Bring up the interfaces within namespaces
```

```
sudo ip netns exec red ip link set eth0 up
```

```
sudo ip netns exec green ip link set eth2 up
```

```
sudo ip netns exec blue ip link set eth4 up
```

```
// Assign interfaces within namespaces IP addresses
```

```
sudo ip netns exec red ip address add 10.0.0.1/24 dev eth0
```

```
sudo ip netns exec green ip address add 10.0.0.3/24 dev eth2
```

```
sudo ip netns exec blue ip address add 10.0.0.5/24 dev eth4
```

```
// Create bridge using iproute package. Brctl is deprecated
```

```
sudo ip link add name br0 type bridge
```

```
sudo ip link set dev br0 up
```

```
// Set the other lose interfaces into the bridge
```

```
sudo ip link set eth1 master br0
```

```
sudo ip link set eth3 master br0
```

```
sudo ip link set eth5 master br0
```

```
//Bring bridge interfaces up
```

```
sudo ip link set dev eth1 up
```

```
sudo ip link set dev eth3 up
```

```
sudo ip link set dev eth5 up
```

```
// Now ping, it works
```

```
sudo ip netns exec red ping 10.0.0.3
```

```
sudo ip netns exec red ping 10.0.0.5
```

```
sudo ip netns exec green ping 10.0.0.5
```

```
// Add network loop into br0 and set the interfaces up
```

```
sudo ip link add eth11 type veth peer name eth22
```

```
sudo ip link set eth11 master br0
```

```
sudo ip link set eth22 master br0
```

```
sudo ip link set dev eth11 up
```

```
sudo ip link set dev eth22 up
```

```
// Delete old arp entries
```

```
sudo ip netns exec red arp -d 10.0.0.5
```

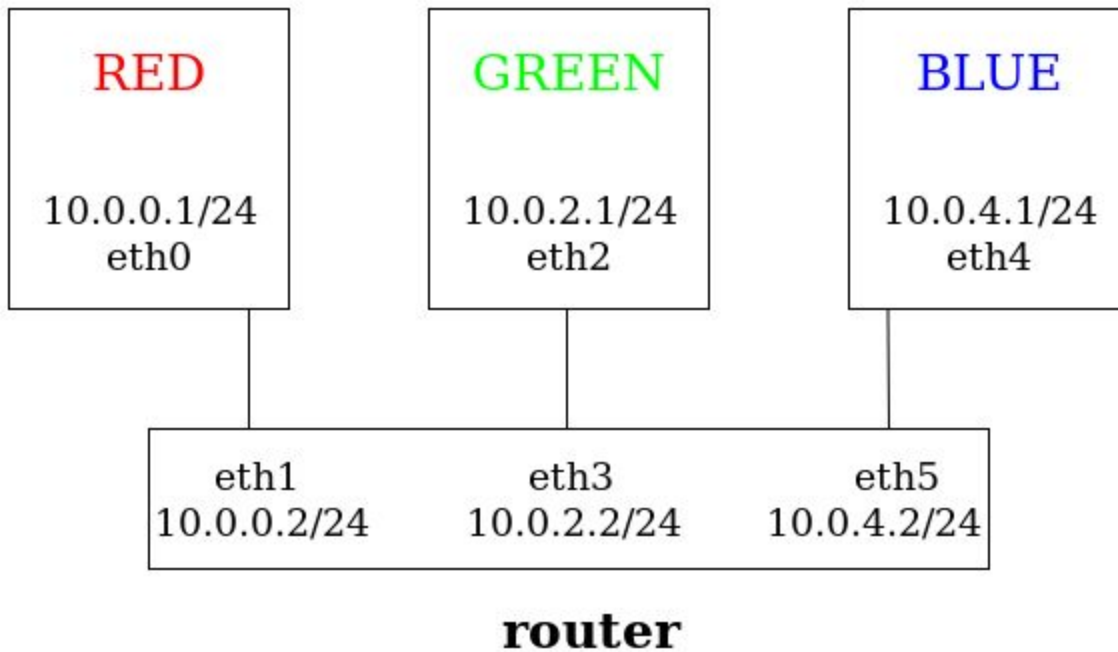
```
sudo ip netns exec red arp -d 10.0.0.3
```

```
// Ping won't work. Reason: Network loop.
```

```
sudo ip netns exec green ping 10.0.0.5
```

```
sudo ip netns exec red ping 10.0.0.3
```

2. Star topology with three namespaces with one namespace (router) at the center.



```
// Create three namespaces
```

```
sudo ip netns add red
```

```
sudo ip netns add green
```

```
sudo ip netns add blue
```

```
// Create three veth pairs
```

```
sudo ip link add eth0 type veth peer name eth1
```

```
sudo ip link add eth2 type veth peer name eth3
```

```
sudo ip link add eth4 type veth peer name eth5
```

```
// Set them into the namespaces
```

```
sudo ip link set eth0 netns red
```

```
sudo ip link set eth2 netns green
```

```
sudo ip link set eth4 netns blue
```

```
// Bring them up
```

```
sudo ip netns exec red ip link set eth0 up
sudo ip netns exec green ip link set eth2 up
sudo ip netns exec blue ip link set eth4 up
```

```
// Assign IP address to them (all different subnets)
sudo ip netns exec red ip address add 10.0.0.1/24 dev eth0
sudo ip netns exec green ip address add 10.0.2.1/24 dev eth2
sudo ip netns exec blue ip address add 10.0.4.1/24 dev eth4
```

```
// Create router namespace and add appropriate interfaces into it
sudo ip netns add router
sudo ip link set eth1 netns router
sudo ip link set eth3 netns router
sudo ip link set eth5 netns router
```

```
// Bring the interface up
sudo ip netns exec router ip link set eth1 up
sudo ip netns exec router ip link set eth3 up
sudo ip netns exec router ip link set eth5 up
```

```
// Assign IP addresses to the interfaces within router
sudo ip netns exec router ip address add 10.0.0.2/24 dev eth1
sudo ip netns exec router ip address add 10.0.2.2/24 dev eth3
sudo ip netns exec router ip address add 10.0.4.2/24 dev eth5
```

```
// Bring loopback interfaces up
sudo ip netns exec router ip link set lo up
sudo ip netns exec red ip link set lo up
sudo ip netns exec blue ip link set lo up
sudo ip netns exec green ip link set lo up
```

```
//Try ping, won't work as there is no way to know where to send packets
// Add default gateway, i.e. it serves as a forwarding host to connect to other networks
sudo ip netns exec red ip route add default via 10.0.0.2 dev eth0
sudo ip netns exec green ip route add default via 10.0.2.2 dev eth2
sudo ip netns exec blue ip route add default via 10.0.4.2 dev eth4
```

```
//Enable IP forwarding : Make a system to act as a router i.e., it should determine the path a
packet has to take to reach it's destination
sudo ip netns exec router sysctl -w net.ipv4.ip_forward=1
```

```
// Try ping now, it works
sudo ip netns exec red ping 10.0.4.1
```

```
sudo ip netns exec red ping 10.0.2.1  
sudo ip netns exec blue ping 10.0.0.1
```