In [1]:
```
%load_ext uhed
```

In [2]:
```
%slice SyedAhmed
```

In [3]:
```
%site vts-gpo
```

In [4]:
```
%lab
```

Lab 8 - NetState

Build Network

Building:

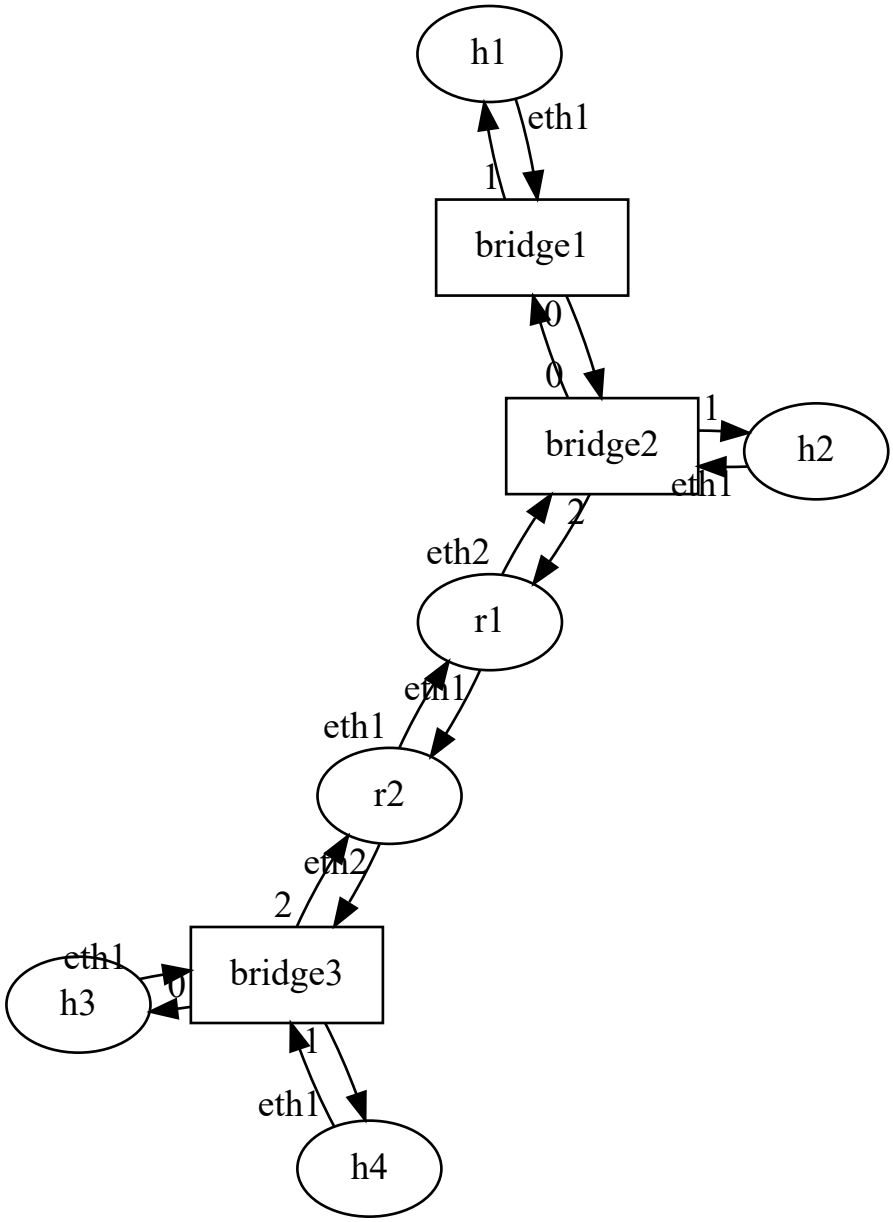
Success!

```
I created a slicename, selected the site that was not heavily in use by other
people in class and manifested
```

In [5]:
```
manifest = SITE.listresources(context, SLICE)
```

In [6]:
```
genish.showtopo(manifest,"neato")
```

Out[6]:



In [7]:
```
SITE.getL2Table(context, SLICE, "bridge1")
```

Out[7]:

Port	VLAN	MAC	Age
2	0	76:14:33:7c:c0:20	19
1	0	3e:e6:38:b8:83:67	19
1	0	82:59:af:d6:79:4f	9

In [8]:
```
SITE.getL2Table(context, SLICE, "bridge2")
```

Out[8]:

Port	VLAN	MAC	Age
1	0	76:14:33:7c:c0:20	28
2	0	3e:e6:38:b8:83:67	27
3	0	82:59:af:d6:79:4f	7

In [9]:
```
SITE.getL2Table(context, SLICE, "bridge3")
```

Out[9]:

Port	VLAN	MAC	Age
2	0	7e:53:7a:19:da:8e	31
1	0	5e:c3:fb:e6:26:cb	31
3	0	86:fe:87:53:24:79	0

At this point essentially what I did was I created the L2 tables and assigned them to the bridges present in the network. This shows that everything is working fine (MAC address).

In [10]:
```
SITE.IPv4Router.getRouteTable(context, SLICE, "r1")
```

Out[10]:

	Selected	Network	Next Hop	Interface	Duration
O	False	10.10.123.0/24 [110/10]	directly connected	eth2	00:35:25
C	True	10.10.123.0/24	directly connected	eth2	None
O	False	10.75.73.0/24 [110/10]	directly connected	eth1	00:34:45
C	True	10.75.73.0/24	directly connected	eth1	None
C	True	127.0.0.0/8	directly connected	lo	None
O	True	192.168.90.0/24 [110/20]	10.75.73.2	eth1	00:34:35

In [11]:
```
SITE.IPv4Router.getRouteTable(context, SLICE, "r2")
```

Out[11]:

	Selected	Network	Next Hop	Interface	Duration
O	True	10.10.123.0/24 [110/20]	10.75.73.1	eth1	00:34:43
O	False	10.75.73.0/24 [110/10]	directly connected	eth1	00:35:33
C	True	10.75.73.0/24	directly connected	eth1	None
C	True	127.0.0.0/8	directly connected	lo	None
O	False	192.168.90.0/24 [110/10]	directly connected	eth2	00:35:33
C	True	192.168.90.0/24	directly connected	eth2	None

In [13]:
```
SITE.Host.getRouteTable(context, SLICE, "h1")
```

Out[13]:

Destination	Mask	Gateway	Interface
0.0.0.0	0.0.0.0	10.10.123.254	eth1
10.10.123.0	255.255.255.0	0.0.0.0	eth1

In [14]:
```
SITE.Host.getRouteTable(context, SLICE, "h2")
```

Out[14]:

Destination	Mask	Gateway	Interface
0.0.0.0	0.0.0.0	10.10.123.254	eth1
10.10.123.0	255.255.255.0	0.0.0.0	eth1

In [15]:
```
SITE.Host.getRouteTable(context, SLICE, "h3")
```

Out[15]:

Destination	Mask	Gateway	Interface
0.0.0.0	0.0.0.0	192.168.90.254	eth1
192.168.90.0	255.255.255.0	0.0.0.0	eth1

In [16]:
```
SITE.Host.getRouteTable(context, SLICE, "h4")
```

Out[16]:

Destination	Mask	Gateway	Interface
0.0.0.0	0.0.0.0	192.168.90.254	eth1
192.168.90.0	255.255.255.0	0.0.0.0	eth1

In [17]:
```
SITE.Host.getRouteTable(context, SLICE, "r1")
```

Out[17]:

Destination	Mask	Gateway	Interface
10.10.123.0	255.255.255.0	0.0.0.0	eth2
10.75.73.0	255.255.255.0	0.0.0.0	eth1
192.168.90.0	255.255.255.0	10.75.73.2	eth1

In [18]:
```
SITE.Host.getRouteTable(context, SLICE, "r2")
```

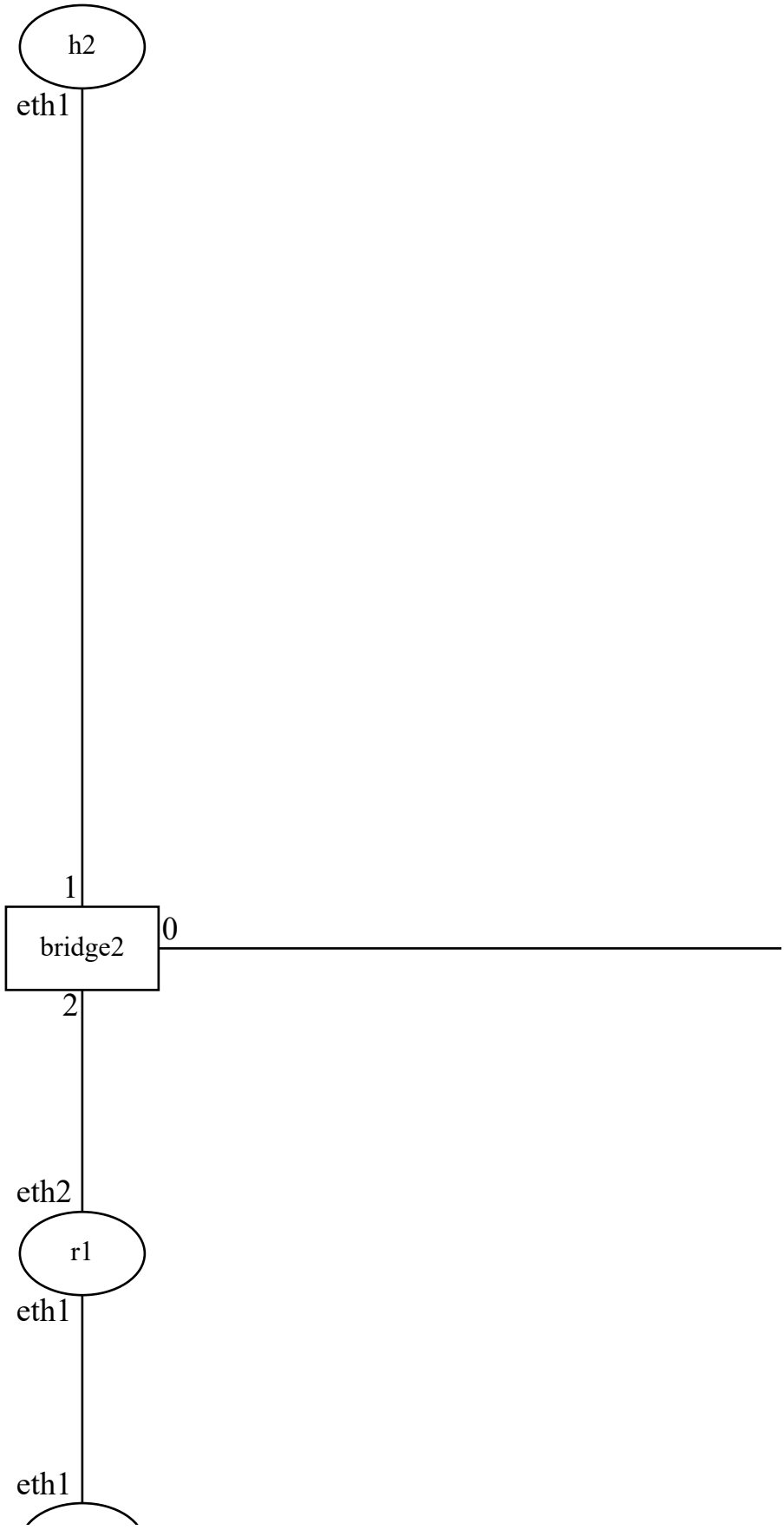
Out[18]:

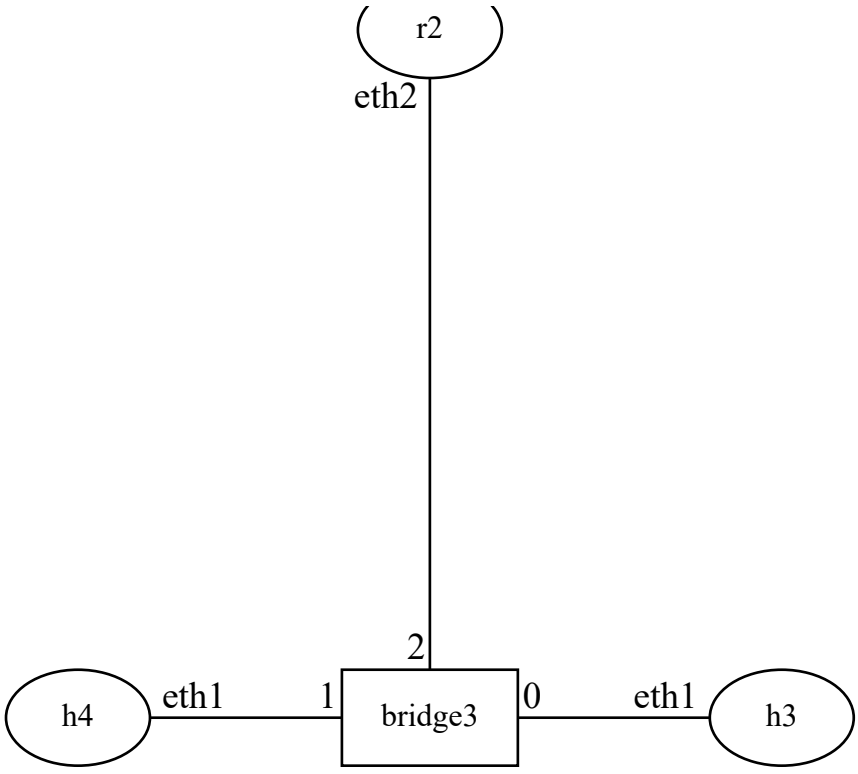
Destination	Mask	Gateway	Interface
10.10.123.0	255.255.255.0	10.75.73.1	eth1
10.75.73.0	255.255.255.0	0.0.0.0	eth1
192.168.90.0	255.255.255.0	0.0.0.0	eth2

In [22]:
```
import uhgeni.ssh
uhgeni.ssh.writeSliceConfig(SLICE, manifest)
```

In [23]:
```
import uhgeni.graph.util
g = uhgeni.graph.util.buildFromManifest(manifest)
g.context = context
g.show()
```

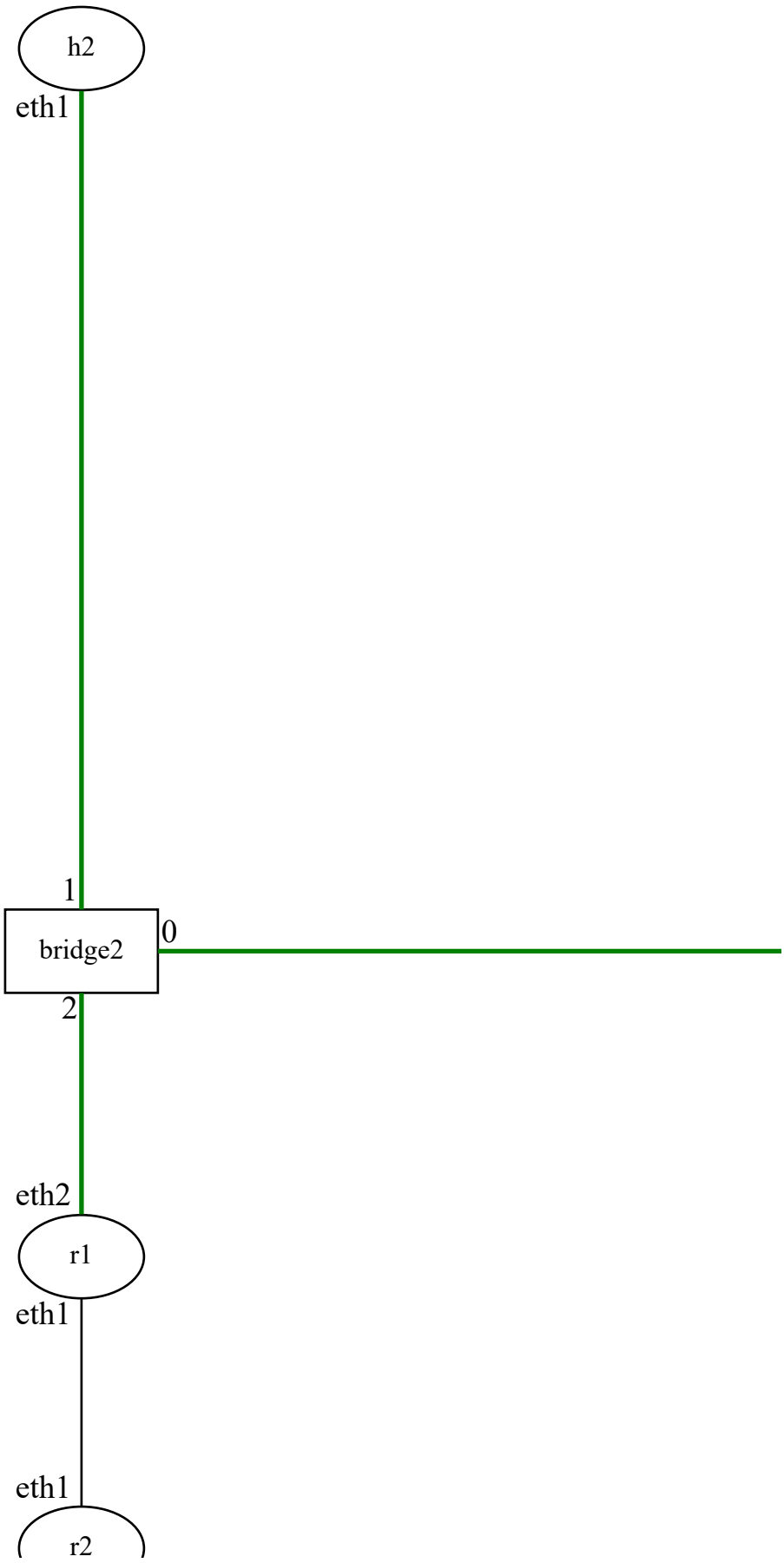
Out[23]:

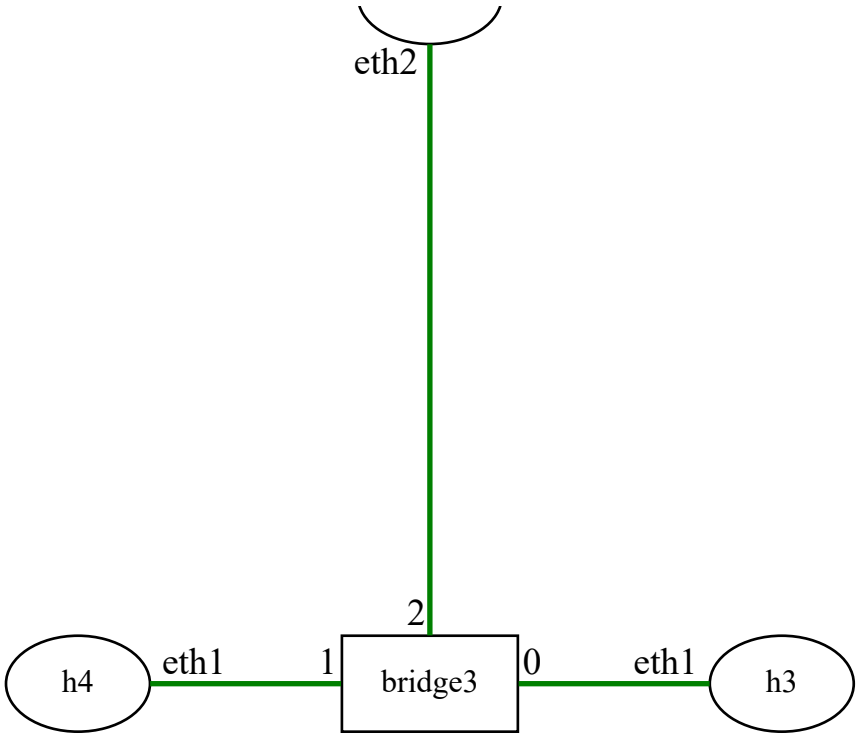



r2
eth2
2
h4
eth1
1
bridge3
0
eth1
h3

In [24]:
```
g.decorateSTPInfo()
g.show()
```

Out[24]:





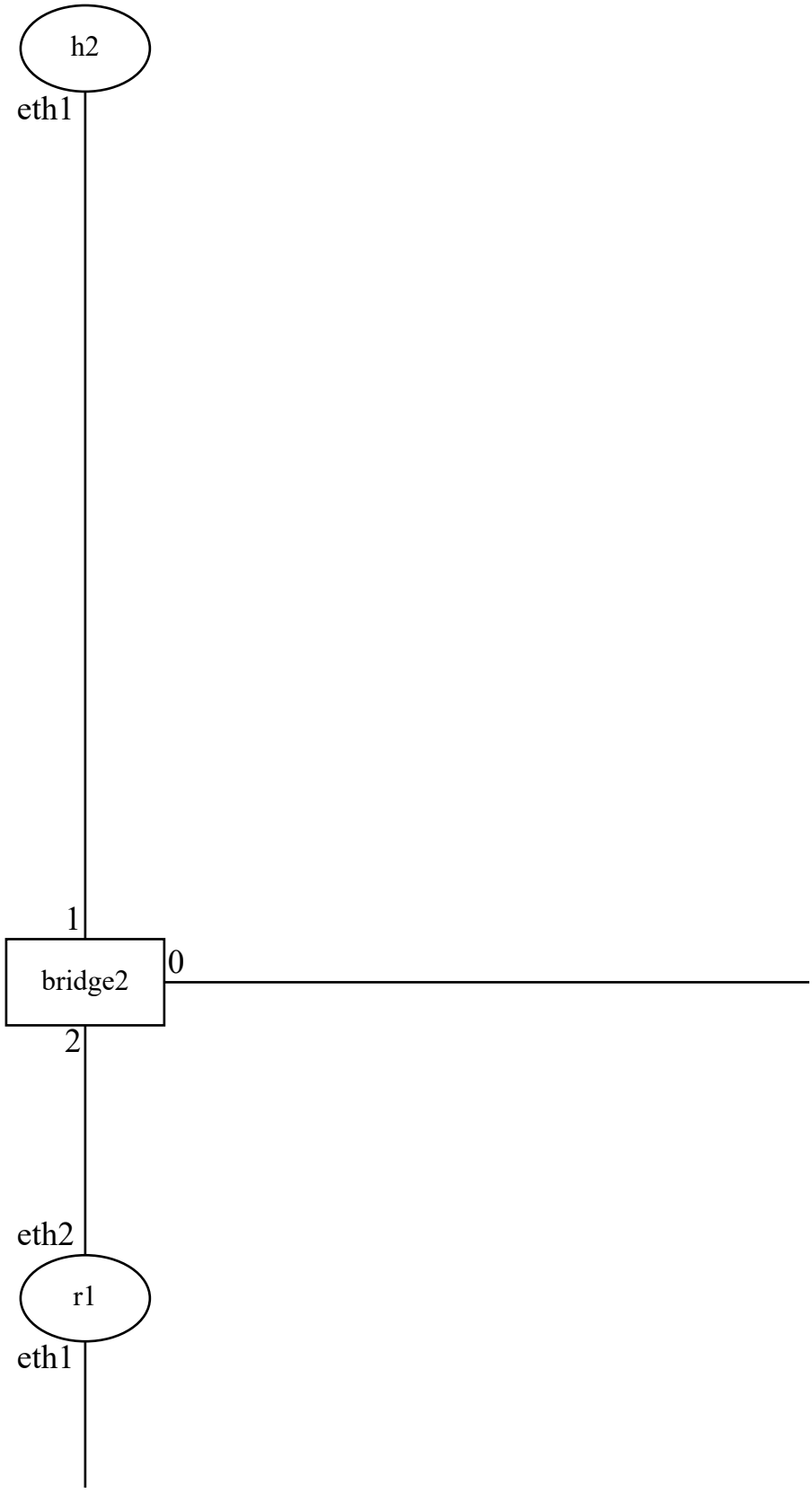
sazaidi5@cot-cn:~$ gssh SyedAhmed h1 / # tcpdump -i eth1 -e not ether dst 01:80:c2:00:00:00 -c 5 tcpdump: verbose output suppressed, use -v or -vv for full protocol decode listening on eth1, link-type EN10MB (Ethernet), capture size 262144 bytes 04:44:19.117720 82:59:af:d6:79:4f (oui Unknown) > 01:00:5e:00:00:05 (oui Unknown), ethertype IPv4 (0x0800), length 78: 10.10.123.254 > 224.0.0.5 : OSPFv2, Hello, length 44 04:44:19.118016 76:14:33:7c:c0:20 (oui Unknown) > 82:59:af:d6:79:4f (oui Unknown), ethertype IPv4 (0x0800), length 82: 10.10.123.1.38560 > 192.1 .242.132.53: 58678+ PTR? 5.0.0.224.in-addr.arpa. (40) 04:44:19.118491 82:59:af:d6:79:4f (oui Unknown) > 76:14:33:7c:c0:20 (oui Unknown), ethertype IPv4 (0x0800), length 110: 10.10.123.254 > 10.10.12 3.1: ICMP net 192.1.242.132 unreachable, length 76 04:44:21.620628 76:14:33:7c:c0:20 (oui Unknown) > 82:59:af:d6:79:4f (oui Unknown), ethertype IPv4 (0x0800), length 82: 10.10.123.1.38560 > 192.1 .242.132.53: 58678+ PTR? 5.0.0.224.in-addr.arpa. (40) 04:44:21.620691 82:59:af:d6:79:4f (oui Unknown) > 76:14:33:7c:c0:20 (oui Unknown), ethertype IPv4 (0x0800), length 110: 10.10.123.254 > 10.10.12 3.1: ICMP net 192.1.242.132 unreachable, length 76 5 packets captured 21 packets received by filter 13 packets dropped by kernel

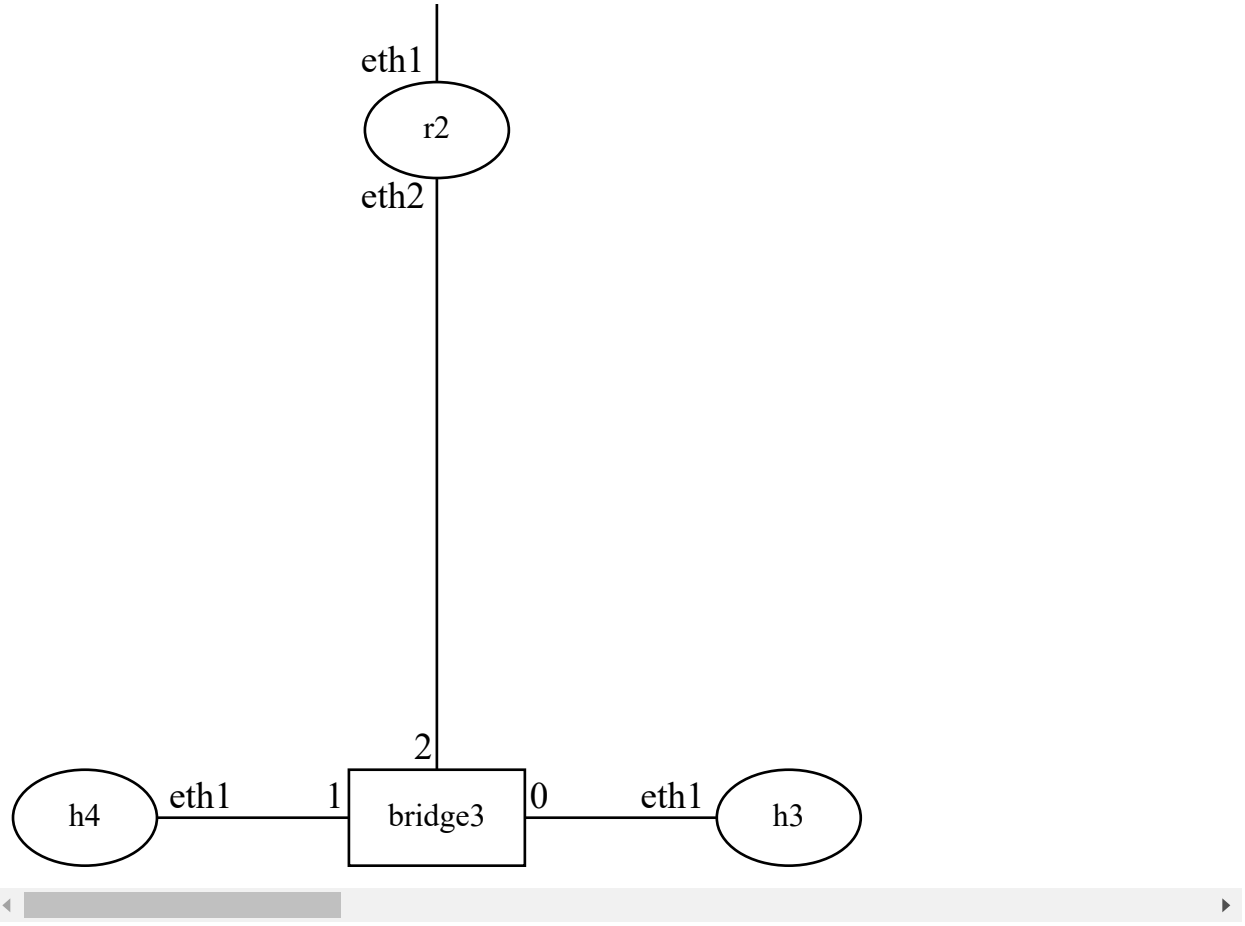
In [25]:
```
import uhgeni.graph.util

g = uhgeni.graph.util.buildFromManifest(manifest)
g.context = context

g.show()
```

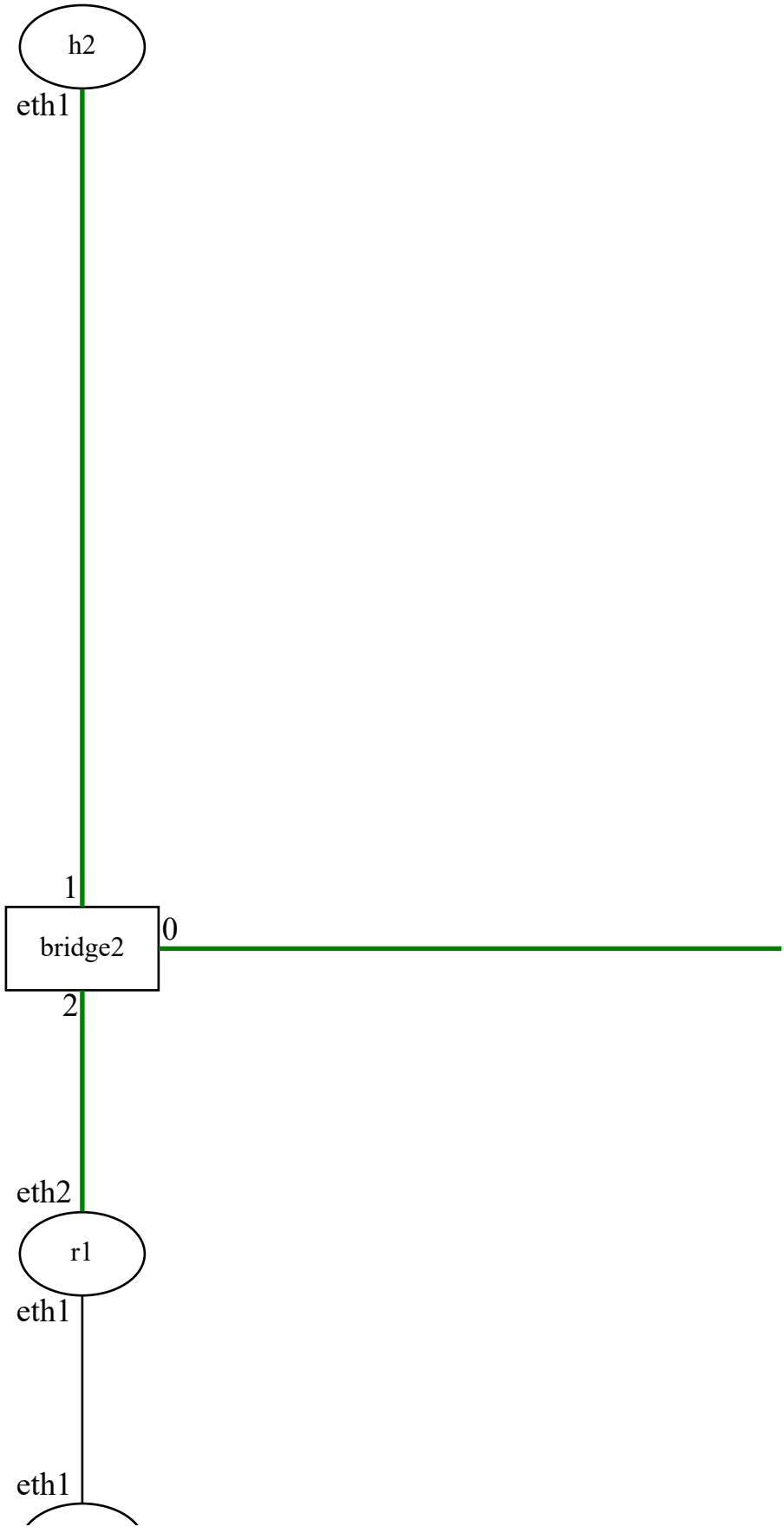
Out[25]:

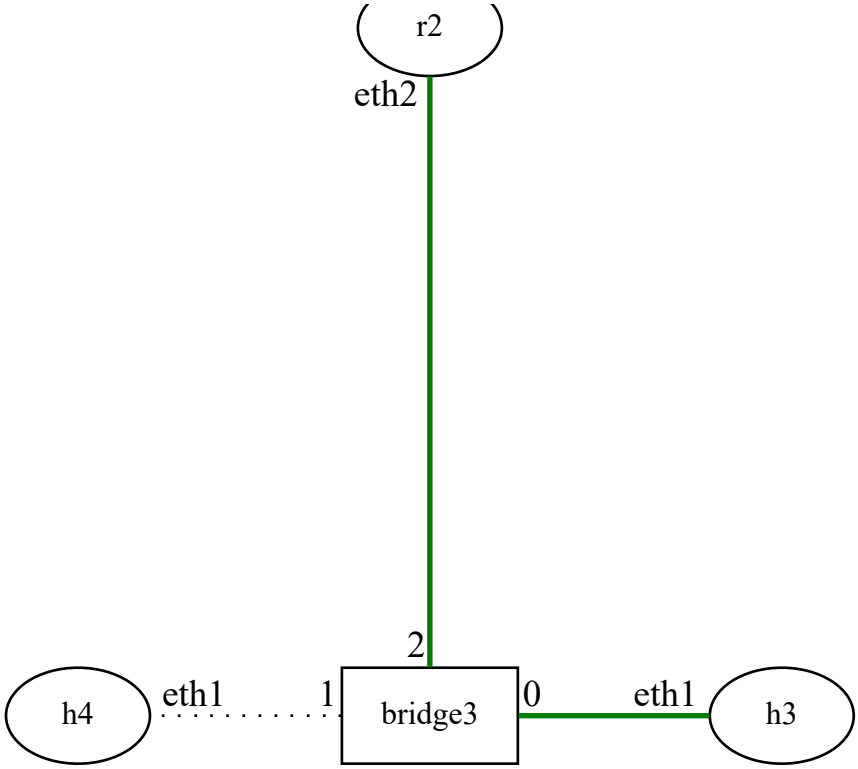



eth1
r2
eth2
2
h4
eth1
1
bridge3
0
eth1
h3

In [26]:
```
g["bridge3"][1].setDown()
g.decorateSTPInfo()
g.show()
```

Out[26]:






```
From L2 table & STPinfo the MAC addresses for our Hosts' are

Host1: 76:14:33:7C:C0:20
Host2: 3e:e6:38:b8:83:67
Host3: 5e:c3:fb:e6:26:cb
Host 4: 7e:53:7a:19:8a:8e

The router Mac addresses are the following:

R1: d2:21:6d:c4:7b:4f (eth1), 82:59:af:86:79:4f (eth2)
R2: 72:a3:13:b8:b7:19 (eth1), 86:fe:87:53:53:24:79 (eth2)
```

In [27]:
```
SITE.getPortInfo(context, SLICE, "bridge1")
```

Out[27]:

Client ID	ifindex	vlan	MTU	Admin State	Link State	RX Bytes (Pkts)	TX Bytes (Pkts)
bridge1:0	7847	None	1500	up	up	167127 (2181)	315804 (5462)
bridge1:1	7849	None	1500	up	up	102292 (1356)	380074 (6277)

In [28]:
```
SITE.getPortInfo(context, SLICE, "bridge2")
```

Out[28]:

Client ID	ifindex	vlan	MTU	Admin State	Link State	RX Bytes (Pkts)	TX Bytes (Pkts)
bridge2:1	7851	None	1500	up	up	102106 (1353)	379806 (6275)
bridge2:0	7848	None	1500	up	up	316722 (5476)	167891 (2191)
bridge2:2	7857	None	1500	up	up	193146 (2441)	341280 (5722)

In [29]:
```
SITE.getPortInfo(context, SLICE, "bridge3")
```

Out[29]:

Client ID	ifindex	vlan	MTU	Admin State	Link State	RX Bytes (Pkts)	TX Bytes (Pkts)
bridge3:2	7861	None	1500	up	up	189082 (2419)	337948 (5696)
bridge3:0	7853	None	1500	up	up	101378 (1357)	378884 (6283)
bridge3:1	7855	None	1500	down	down	90836 (1198)	334766 (5528)

```
Host1 Ip address:

/ # ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
7850: eth1@if7849: <BROADCAST,MULTICAST,UP,LOWER_UP,M-DOWN> mtu 1500 qdisc
netem state UP qlen 1000
    link/ether 76:14:33:7c:c0:20 brd ff:ff:ff:ff:ff:ff
    inet 10.10.123.1/24 scope global eth1
       valid_lft forever preferred_lft forever
    inet6 fe80::7414:33ff:fe7c:c020/64 scope link
       valid_lft forever preferred_lft forever
```

```
Host2 Ip address:


sazaidi5@cot-cn:~$ gssh SyedAhmed h2
/ # ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
7852: eth1@if7851: <BROADCAST,MULTICAST,UP,LOWER_UP,M-DOWN> mtu 1500 qdisc
netem state UP qlen 1000
    link/ether 3e:e6:38:b8:83:67 brd ff:ff:ff:ff:ff:ff
    inet 10.10.123.2/24 scope global eth1
       valid_lft forever preferred_lft forever
    inet6 fe80::3ce6:38ff:feb8:8367/64 scope link
```

```
       valid_lft forever preferred_lft forever
```

```
Host3 Ip address:

    sazaidi5@cot-cn:~$ gssh SyedAhmed h3
/ # ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
7854: eth1@if7853: <BROADCAST,MULTICAST,UP,LOWER_UP,M-DOWN> mtu 1500 qdisc
netem state UP qlen 1000
    link/ether 5e:c3:fb:e6:26:cb brd ff:ff:ff:ff:ff:ff
    inet 192.168.90.1/24 scope global eth1
       valid_lft forever preferred_lft forever
    inet6 fe80::5cc3:fbff:fee6:26cb/64 scope link
       valid_lft forever preferred_lft forever
```

```
Host 4 Ip address:


sazaidi5@cot-cn:~$ gssh SyedAhmed h4
/ # ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
7856: eth1@if7855: <NO-CARRIER,BROADCAST,MULTICAST,UP,M-DOWN> mtu 1500 qdisc
netem state LOWERLAYERDOWN qlen 1000
    link/ether 7e:53:7a:19:da:8e brd ff:ff:ff:ff:ff:ff
    inet 192.168.90.2/24 scope global eth1
       valid_lft forever preferred_lft forever
    inet6 fe80::7c53:7aff:fe19:da8e/64 scope link
       valid_lft forever preferred_lft forever
/ #
```

```
Ip address for Host 1

/ # route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         10.10.123.254   0.0.0.0         UG    0      0        0 eth1
10.10.123.0     0.0.0.0         255.255.255.0   U     0      0        0 eth1
/ #
```

```
Ip address for Host 2

/ # route -n
```

```
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         10.10.123.254   0.0.0.0         UG    0      0        0 eth1
10.10.123.0     0.0.0.0         255.255.255.0   U     0      0        0 eth1
/ #
```

```
Ip address for Host 3

/ # route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         192.168.90.254  0.0.0.0         UG    0      0        0 eth1
192.168.90.0    0.0.0.0         255.255.255.0   U     0      0        0 eth1
/ #
```

```
Ip address for Host 4

/ # route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         192.168.90.254  0.0.0.0         UG    0      0        0 eth1
192.168.90.0    0.0.0.0         255.255.255.0   U     0      0        0 eth1
/ #
```

```
Arp address for Host 1

/ # arp -a
? (10.10.123.254) at 82:59:af:d6:79:4f [ether] on eth1
? (10.10.123.2) at 3e:e6:38:b8:83:67 [ether] on eth1
/ #

Full thing:

sazaidi5@cot-cn:~$ gssh SyedAhmed h1
/ # tcpdump -i eth1 -e not ether dst 01:80:c2:00:00:00 -c 5
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on eth1, link-type EN10MB (Ethernet), capture size 262144 bytes
04:44:19.117720 82:59:af:d6:79:4f (oui Unknown) > 01:00:5e:00:00:05 (oui
Unknown), ethertype IPv4 (0x0800), length 78: 10.10.123.254 > 224.0.0.5
: OSPFv2, Hello, length 44
04:44:19.118016 76:14:33:7c:c0:20 (oui Unknown) > 82:59:af:d6:79:4f (oui
Unknown), ethertype IPv4 (0x0800), length 82: 10.10.123.1.38560 > 192.1
.242.132.53: 58678+ PTR? 5.0.0.224.in-addr.arpa. (40)
04:44:19.118491 82:59:af:d6:79:4f (oui Unknown) > 76:14:33:7c:c0:20 (oui
Unknown), ethertype IPv4 (0x0800), length 110: 10.10.123.254 > 10.10.12
3.1: ICMP net 192.1.242.132 unreachable, length 76
04:44:21.620628 76:14:33:7c:c0:20 (oui Unknown) > 82:59:af:d6:79:4f (oui
Unknown), ethertype IPv4 (0x0800), length 82: 10.10.123.1.38560 > 192.1
.242.132.53: 58678+ PTR? 5.0.0.224.in-addr.arpa. (40)
04:44:21.620691 82:59:af:d6:79:4f (oui Unknown) > 76:14:33:7c:c0:20 (oui
Unknown), ethertype IPv4 (0x0800), length 110: 10.10.123.254 > 10.10.12
3.1: ICMP net 192.1.242.132 unreachable, length 76
5 packets captured
21 packets received by filter
```

```
13 packets dropped by kernel
/ # ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
7850: eth1@if7849: <BROADCAST,MULTICAST,UP,LOWER_UP,M-DOWN> mtu 1500 qdisc
netem state UP qlen 1000
    link/ether 76:14:33:7c:c0:20 brd ff:ff:ff:ff:ff:ff
    inet 10.10.123.1/24 scope global eth1
       valid_lft forever preferred_lft forever
    inet6 fe80::7414:33ff:fe7c:c020/64 scope link
       valid_lft forever preferred_lft forever
/ # route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         10.10.123.254   0.0.0.0         UG    0      0        0 eth1
10.10.123.0     0.0.0.0         255.255.255.0   U     0      0        0 eth1
/ #
/ #
/ # arp -a
? (10.10.123.254) at 82:59:af:d6:79:4f [ether] on eth1
? (10.10.123.2) at 3e:e6:38:b8:83:67 [ether] on eth1
/ #
```

```
Arp address for Host 2

/ # arp -a
? (10.10.123.1) at 76:14:33:7c:c0:20 [ether] on eth1
? (10.10.123.254) at 82:59:af:d6:79:4f [ether] on eth1
/ #

Full thing:

sazaidi5@cot-cn:~$ gssh SyedAhmed h2
/ # ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
7852: eth1@if7851: <BROADCAST,MULTICAST,UP,LOWER_UP,M-DOWN> mtu 1500 qdisc
netem state UP qlen 1000
    link/ether 3e:e6:38:b8:83:67 brd ff:ff:ff:ff:ff:ff
    inet 10.10.123.2/24 scope global eth1
       valid_lft forever preferred_lft forever
    inet6 fe80::3ce6:38ff:feb8:8367/64 scope link
       valid_lft forever preferred_lft forever
/ # route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         10.10.123.254   0.0.0.0         UG    0      0        0 eth1
```

```
10.10.123.0     0.0.0.0         255.255.255.0   U     0      0        0 eth1
/ # arp -a
? (10.10.123.1) at 76:14:33:7c:c0:20 [ether] on eth1
? (10.10.123.254) at 82:59:af:d6:79:4f [ether] on eth1
/ #
```

```
Arp address for Host 3

/ # arp -a
? (192.168.90.254) at 86:fe:87:53:24:79 [ether] on eth1
/ #



Full thing:

sazaidi5@cot-cn:~$ gssh SyedAhmed h3
/ # ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
7854: eth1@if7853: <BROADCAST,MULTICAST,UP,LOWER_UP,M-DOWN> mtu 1500 qdisc
netem state UP qlen 1000
    link/ether 5e:c3:fb:e6:26:cb brd ff:ff:ff:ff:ff:ff
    inet 192.168.90.1/24 scope global eth1
       valid_lft forever preferred_lft forever
    inet6 fe80::5cc3:fbff:fee6:26cb/64 scope link
       valid_lft forever preferred_lft forever
/ #
/ # route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         192.168.90.254  0.0.0.0         UG    0      0        0 eth1
192.168.90.0    0.0.0.0         255.255.255.0   U     0      0        0 eth1
/ #
/ #
/ # arp -a
? (192.168.90.254) at 86:fe:87:53:24:79 [ether] on eth1
/ #
```

```
Arp address for Host 4


 # arp -a
? (192.168.90.254) at <incomplete> on eth1
? (192.168.90.1) at <incomplete> on eth1
/ #
```

```
Full thing:

sazaidi5@cot-cn:~$ gssh SyedAhmed h4
/ # ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
7856: eth1@if7855: <NO-CARRIER,BROADCAST,MULTICAST,UP,M-DOWN> mtu 1500 qdisc
netem state LOWERLAYERDOWN qlen 1000
    link/ether 7e:53:7a:19:da:8e brd ff:ff:ff:ff:ff:ff
    inet 192.168.90.2/24 scope global eth1
       valid_lft forever preferred_lft forever
    inet6 fe80::7c53:7aff:fe19:da8e/64 scope link
       valid_lft forever preferred_lft forever
/ # route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         192.168.90.254  0.0.0.0         UG    0      0        0 eth1
192.168.90.0    0.0.0.0         255.255.255.0   U     0      0        0 eth1
/ #
/ #
/ #
/ # arp -a
/ #
/ #
/ # arp -a
? (192.168.90.254) at <incomplete> on eth1
? (192.168.90.1) at <incomplete> on eth1
/ #
```

Mac & IP addresses I got using the IP Addr, route -n and arp -a commands.

I then pinged host 2 and 4 from host1

sazaidi5@cot-cn:~$ gssh SyedAhmed h3 / # ip addr 1: lo: mtu 65536 qdisc noqueue state UNKNOWN qlen 1 link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00 inet 127.0.0.1/8 scope host lo valid_lft forever preferred_lft forever inet6 ::1/128 scope host valid_lft forever preferred_lft forever 7854: eth1@if7853: mtu 1500 qdisc netem state UP qlen 1000 link/ether 5e:c3:fb:e6:26:cb brd ff:ff:ff:ff:ff:ff inet 192.168.90.1/24 scope global eth1 valid_lft forever preferred_lft forever inet6 fe80::5cc3:fbff:fee6:26cb/64 scope link valid_lft forever preferred_lft forever / # / # route -n Kernel IP routing table Destination Gateway Genmask Flags Metric Ref Use Iface 0.0.0.0 192.168.90.254 0.0.0.0 UG 0 0 0 eth1 192.168.90.0 0.0.0.0 255.255.255.0 U 0 0 0 eth1 / # / # / # arp -a ? (192.168.90.254) at 86:fe:87:53:24:79 [ether] on eth1 / # / # / # arp -a ? (192.168.90.254) at 86:fe:87:53:24:79 [ether] on eth1 / # / # / # ping 10.10.123.2 PING 10.10.123.2 (10.10.123.2) 56(84) bytes of data. 64 bytes from 10.10.123.2: icmp_seq=1 ttl=62 time=0.536 ms 64 bytes from 10.10.123.2: icmp_seq=2 ttl=62 time=0.096 ms 64 bytes from 10.10.123.2: icmp_seq=3 ttl=62 time=0.108 ms 64 bytes from 10.10.123.2: icmp_seq=4 ttl=62 time=0.096 ms 64 bytes from

10.10.123.2: icmp_seq=5 ttl=62 time=0.126 ms 64 bytes from 10.10.123.2: icmp_seq=6 ttl=62 time=0.083 ms ^C --- 10.10.123.2 ping statistics --- 6 packets transmitted, 6 received, 0% packet loss, time 4998ms rtt min/avg/max/mdev = 0.083/0.174/0.536/0.162 ms / #

I pinged host 2 to host 3 to prove that it works

In [32]:
```
SITE.Host.getRouteTable(context, SLICE, "h1")
```

Out[32]:

Destination	Mask	Gateway	Interface
0.0.0.0	0.0.0.0	10.10.123.254	eth1
10.10.123.0	255.255.255.0	0.0.0.0	eth1

In [33]:
```
SITE.Host.getRouteTable(context, SLICE, "h2")
```

Out[33]:

Destination	Mask	Gateway	Interface
0.0.0.0	0.0.0.0	10.10.123.254	eth1
10.10.123.0	255.255.255.0	0.0.0.0	eth1

In [34]:
```
SITE.Host.getRouteTable(context, SLICE, "h3")
```

Out[34]:

Destination	Mask	Gateway	Interface
0.0.0.0	0.0.0.0	192.168.90.254	eth1
192.168.90.0	255.255.255.0	0.0.0.0	eth1

In [35]:
```
SITE.Host.getRouteTable(context, SLICE, "h4")
```

Out[35]:

Destination	Mask	Gateway	Interface
0.0.0.0	0.0.0.0	192.168.90.254	eth1
192.168.90.0	255.255.255.0	0.0.0.0	eth1

In [36]:
```
SITE.Host.getRouteTable(context, SLICE, "r1")
```

Out[36]:

Destination	Mask	Gateway	Interface
10.10.123.0	255.255.255.0	0.0.0.0	eth2
10.75.73.0	255.255.255.0	0.0.0.0	eth1
192.168.90.0	255.255.255.0	10.75.73.2	eth1

In [37]:
```
SITE.Host.getRouteTable(context, SLICE, "r2")
```

Out[37]:

Destination	Mask	Gateway	Interface
10.10.123.0	255.255.255.0	10.75.73.1	eth1
10.75.73.0	255.255.255.0	0.0.0.0	eth1
192.168.90.0	255.255.255.0	0.0.0.0	eth2

In [38]:
```
SITE.IPv4Router.getOSPFNeighbors(context, SLICE, "r1")
```

Out[38]:

ID	Priority	State	Dead Time	Address	Interface
192.168.90.254	1	Full/DR	37.515s	10.75.73.2	eth1:10.75.73.1

In [39]:
```
SITE.IPv4Router.getOSPFNeighbors(context, SLICE, "r2")
```

Out[39]:

ID	Priority	State	Dead Time	Address	Interface
10.75.73.1	1	Full/Backup	31.516s	10.75.73.1	eth1:10.75.73.2

```
ID - tells you whats the connection R1 has with other routers (r1 is connected
to r2)
get route to means - it tells us what it's connected to directly (what's
connected to the router)
```

trace route from host 2 to host 3

```
/ # traceroute 192.168.90.1
traceroute to 192.168.90.1 (192.168.90.1), 30 hops max, 46 byte packets
 1  10.10.123.254 (10.10.123.254)  0.006 ms  0.012 ms  0.003 ms
 2  10.75.73.2 (10.75.73.2)  0.004 ms  0.011 ms  0.004 ms
 3  192.168.90.1 (192.168.90.1)  0.385 ms  0.011 ms  0.004 ms
```

```
whole thing:

        inet 10.10.123.2/24 scope global eth1
       valid_lft forever preferred_lft forever
    inet6 fe80::3ce6:38ff:feb8:8367/64 scope link
       valid_lft forever preferred_lft forever
/ # route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         10.10.123.254   0.0.0.0         UG    0      0        0 eth1
10.10.123.0     0.0.0.0         255.255.255.0   U     0      0        0 eth1
/ # arp -a
? (10.10.123.1) at 76:14:33:7c:c0:20 [ether] on eth1
? (10.10.123.254) at 82:59:af:d6:79:4f [ether] on eth1
/ #
```

```
/ #
/ #
/ # tcpdump -i eth1 -e not ether dst 01:80:c2:00:00:00 –c 5
tcpdump: illegal token: –
/ #
/ #
/ # tcpdump -i eth1 -e not ether dst 01:80:c2:00:00:00 -c 5
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on eth1, link-type EN10MB (Ethernet), capture size 262144 bytes
06:55:04.213362 82:59:af:d6:79:4f (oui Unknown) > 3e:e6:38:b8:83:67 (oui
Unknown), ethertype IPv4 (0x0800), length 98: 192.168.90.1 > 10.10.123.
2: ICMP echo request, id 1279, seq 1, length 64
06:55:04.213398 3e:e6:38:b8:83:67 (oui Unknown) > 82:59:af:d6:79:4f (oui
Unknown), ethertype IPv4 (0x0800), length 98: 10.10.123.2 > 192.168.90.
1: ICMP echo reply, id 1279, seq 1, length 64
06:55:04.213577 3e:e6:38:b8:83:67 (oui Unknown) > 82:59:af:d6:79:4f (oui
Unknown), ethertype IPv4 (0x0800), length 84: 10.10.123.2.46672 > 192.1
.242.132.53: 15533+ PTR? 2.123.10.10.in-addr.arpa. (42)
06:55:04.213613 82:59:af:d6:79:4f (oui Unknown) > 3e:e6:38:b8:83:67 (oui
Unknown), ethertype IPv4 (0x0800), length 112: 10.10.123.254 > 10.10.12
3.2: ICMP net 192.1.242.132 unreachable, length 78
06:55:04.383022 82:59:af:d6:79:4f (oui Unknown) > 3e:e6:38:b8:83:67 (oui
Unknown), ethertype IPv4 (0x0800), length 126: 10.75.73.2 > 10.10.123.2
: ICMP host 192.168.90.2 unreachable, length 92
5 packets captured
44 packets received by filter
33 packets dropped by kernel
/ #
/ #
/ #
/ #
/ # traceroute 192.168.90.1
traceroute to 192.168.90.1 (192.168.90.1), 30 hops max, 46 byte packets
 1  10.10.123.254 (10.10.123.254)  0.006 ms  0.012 ms  0.003 ms
 2  10.75.73.2 (10.75.73.2)  0.004 ms  0.011 ms  0.004 ms
 3  192.168.90.1 (192.168.90.1)  0.385 ms  0.011 ms  0.004 ms
/ #
```

In [ ]: