Basic Networking Hans-on: VyOS and Static Routing

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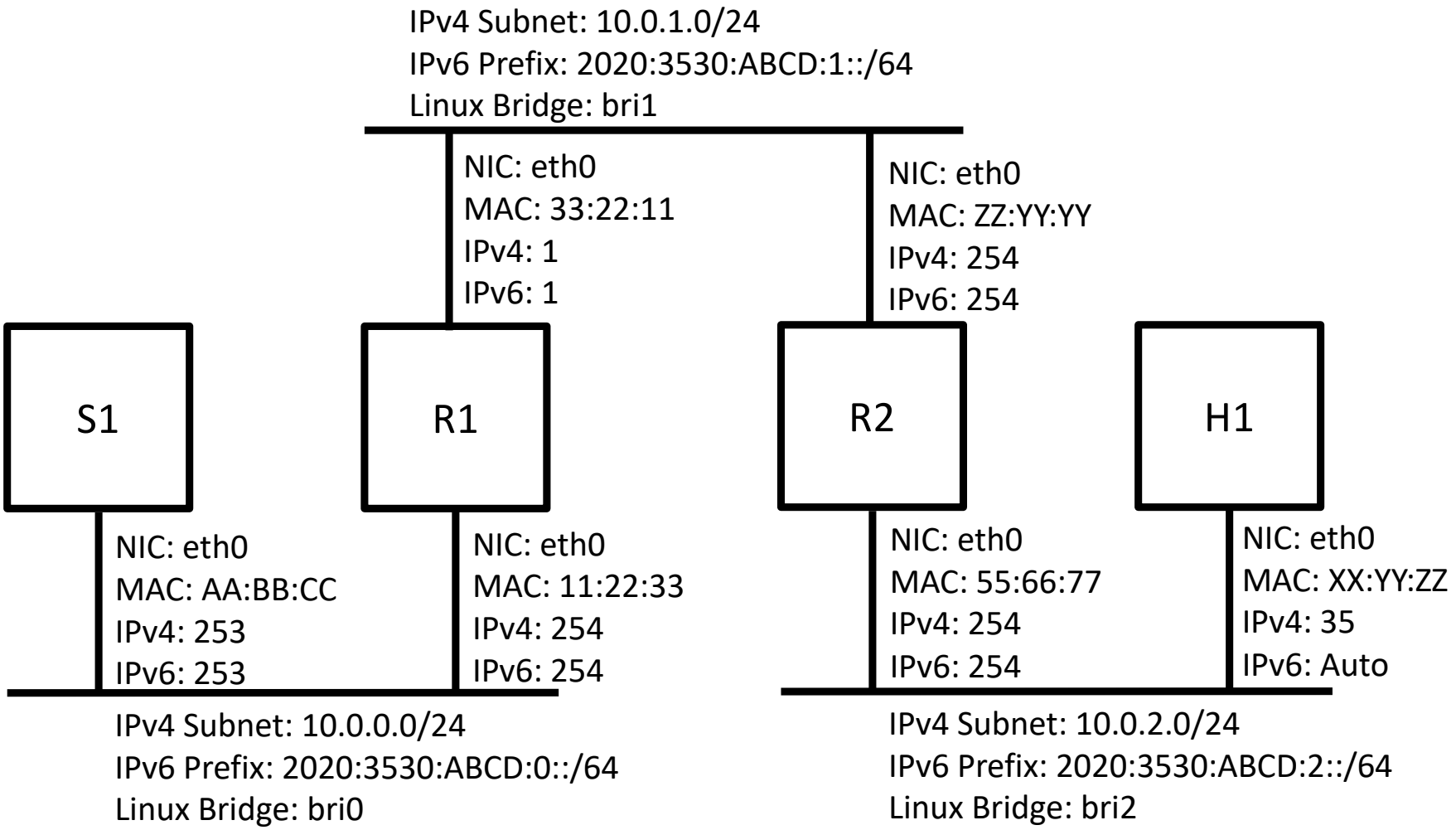
Objective and Contents

- Objective
  - Interconnecting multiple subnets
  - Understanding the static routing in IPv4 and IPv6
  - Understanding a router

- Contents
  - Installing 2 VM instances of VyOS
  - Configuring the more subnets
  - Checking connectivity between throughout the network

Network Diagram of the Day



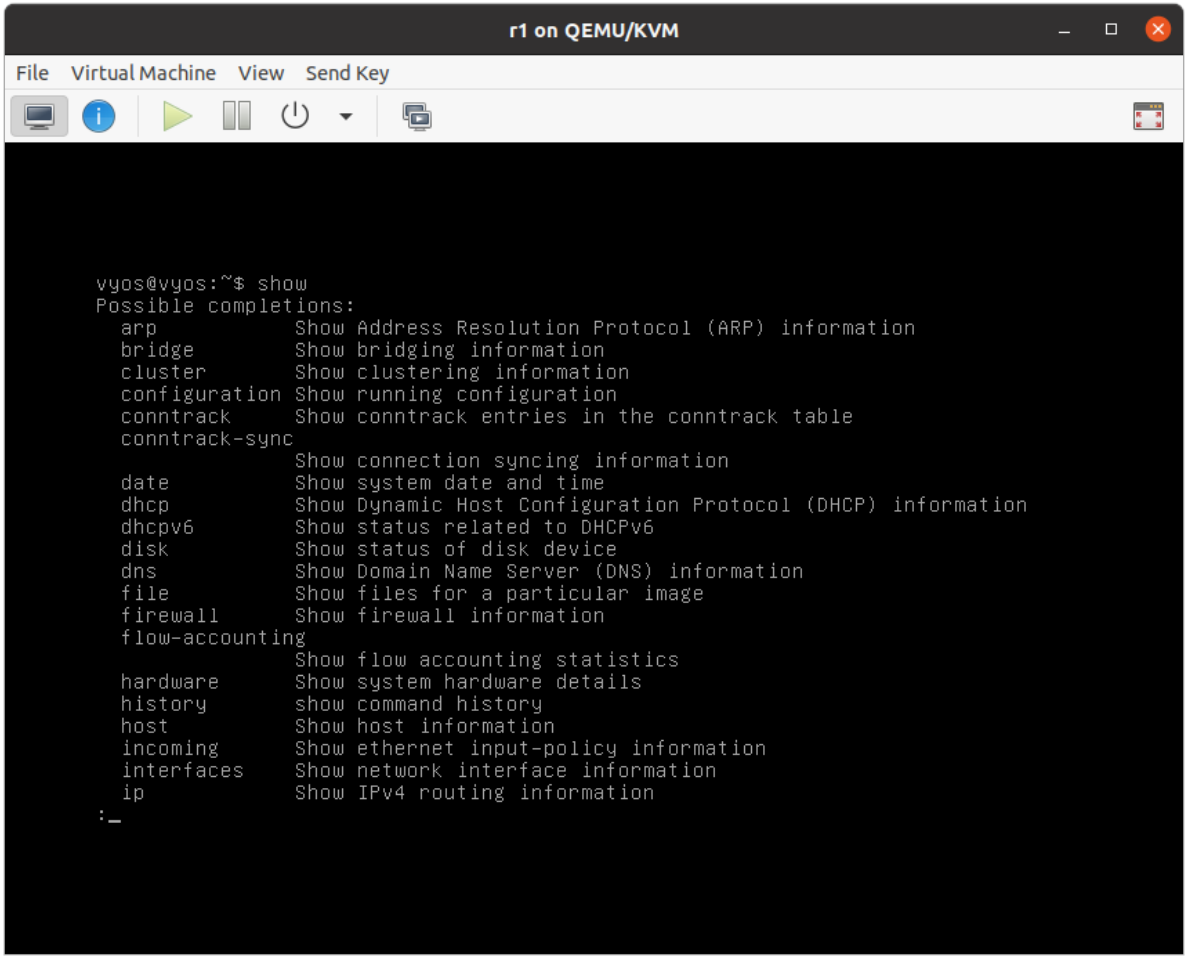
Preparation for Running VyOS as a VM

- Copy ISO image of VyOS 1.1.8 to your laptop
- Install a VyOS instance on virt-manager
- Login to VyOS
- Execute “install image”

The most important commands (1/2)

```
$ show ?
```

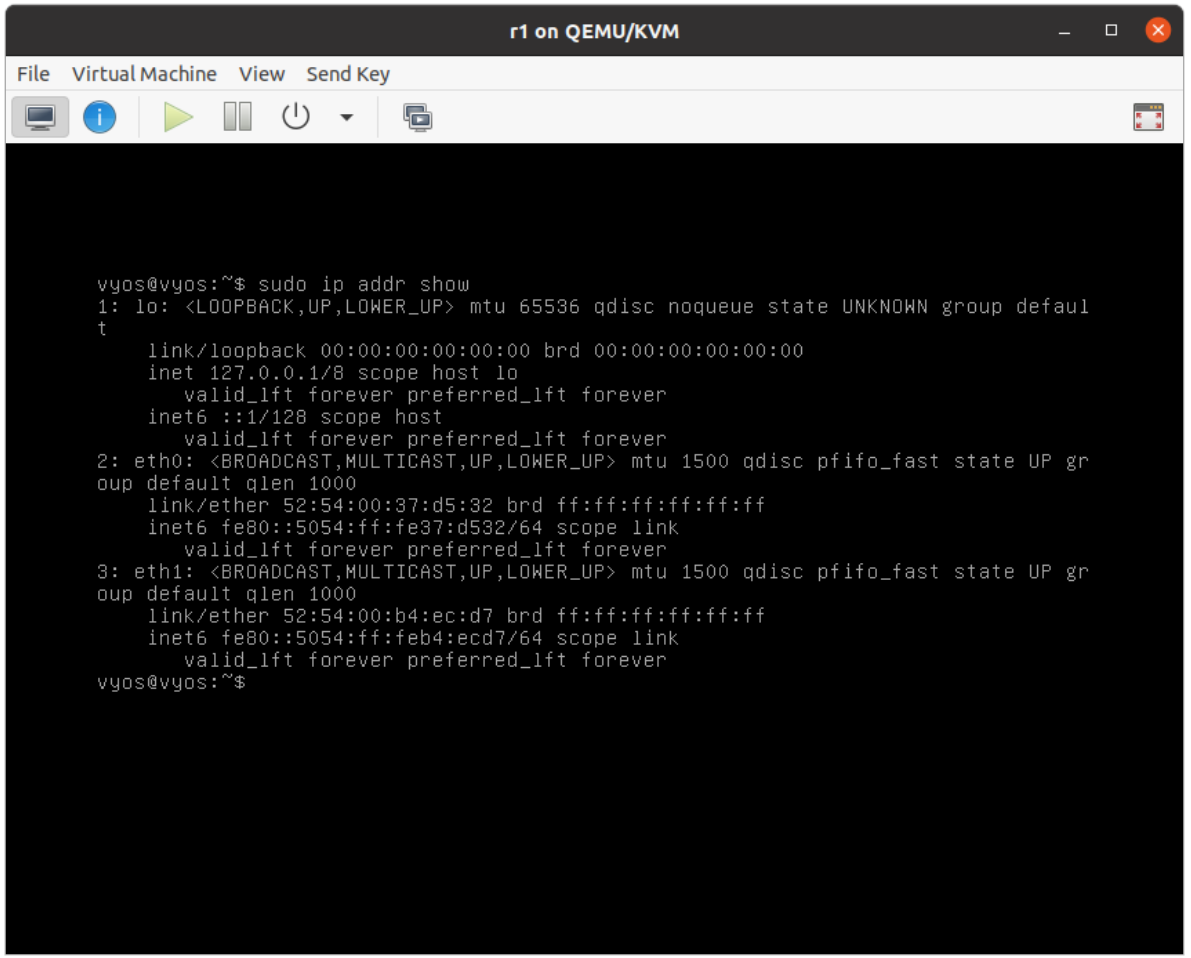
- What does it give?



The most important commands (2/2)

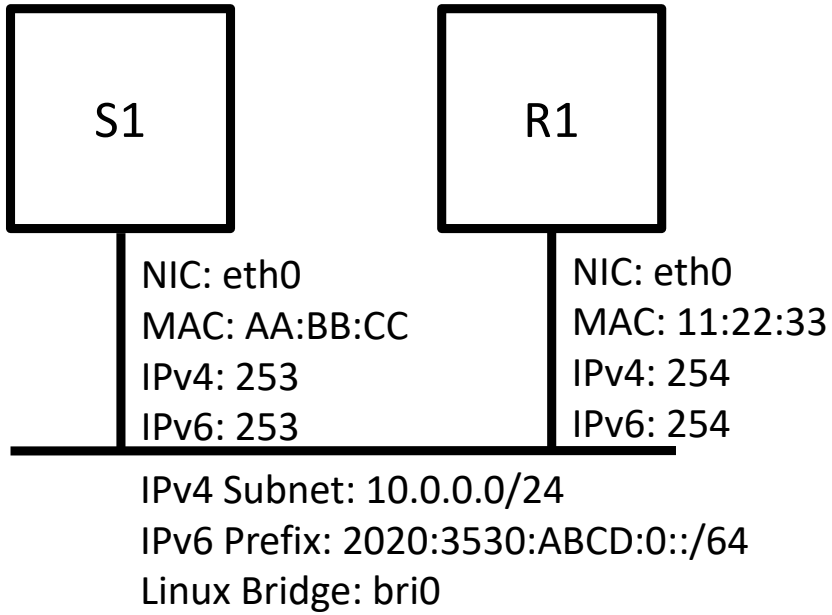
```
$ sudo SOMETHING
```

- Allows you to execute Linux commands
  - ip addr show
  - ping, traceroute, tcpdump
  - iperf



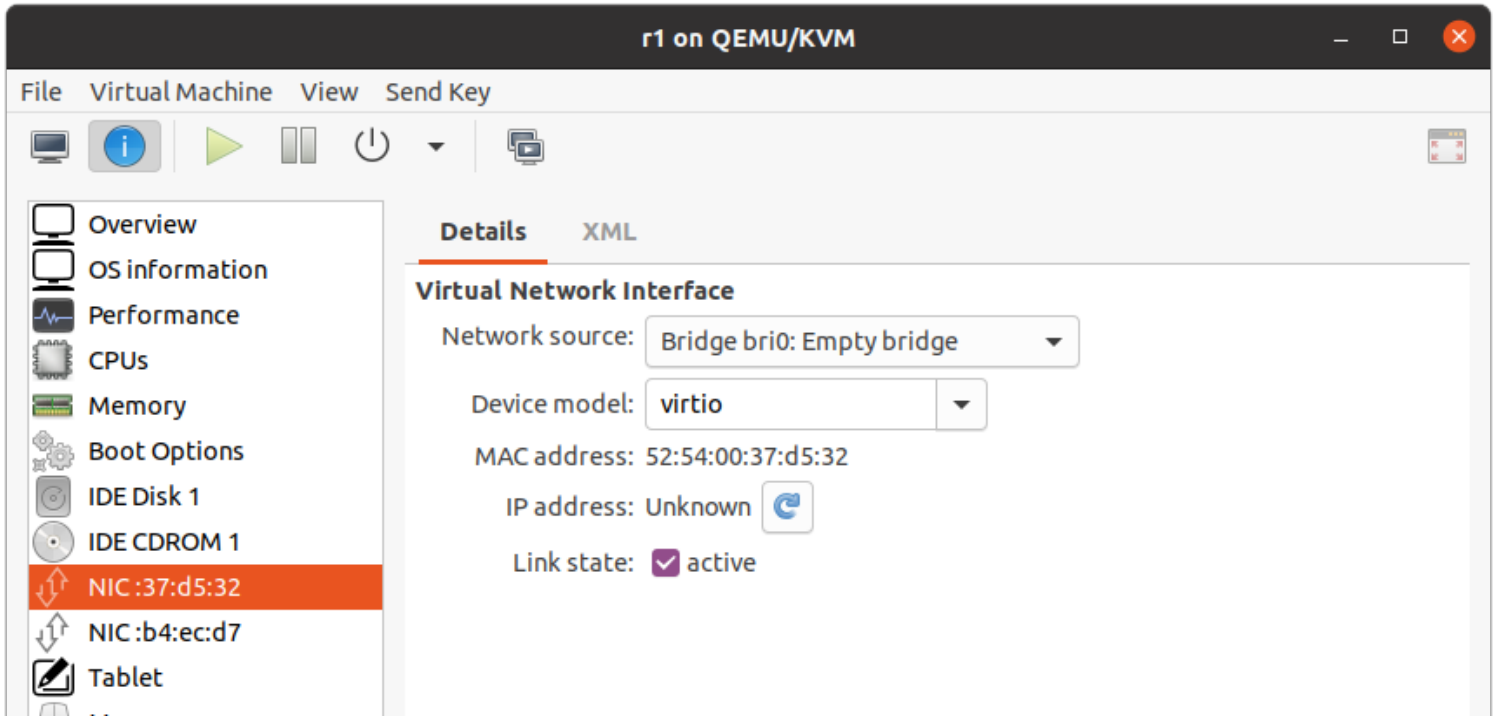
Connecting R1 to the same Linux Bridge with S1

- Goal: S1 and R1 ping each other
- eth0 of R1 must be connected via Bridge I/F (bri0)
- Fix the IPv4/v6 address to give to each NIC by yourself



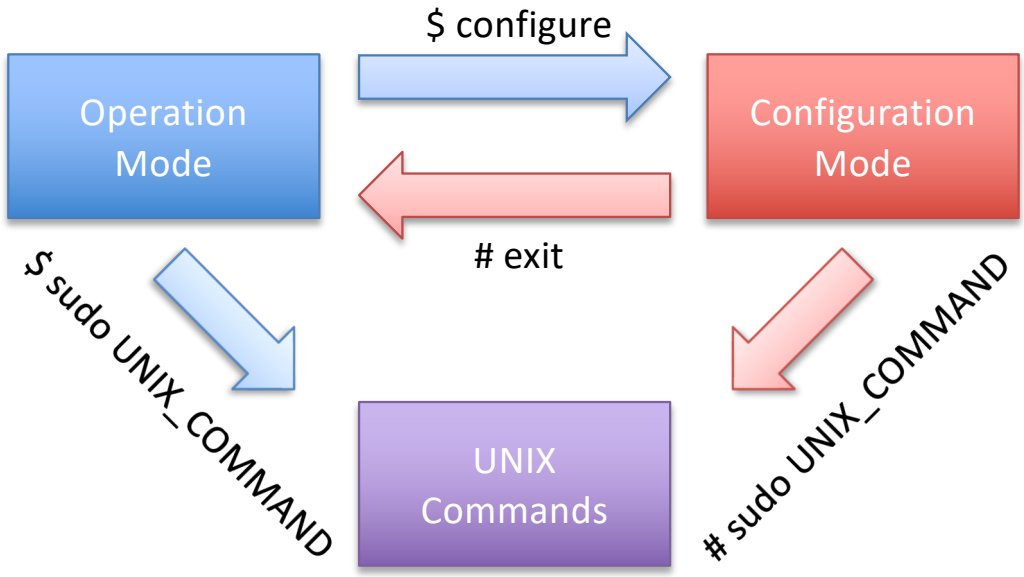
Selecting an appropriate Bridge I/F on virt-manager

- “Network source” must be Bridge I/F for VM-VM connection on the same virt-manager



Basic Operation of VyOS

- Operation Mode
  - Show configuration and status
  - Restart, power off the system
- Configuration Mode
  - Show and set configuration



Showing Status and Configuration

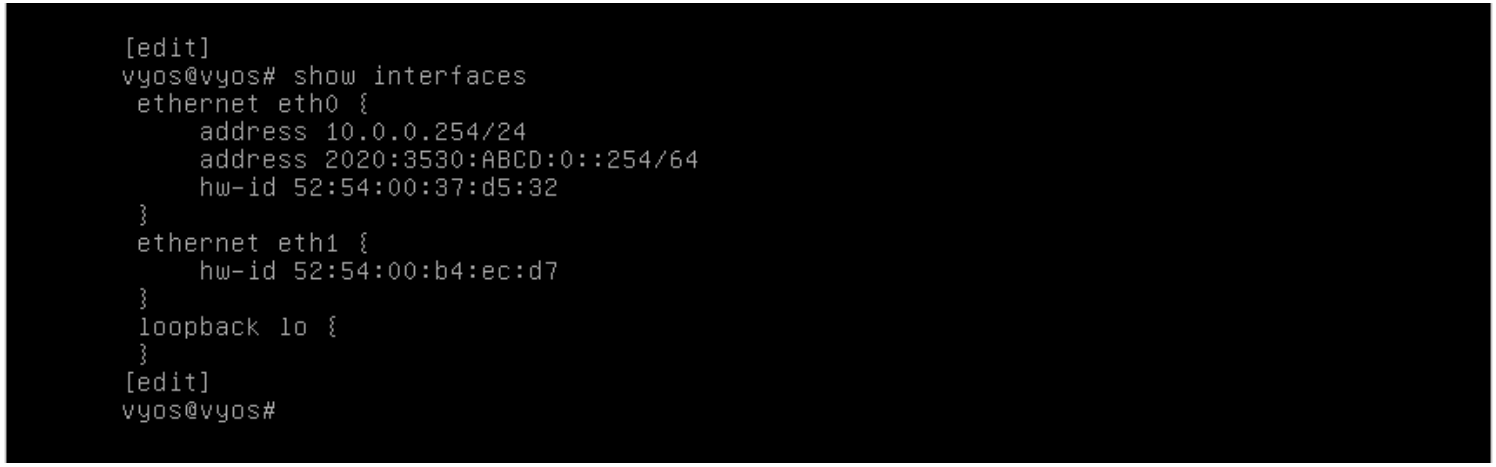
- “$ show SOMETHING” provides the status of your configuration and protocol behavior

- “# show SOMETHING” provides the configuration of what you have done

Configuring IP Address on VyOS

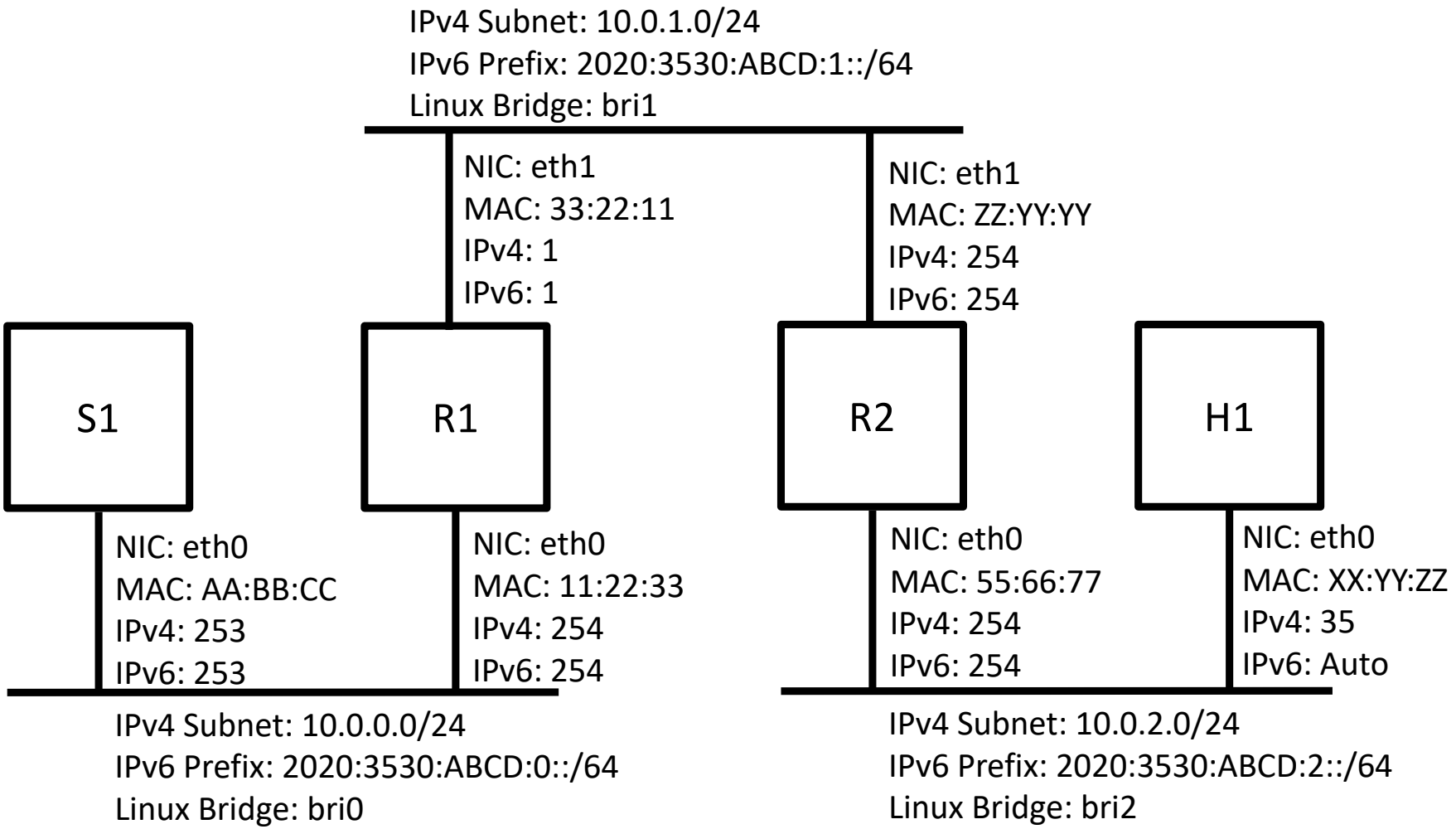
- Example to configure IPv4/v6 addresses on ethX

```
$ configure
# set interfaces ethernet eth0 address 10.0.0.254/24
# set interfaces ethernet eth0 address 2020:3530:ABCD:0::254/64
# commit
# save
```



Things to explore further

What we covered till now



Things you can explore until S1 and H1 can ping with each other using IPv4 and IPv6

- Adding a static IPv6 address to S1?
- Installing R2, Relocating H1
- Enabling routing at S1, H1, R1 and R2

- Optional
  - Enabling “Router Advertisement” on R2 so that H1 can configure IPv6 address automatically
  - Enabling AAAA Records in DNS Server (Hostname <-> IPv6 address)

Hint: Setting Up Bridge I/Fs on Host Ubuntu

- Creating 2 additional bridge interfaces (assuming you already have bri0)

```
$ sudo brctl addbr bri1
$ sudo brctl addbr bri2
```

- Making the interfaces up and running

```
$ sudo ip link set bri1 up
$ sudo ip link set bri2 up
```

Hint: Configuring Static Route on VyOS

- Example to configure IPv4/v6 static route on ethX

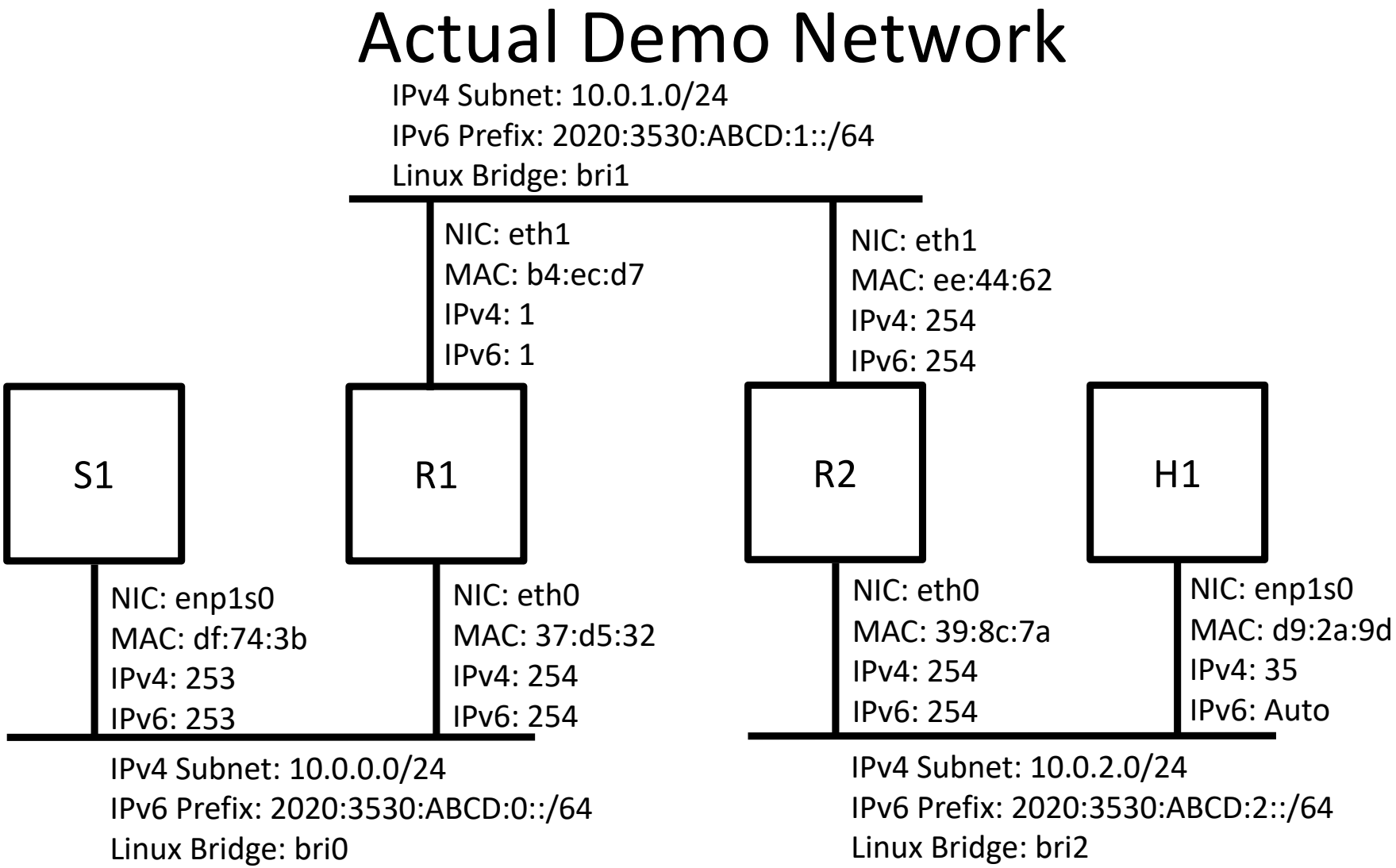
```
$ configure
# set protocols static route 192.168.102.0.0/24 next-hop 192.168.100.1
# set protocols static route6 2013:ABCD:102::/64 next-hop 2013:ABCD:100::1
# commit
# save
```

Hint: Deleting Configurations on VyOS

- Example to delete IPv4 address and static route

```
$ configure
# delete interfaces ethernet ethY address 192.168.1.10/24
# delete protocols static route 192.168.100.0/24 next-hop 192.168.101.1
# commit
# save
```

Actual Demo Network



Checking IPv4/IPv6 throughput in the network

- ping, ping6
- traceroute, traceroute6
- iperf
- tcpdump
- ip route show, ip -6 route show (on Ubuntu server)
- show ip route, show ipv6 route (on VyOS)

Done!!