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```
Clone de Mininet-VM [Executando] - Oracle VirtualBox
Arquivo  Máquina  Visualizar  Entrada  Dispositivos  Ajuda

Ubuntu 14.04.4 LTS mininet-vm tty1

mininet-vm login: mininet
Password:
Last login: Mon Oct 20 11:57:53 PDT 2025 from 192.168.56.1 on pts/1
Welcome to Ubuntu 14.04.4 LTS (GNU/Linux 4.2.0-27-generic x86_64)

 * Documentation:  https://help.ubuntu.com/
mininet@mininet-vm:~$
```

[illegible]

3-Inspeccionando as informações da topologia

3.1-Nós

```
*** Starting CLI:
mininet> nodes
available nodes are:
c0 h1 h10 h11 h12 h13 h14 h15 h16 h2 h3 h4 h5 h6 h7 h8 h9 s1 s10 s11 s12 s13 s14
s15 s2 s3 s4 s5 s6 s7 s8 s9
mininet>
```

3.2-Rede

```
mininet> net
h1 h1-eth0:s4-eth1
h2 h2-eth0:s4-eth2
h3 h3-eth0:s5-eth1
h4 h4-eth0:s5-eth2
h5 h5-eth0:s7-eth1
h6 h6-eth0:s7-eth2
h7 h7-eth0:s8-eth1
h8 h8-eth0:s8-eth2
h9 h9-eth0:s11-eth1
h10 h10-eth0:s11-eth2
h11 h11-eth0:s12-eth1
h12 h12-eth0:s12-eth2
h13 h13-eth0:s14-eth1
h14 h14-eth0:s14-eth2
h15 h15-eth0:s15-eth1
h16 h16-eth0:s15-eth2
s1 lo: s1-eth1:s2-eth3 s1-eth2:s9-eth3
s2 lo: s2-eth1:s3-eth3 s2-eth2:s6-eth3 s2-eth3:s1-eth1
s3 lo: s3-eth1:s4-eth3 s3-eth2:s5-eth3 s3-eth3:s2-eth1
s4 lo: s4-eth1:h1-eth0 s4-eth2:h2-eth0 s4-eth3:s3-eth1
s5 lo: s5-eth1:h3-eth0 s5-eth2:h4-eth0 s5-eth3:s3-eth2
s6 lo: s6-eth1:s7-eth3 s6-eth2:s8-eth3 s6-eth3:s2-eth2
s7 lo: s7-eth1:h5-eth0 s7-eth2:h6-eth0 s7-eth3:s6-eth1
s8 lo: s8-eth1:h7-eth0 s8-eth2:h8-eth0 s8-eth3:s6-eth2
s9 lo: s9-eth1:s10-eth3 s9-eth2:s13-eth3 s9-eth3:s1-eth2
s10 lo: s10-eth1:s11-eth3 s10-eth2:s12-eth3 s10-eth3:s9-eth1
s11 lo: s11-eth1:h9-eth0 s11-eth2:h10-eth0 s11-eth3:s10-eth1
s12 lo: s12-eth1:h11-eth0 s12-eth2:h12-eth0 s12-eth3:s10-eth2
s13 lo: s13-eth1:s14-eth3 s13-eth2:s15-eth3 s13-eth3:s9-eth2
s14 lo: s14-eth1:h13-eth0 s14-eth2:h14-eth0 s14-eth3:s13-eth1
s15 lo: s15-eth1:h15-eth0 s15-eth2:h16-eth0 s15-eth3:s13-eth2
c0
mininet>
```

3.3-Endereços das portas lógicas

```
mininet> dump
<Host h1: h1-eth0:10.0.0.1 pid=15916>
<Host h2: h2-eth0:10.0.0.2 pid=15920>
<Host h3: h3-eth0:10.0.0.3 pid=15922>
<Host h4: h4-eth0:10.0.0.4 pid=15924>
<Host h5: h5-eth0:10.0.0.5 pid=15926>
<Host h6: h6-eth0:10.0.0.6 pid=15928>
<Host h7: h7-eth0:10.0.0.7 pid=15930>
<Host h8: h8-eth0:10.0.0.8 pid=15932>
<Host h9: h9-eth0:10.0.0.9 pid=15934>
<Host h10: h10-eth0:10.0.0.10 pid=15936>
<Host h11: h11-eth0:10.0.0.11 pid=15938>
<Host h12: h12-eth0:10.0.0.12 pid=15940>
<Host h13: h13-eth0:10.0.0.13 pid=15942>
<Host h14: h14-eth0:10.0.0.14 pid=15944>
<Host h15: h15-eth0:10.0.0.15 pid=15946>
<Host h16: h16-eth0:10.0.0.16 pid=15948>
<OVSSwitch s1: lo:127.0.0.1,s1-eth1:None,s1-eth2:None pid=15953>
<OVSSwitch s2: lo:127.0.0.1,s2-eth1:None,s2-eth2:None,s2-eth3:None pid=15956>
<OVSSwitch s3: lo:127.0.0.1,s3-eth1:None,s3-eth2:None,s3-eth3:None pid=15959>
<OVSSwitch s4: lo:127.0.0.1,s4-eth1:None,s4-eth2:None,s4-eth3:None pid=15962>
<OVSSwitch s5: lo:127.0.0.1,s5-eth1:None,s5-eth2:None,s5-eth3:None pid=15965>
<OVSSwitch s6: lo:127.0.0.1,s6-eth1:None,s6-eth2:None,s6-eth3:None pid=15968>
<OVSSwitch s7: lo:127.0.0.1,s7-eth1:None,s7-eth2:None,s7-eth3:None pid=15971>
<OVSSwitch s8: lo:127.0.0.1,s8-eth1:None,s8-eth2:None,s8-eth3:None pid=15974>
<OVSSwitch s9: lo:127.0.0.1,s9-eth1:None,s9-eth2:None,s9-eth3:None pid=15977>
<OVSSwitch s10: lo:127.0.0.1,s10-eth1:None,s10-eth2:None,s10-eth3:None pid=15980>
<OVSSwitch s11: lo:127.0.0.1,s11-eth1:None,s11-eth2:None,s11-eth3:None pid=15983>
<OVSSwitch s12: lo:127.0.0.1,s12-eth1:None,s12-eth2:None,s12-eth3:None pid=15986>
<OVSSwitch s13: lo:127.0.0.1,s13-eth1:None,s13-eth2:None,s13-eth3:None pid=15989>
<OVSSwitch s14: lo:127.0.0.1,s14-eth1:None,s14-eth2:None,s14-eth3:None pid=15992>
<OVSSwitch s15: lo:127.0.0.1,s15-eth1:None,s15-eth2:None,s15-eth3:None pid=15995>
<Controller c0: 127.0.0.1:6653 pid=15909>
mininet>
```

4-Dados dos Hosts

```
mininet> clear
*** Unknown command: clear
mininet> h1 ifconfig -a
h1-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.0.1 netmask 255.0.0.0 broadcast 10.255.255.255
    ether 00:00:00:00:00:01 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet> h2 ifconfig -a
h2-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.0.2 netmask 255.0.0.0 broadcast 10.255.255.255
    ether 00:00:00:00:00:02 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet> _
```

```
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet> h3 ifconfig -a
h3-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.0.3 netmask 255.0.0.0 broadcast 10.255.255.255
    ether 00:00:00:00:00:03 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet> h4 ifconfig -a
h4-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.0.4 netmask 255.0.0.0 broadcast 10.255.255.255
    ether 00:00:00:00:00:04 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet> _
```

```

TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet> h5 ifconfig -a
h5-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.0.5 netmask 255.0.0.0 broadcast 10.255.255.255
    ether 00:00:00:00:00:05 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet> h6 ifconfig -a
h6-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.0.6 netmask 255.0.0.0 broadcast 10.255.255.255
    ether 00:00:00:00:00:06 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet> _

```

```

TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet> h7 ifconfig -a
h7-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.0.7 netmask 255.0.0.0 broadcast 10.255.255.255
    ether 00:00:00:00:00:07 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet> h8 ifconfig -a
h8-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.0.8 netmask 255.0.0.0 broadcast 10.255.255.255
    ether 00:00:00:00:00:08 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet>

```

```

TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet> h9 ifconfig -a
h9-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.0.9 netmask 255.0.0.0 broadcast 10.255.255.255
    ether 00:00:00:00:00:09 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet> h10 ifconfig -a
h10-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.0.10 netmask 255.0.0.0 broadcast 10.255.255.255
    ether 00:00:00:00:00:0a txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet> _

```

```

TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet> h11 ifconfig -a
h11-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.0.11 netmask 255.0.0.0 broadcast 10.255.255.255
    ether 00:00:00:00:00:0b txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet> h12 ifconfig -a
h12-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.0.12 netmask 255.0.0.0 broadcast 10.255.255.255
    ether 00:00:00:00:00:0c txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet>

```

```

TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet> h13 ifconfig -a
h13-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.0.13 netmask 255.0.0.0 broadcast 10.255.255.255
    ether 00:00:00:00:00:0d txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet> h14 ifconfig -a
h14-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.0.14 netmask 255.0.0.0 broadcast 10.255.255.255
    ether 00:00:00:00:00:0e txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet>

```

```

TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet> h15 ifconfig -a
h15-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.0.15 netmask 255.0.0.0 broadcast 10.255.255.255
    ether 00:00:00:00:00:0f txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet> h16 ifconfig -a
h16-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.0.16 netmask 255.0.0.0 broadcast 10.255.255.255
    ether 00:00:00:00:00:10 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

mininet>

```


5-Testando todos os nós

```
mininet> pingall
*** Ping: testing ping reachability
h1 -> h2 h3 h4 h5 h6 h7 h8 h9 h10 h11 h12 h13 h14 h15 h16
h2 -> h1 h3 h4 h5 h6 h7 h8 h9 h10 h11 h12 h13 h14 h15 h16
h3 -> h1 h2 h4 h5 h6 h7 h8 h9 h10 h11 h12 h13 h14 h15 h16
h4 -> h1 h2 h3 h5 h6 h7 h8 h9 h10 h11 h12 h13 h14 h15 h16
h5 -> h1 h2 h3 h4 h6 h7 h8 h9 h10 h11 h12 h13 h14 h15 h16
h6 -> h1 h2 h3 h4 h5 h7 h8 h9 h10 h11 h12 h13 h14 h15 h16
h7 -> h1 h2 h3 h4 h5 h6 h8 h9 h10 h11 h12 h13 h14 h15 h16
h8 -> h1 h2 h3 h4 h5 h6 h7 h9 h10 h11 h12 h13 h14 h15 h16
h9 -> h1 h2 h3 h4 h5 h6 h7 h8 h10 h11 h12 h13 h14 h15 h16
h10 -> h1 h2 h3 h4 h5 h6 h7 h8 h9 h11 h12 h13 h14 h15 h16
h11 -> h1 h2 h3 h4 h5 h6 h7 h8 h9 h10 h12 h13 h14 h15 h16
h12 -> h1 h2 h3 h4 h5 h6 h7 h8 h9 h10 h11 h13 h14 h15 h16
h13 -> h1 h2 h3 h4 h5 h6 h7 h8 h9 h10 h11 h12 h14 h15 h16
h14 -> h1 h2 h3 h4 h5 h6 h7 h8 h9 h10 h11 h12 h13 h15 h16
h15 -> h1 h2 h3 h4 h5 h6 h7 h8 h9 h10 h11 h12 h13 h14 h16
h16 -> h1 h2 h3 h4 h5 h6 h7 h8 h9 h10 h11 h12 h13 h14 h15
*** Results: 0% dropped (240/240 received)
mininet>
```

6- Teste Cliente-Servidor

```
mininet@mininet-vm: ~
login as: mininet
mininet@192.168.56.104's password:
Access denied
mininet@192.168.56.104's password:
Welcome to Ubuntu 14.04.4 LTS (GNU/Linux 4.2.0-27-generic x86_64)

 * Documentation:  https://help.ubuntu.com/
New release '16.04.7 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Thu Oct 23 08:01:14 2025
mininet@mininet-vm:~$
```

6.1-Recriando a topologia

```
Last login: Thu Oct 23 08:01:14 2025
mininet@mininet-vm:~$ sudo mn --mac --topo=tree,depth=4,fanout=2 --link tc,bw=25
*** Creating network
*** Adding controller
-----
Caught exception. Cleaning up...

Exception: Please shut down the controller which is running on port 6653:
Active Internet connections (servers and established)
tcp        0      0 0.0.0.0:6653          0.0.0.0:*            LISTEN
3419/controller
tcp        0      0 127.0.0.1:6653        127.0.0.1:49994      ESTABLISHED
3419/controller
tcp        0      0 127.0.0.1:49980       127.0.0.1:6653       ESTABLISHED
1136/ovs-vswitchd
tcp        0      0 127.0.0.1:6653        127.0.0.1:49988      ESTABLISHED
3419/controller
tcp        0      0 127.0.0.1:6653        127.0.0.1:49972      ESTABLISHED
3419/controller
tcp        0      0 127.0.0.1:6653        127.0.0.1:49986      ESTABLISHED
3419/controller
tcp        0      0 127.0.0.1:6653        127.0.0.1:49974      ESTABLISHED
3419/controller
tcp        0      0 127.0.0.1:49986       127.0.0.1:6653       ESTABLISHED
1136/ovs-vswitchd
tcp        0      0 127.0.0.1:49972       127.0.0.1:6653       ESTABLISHED
1136/ovs-vswitchd
tcp        0      0 127.0.0.1:49976       127.0.0.1:6653       ESTABLISHED
1136/ovs-vswitchd
tcp        0      0 127.0.0.1:6653        127.0.0.1:49982      ESTABLISHED
3419/controller
tcp        0      0 127.0.0.1:6653        127.0.0.1:49992      ESTABLISHED
3419/controller
tcp        0      0 127.0.0.1:49994       127.0.0.1:6653       ESTABLISHED
1136/ovs-vswitchd
tcp        0      0 127.0.0.1:6653        127.0.0.1:49966      ESTABLISHED
3419/controller
tcp        0      0 127.0.0.1:49982       127.0.0.1:6653       ESTABLISHED
1136/ovs-vswitchd
```

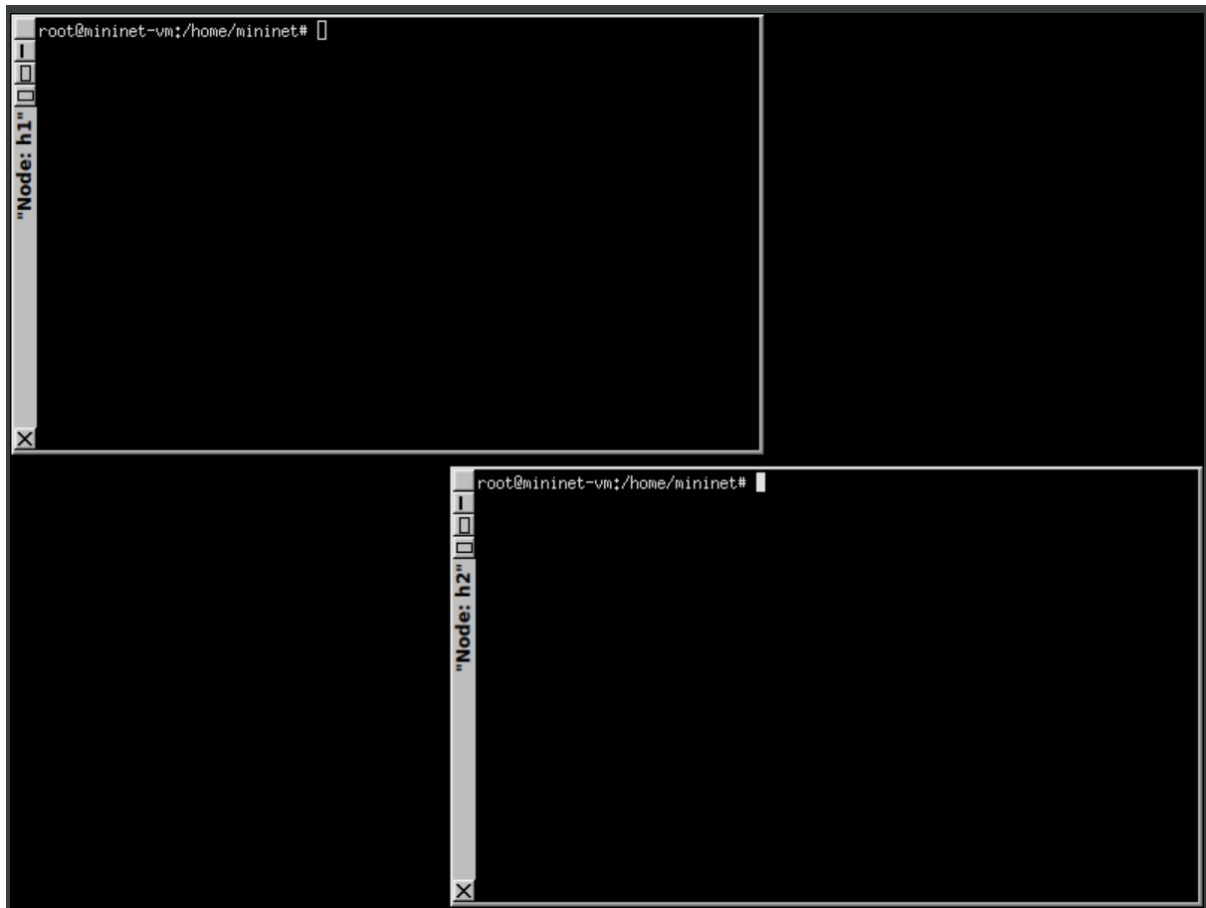


```

*** Removing excess controllers/ofprotocols/ofdatapaths/pings/noxes
killall controller ofprotocol ofdatapath ping nox_core lt-nox_core ovs-openflowd
  ovs-controller udpbwtest mnexec ivs 2> /dev/null
killall -9 controller ofprotocol ofdatapath ping nox_core lt-nox_core ovs-openfl
owd ovs-controller udpbwtest mnexec ivs 2> /dev/null
pkill -9 -f "sudo mnexec"
*** Removing junk from /tmp
rm -f /tmp/vconn* /tmp/vlogs* /tmp/*.out /tmp/*.log
*** Removing old X11 tunnels
*** Removing excess kernel datapaths
ps ax | egrep -o 'dp[0-9]+' | sed 's/dp/nl:/'
*** Removing OVS datapaths
ovs-vsctl --timeout=1 list-br
ovs-vsctl --if-exists del-br s1 -- --if-exists del-br s10 -- --if-exists del-br
s11 -- --if-exists del-br s12 -- --if-exists del-br s13 -- --if-exists del-br s1
4 -- --if-exists del-br s15 -- --if-exists del-br s2 -- --if-exists del-br s3 --
--if-exists del-br s4 -- --if-exists del-br s5 -- --if-exists del-br s6 -- --if
-exists del-br s7 -- --if-exists del-br s8 -- --if-exists del-br s9
ovs-vsctl --timeout=1 list-br
*** Removing all links of the pattern foo-ethX
ip link show | egrep -o '([_.:alnum:]]+-eth[[:digit:]]+)'
( ip link del s2-eth3;ip link del s1-eth1;ip link del s1-eth1;ip link del s2-eth
3;ip link del s9-eth3;ip link del s1-eth2;ip link del s1-eth2;ip link del s9-eth
3;ip link del s3-eth3;ip link del s2-eth1;ip link del s2-eth1;ip link del s3-eth
3;ip link del s6-eth3;ip link del s2-eth2;ip link del s2-eth2;ip link del s6-eth
3;ip link del s4-eth3;ip link del s3-eth1;ip link del s3-eth1;ip link del s4-eth
3;ip link del s5-eth3;ip link del s3-eth2;ip link del s3-eth2;ip link del s5-eth
3;ip link del s4-eth1;ip link del s4-eth2;ip link del s5-eth1;ip link del s5-eth
2;ip link del s7-eth3;ip link del s6-eth1;ip link del s6-eth1;ip link del s7-eth
3;ip link del s8-eth3;ip link del s6-eth2;ip link del s6-eth2;ip link del s8-eth
3;ip link del s7-eth1;ip link del s7-eth2;ip link del s8-eth1;ip link del s8-eth
2;ip link del s10-eth3;ip link del s9-eth1;ip link del s9-eth1;ip link del s10-e
th3;ip link del s13-eth3;ip link del s9-eth2;ip link del s9-eth2;ip link del s13
-eth3;ip link del s11-eth3;ip link del s10-eth1;ip link del s10-eth1;ip link del
s11-eth3;ip link del s12-eth3;ip link del s10-eth2;ip link del s10-eth2;ip link
del s12-eth3;ip link del s11-eth1;ip link del s11-eth2;ip link del s12-eth1;ip
link del s12-eth2;ip link del s14-eth3;ip link del s13-eth1;ip link del s13-eth1
;ip link del s14-eth3;ip link del s15-eth3;ip link del s13-eth2;ip link del s13-
eth2;ip link del s15-eth3;ip link del s14-eth1;ip link del s14-eth2;ip link del
s15-eth1;ip link del s15-eth2 ) 2> /dev/null
ip link show
*** Killing stale mininet node processes
pkill -9 -f mininet:
*** Shutting down stale tunnels
pkill -9 -f Tunnel=Ethernet
pkill -9 -f .ssh/mn
rm -f ~/.ssh/mn/*
*** Cleanup complete.
mininet@mininet-vm:~$

```

7- Abrindo terminal Host1 e Host2



7.1-Configurando H1 como servidor e H2 como cliente

