# Trabalho Final Mininet

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# Parte 1: Topologia em Árvore com Profundidade Três e Ramificação Cinco

## a - Criação da Topologia:

Para a criação da topologia, foi utilizado o comando sudo mn –topo=tree,depth=3,fanout=5 –mac –link=tc,bw=30. –topo forma uma topologia em formato de árvore; depth=3 concede à árvore quatro camadas de profundidade onde os switches são alocados nas três primeiras e os hosts na última; fanout=5 faz com que cada switch tenha cinco ramificações; –mac padroniza o endereço mac dos hosts e –link=tc, bw=30 define a largura da banda bw como sendo de 30 Mbps.

```
login as: mininet
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 Nov  6 10:44:38 2025 from 192.168.56.1
mininet@mininet-vm:~$ sudo mn --topo=tree,depth=3,fanout=5 --mac --link=tc,bw=30
*** Creating network
*** Adding controller
*** Adding hosts:
h1 h2 h3 h4 h5 h6 h7 h8 h9 h10 h11 h12 h13 h14 h15 h16 h17 h18 h19 h20 h21 h22 h
23 h24 h25 h26 h27 h28 h29 h30 h31 h32 h33 h34 h35 h36 h37 h38 h39 h40 h41 h42 h
43 h44 h45 h46 h47 h48 h49 h50 h51 h52 h53 h54 h55 h56 h57 h58 h59 h60 h61 h62 h
63 h64 h65 h66 h67 h68 h69 h70 h71 h72 h73 h74 h75 h76 h77 h78 h79 h80 h81 h82 h
83 h84 h85 h86 h87 h88 h89 h90 h91 h92 h93 h94 h95 h96 h97 h98 h99 h100 h101 h10
2 h103 h104 h105 h106 h107 h108 h109 h110 h111 h112 h113 h114 h115 h116 h117 h11
8 h119 h120 h121 h122 h123 h124 h125
*** Adding switches:
s1 s2 s3 s4 s5 s6 s7 s8 s9 s10 s11 s12 s13 s14 s15 s16 s17 s18 s19 s20 s21 s22 s
23 s24 s25 s26 s27 s28 s29 s30 s31
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*** Adding links:
(30.00Mbit) (30.00Mbit) (s1, s2) (30.00Mbit) (30.00Mbit) (s1, s8) (30.00Mbit) (3
0.00Mbit) (s1, s14) (30.00Mbit) (30.00Mbit) (s1, s20) (30.00Mbit) (30.00Mbit) (s
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it) (s2, s7) (30.00Mbit) (30.00Mbit) (s3, h1) (30.00Mbit) (30.00Mbit) (s3, h2) (
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.00Mbit) (s3, h5) (30.00Mbit) (30.00Mbit) (s4, h6) (30.00Mbit) (30.00Mbit) (s4,
h7) (30.00Mbit) (30.00Mbit) (s4, h8) (30.00Mbit) (30.00Mbit) (s4, h9) (30.00Mbit
) (30.00Mbit) (s4, h10) (30.00Mbit) (30.00Mbit) (s5, h11) (30.00Mbit) (30.00Mbit
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(s6, h19) (30.00Mbit) (30.00Mbit) (s6, h20) (30.00Mbit) (30.00Mbit) (s7, h21) (3
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8, s9) (30.00Mbit) (30.00Mbit) (s8, s10) (30.00Mbit) (30.00Mbit) (s8, s11) (30.0
0Mbit) (30.00Mbit) (s8, s12) (30.00Mbit) (30.00Mbit) (s8, s13) (30.00Mbit) (30.0
0Mbit) (s9, h26) (30.00Mbit) (30.00Mbit) (s9, h27) (30.00Mbit) (30.00Mbit) (s9,
h28) (30.00Mbit) (30.00Mbit) (s9, h29) (30.00Mbit) (30.00Mbit) (s9, h30) (30.00M
bit) (30.00Mbit) (s10, h31) (30.00Mbit) (30.00Mbit) (s10, h32) (30.00Mbit) (30.0
0Mbit) (s10, h33) (30.00Mbit) (30.00Mbit) (s10, h34) (30.00Mbit) (30.00Mbit) (s1
0, h35) (30.00Mbit) (30.00Mbit) (s11, h36) (30.00Mbit) (30.00Mbit) (s11, h37) (3
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) (s12, h42) (30.00Mbit) (30.00Mbit) (s12, h43) (30.00Mbit) (30.00Mbit) (s12, h4
4) (30.00Mbit) (30.00Mbit) (s12, h45) (30.00Mbit) (30.00Mbit) (s13, h46) (30.00M
bit) (30.00Mbit) (s13, h47) (30.00Mbit) (30.00Mbit) (s13, h48) (30.00Mbit) (30.0
0Mbit) (s13, h49) (30.00Mbit) (30.00Mbit) (s13, h50) (30.00Mbit) (30.00Mbit) (s1
4, s15) (30.00Mbit) (30.00Mbit) (s14, s16) (30.00Mbit) (30.00Mbit) (s14, s17) (3
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) (s18, h69) (30.00Mbit) (30.00Mbit) (s18, h70) (30.00Mbit) (30.00Mbit) (s19, h7
1) (30.00Mbit) (30.00Mbit) (s19, h72) (30.00Mbit) (30.00Mbit) (s19, h73) (30.00M
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0Mbit) (s20, s21) (30.00Mbit) (30.00Mbit) (s20, s22) (30.00Mbit) (30.00Mbit) (s2
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0Mbit) (s23, h87) (30.00Mbit) (30.00Mbit) (s23, h88) (30.00Mbit) (30.00Mbit) (s2
3, h89) (30.00Mbit) (30.00Mbit) (s23, h90) (30.00Mbit) (30.00Mbit) (s24, h91) (3
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bit) (30.00Mbit) (s27, h105) (30.00Mbit) (30.00Mbit) (s28, h106) (30.00Mbit) (30
.00Mbit) (s28, h107) (30.00Mbit) (30.00Mbit) (s28, h108) (30.00Mbit) (30.00Mbit)
 (s28, h109) (30.00Mbit) (30.00Mbit) (s28, h110) (30.00Mbit) (30.00Mbit) (s29, h
111) (30.00Mbit) (30.00Mbit) (s29, h112) (30.00Mbit) (30.00Mbit) (s29, h113) (30
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.00Mbit) (30.00Mbit) (s29, h114) (30.00Mbit) (30.00Mbit) (s29, h115) (30.00Mbit)
 (30.00Mbit) (s30, h116) (30.00Mbit) (30.00Mbit) (s30, h117) (30.00Mbit) (30.00M
bit) (s30, h118) (30.00Mbit) (30.00Mbit) (s30, h119) (30.00Mbit) (30.00Mbit) (s3
0, h120) (30.00Mbit) (30.00Mbit) (s31, h121) (30.00Mbit) (30.00Mbit) (s31, h122)
 (30.00Mbit) (30.00Mbit) (s31, h123) (30.00Mbit) (30.00Mbit) (s31, h124) (30.00M
bit) (30.00Mbit) (s31, h125)
*** Configuring hosts
h1 h2 h3 h4 h5 h6 h7 h8 h9 h10 h11 h12 h13 h14 h15 h16 h17 h18 h19 h20 h21 h22 h
23 h24 h25 h26 h27 h28 h29 h30 h31 h32 h33 h34 h35 h36 h37 h38 h39 h40 h41 h42 h
43 h44 h45 h46 h47 h48 h49 h50 h51 h52 h53 h54 h55 h56 h57 h58 h59 h60 h61 h62 h
63 h64 h65 h66 h67 h68 h69 h70 h71 h72 h73 h74 h75 h76 h77 h78 h79 h80 h81 h82 h
83 h84 h85 h86 h87 h88 h89 h90 h91 h92 h93 h94 h95 h96 h97 h98 h99 h100 h101 h10
2 h103 h104 h105 h106 h107 h108 h109 h110 h111 h112 h113 h114 h115 h116 h117 h11
8 h119 h120 h121 h122 h123 h124 h125
*** Starting controller
c0
*** Starting 31 switches
s1 s2 s3 s4 s5 s6 s7 s8 s9 s10 s11 s12 s13 s14 s15 s16 s17 s18 s19 s20 s21 s22 s
23 s24 s25 s26 s27 s28 s29 s30 s31 ...(30.00Mbit) (30.00Mbit) (30.00Mbit) (30.00
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Mbit) (30.00Mbit)
*** Starting CLI:
mininet>
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## b - Inspeção das Informações da Rede

Nodes mostra todos os hosts e switches da rede.

```
mininet> nodes
available nodes are:
c0 h1 h10 h100 h101 h102 h103 h104 h105 h106 h107 h108 h109 h11 h110 h111 h112 h
113 h114 h115 h116 h117 h118 h119 h12 h120 h121 h122 h123 h124 h125 h13 h14 h15
h16 h17 h18 h19 h2 h20 h21 h22 h23 h24 h25 h26 h27 h28 h29 h3 h30 h31 h32 h33 h3
4 h35 h36 h37 h38 h39 h4 h40 h41 h42 h43 h44 h45 h46 h47 h48 h49 h5 h50 h51 h52
h53 h54 h55 h56 h57 h58 h59 h6 h60 h61 h62 h63 h64 h65 h66 h67 h68 h69 h7 h70 h7
1 h72 h73 h74 h75 h76 h77 h78 h79 h8 h80 h81 h82 h83 h84 h85 h86 h87 h88 h89 h9
h90 h91 h92 h93 h94 h95 h96 h97 h98 h99 s1 s10 s11 s12 s13 s14 s15 s16 s17 s18 s
19 s2 s20 s21 s22 s23 s24 s25 s26 s27 s28 s29 s3 s30 s31 s4 s5 s6 s7 s8 s9
mininet>
```

Net exibe as conexões entre hosts e switches.

```
mininet> net
h1 h1-eth0:s3-eth1
h2 h2-eth0:s3-eth2
h3 h3-eth0:s3-eth3
h4 h4-eth0:s3-eth4
h5 h5-eth0:s3-eth5
h6 h6-eth0:s4-eth1
h7 h7-eth0:s4-eth2
h8 h8-eth0:s4-eth3
h9 h9-eth0:s4-eth4
h10 h10-eth0:s4-eth5
h11 h11-eth0:s5-eth1
h12 h12-eth0:s5-eth2
h13 h13-eth0:s5-eth3
h14 h14-eth0:s5-eth4
h15 h15-eth0:s5-eth5
h16 h16-eth0:s6-eth1
h17 h17-eth0:s6-eth2
h18 h18-eth0:s6-eth3
h19 h19-eth0:s6-eth4
h20 h20-eth0:s6-eth5
h21 h21-eth0:s7-eth1
h22 h22-eth0:s7-eth2
h23 h23-eth0:s7-eth3
h24 h24-eth0:s7-eth4
h25 h25-eth0:s7-eth5
h26 h26-eth0:s9-eth1
h27 h27-eth0:s9-eth2
h28 h28-eth0:s9-eth3
h29 h29-eth0:s9-eth4
h30 h30-eth0:s9-eth5
h31 h31-eth0:s10-eth1
h32 h32-eth0:s10-eth2
h33 h33-eth0:s10-eth3
h34 h34-eth0:s10-eth4
h35 h35-eth0:s10-eth5
h36 h36-eth0:s11-eth1
h37 h37-eth0:s11-eth2
h38 h38-eth0:s11-eth3
h39 h39-eth0:s11-eth4
h40 h40-eth0:s11-eth5
h41 h41-eth0:s12-eth1
h42 h42-eth0:s12-eth2
h43 h43-eth0:s12-eth3
h44 h44-eth0:s12-eth4
h45 h45-eth0:s12-eth5
h46 h46-eth0:s13-eth1
h47 h47-eth0:s13-eth2
h48 h48-eth0:s13-eth3
h49 h49-eth0:s13-eth4
h50 h50-eth0:s13-eth5
h51 h51-eth0:s15-eth1
h52 h52-eth0:s15-eth2
h53 h53-eth0:s15-eth3
h54 h54-eth0:s15-eth4
h55 h55-eth0:s15-eth5
h56 h56-eth0:s16-eth1
h57 h57-eth0:s16-eth2
h58 h58-eth0:s16-eth3
h59 h59-eth0:s16-eth4
h60 h60-eth0:s16-eth5
h61 h61-eth0:s17-eth1
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h62 h62-eth0:s17-eth2
h63 h63-eth0:s17-eth3
h64 h64-eth0:s17-eth4
h65 h65-eth0:s17-eth5
h66 h66-eth0:s18-eth1
h67 h67-eth0:s18-eth2
h68 h68-eth0:s18-eth3
h69 h69-eth0:s18-eth4
h70 h70-eth0:s18-eth5
h71 h71-eth0:s19-eth1
h72 h72-eth0:s19-eth2
h73 h73-eth0:s19-eth3
h74 h74-eth0:s19-eth4
h75 h75-eth0:s19-eth5
h76 h76-eth0:s21-eth1
h77 h77-eth0:s21-eth2
h78 h78-eth0:s21-eth3
h79 h79-eth0:s21-eth4
h80 h80-eth0:s21-eth5
h81 h81-eth0:s22-eth1
h82 h82-eth0:s22-eth2
h83 h83-eth0:s22-eth3
h84 h84-eth0:s22-eth4
h85 h85-eth0:s22-eth5
h86 h86-eth0:s23-eth1
h87 h87-eth0:s23-eth2
h88 h88-eth0:s23-eth3
h89 h89-eth0:s23-eth4
h90 h90-eth0:s23-eth5
h91 h91-eth0:s24-eth1
h92 h92-eth0:s24-eth2
h93 h93-eth0:s24-eth3
h94 h94-eth0:s24-eth4
h95 h95-eth0:s24-eth5
h96 h96-eth0:s25-eth1
h97 h97-eth0:s25-eth2
h98 h98-eth0:s25-eth3
h99 h99-eth0:s25-eth4
h100 h100-eth0:s25-eth5
h101 h101-eth0:s27-eth1
h102 h102-eth0:s27-eth2
h103 h103-eth0:s27-eth3
h104 h104-eth0:s27-eth4
h105 h105-eth0:s27-eth5
h106 h106-eth0:s28-eth1
h107 h107-eth0:s28-eth2
h108 h108-eth0:s28-eth3
h109 h109-eth0:s28-eth4
h110 h110-eth0:s28-eth5
h111 h111-eth0:s29-eth1
h112 h112-eth0:s29-eth2
h113 h113-eth0:s29-eth3
h114 h114-eth0:s29-eth4
h115 h115-eth0:s29-eth5
h116 h116-eth0:s30-eth1
h117 h117-eth0:s30-eth2
h118 h118-eth0:s30-eth3
h119 h119-eth0:s30-eth4
h120 h120-eth0:s30-eth5
h121 h121-eth0:s31-eth1
h122 h122-eth0:s31-eth2
h123 h123-eth0:s31-eth3
h124 h124-eth0:s31-eth4
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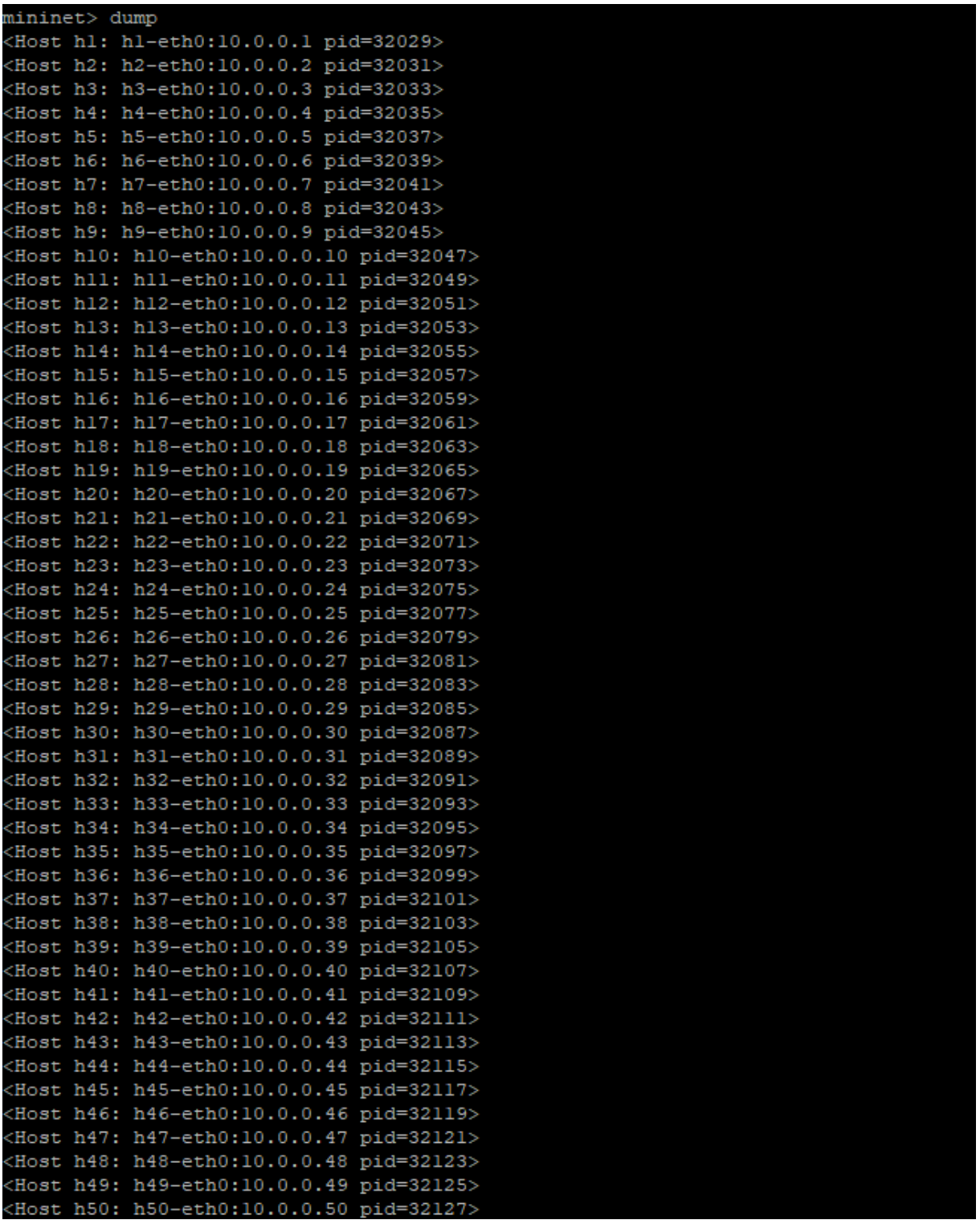
h125 h125-eth0:s31-eth5
s1 lo:  s1-eth1:s2-eth6 s1-eth2:s8-eth6 s1-eth3:s14-eth6 s1-eth4:s20-eth6 s1-eth
5:s26-eth6
s2 lo:  s2-eth1:s3-eth6 s2-eth2:s4-eth6 s2-eth3:s5-eth6 s2-eth4:s6-eth6 s2-eth5:
s7-eth6 s2-eth6:s1-eth1
s3 lo:  s3-eth1:h1-eth0 s3-eth2:h2-eth0 s3-eth3:h3-eth0 s3-eth4:h4-eth0 s3-eth5:
h5-eth0 s3-eth6:s2-eth1
s4 lo:  s4-eth1:h6-eth0 s4-eth2:h7-eth0 s4-eth3:h8-eth0 s4-eth4:h9-eth0 s4-eth5:
h10-eth0 s4-eth6:s2-eth2
s5 lo:  s5-eth1:h11-eth0 s5-eth2:h12-eth0 s5-eth3:h13-eth0 s5-eth4:h14-eth0 s5-e
th5:h15-eth0 s5-eth6:s2-eth3
s6 lo:  s6-eth1:h16-eth0 s6-eth2:h17-eth0 s6-eth3:h18-eth0 s6-eth4:h19-eth0 s6-e
th5:h20-eth0 s6-eth6:s2-eth4
s7 lo:  s7-eth1:h21-eth0 s7-eth2:h22-eth0 s7-eth3:h23-eth0 s7-eth4:h24-eth0 s7-e
th5:h25-eth0 s7-eth6:s2-eth5
s8 lo:  s8-eth1:s9-eth6 s8-eth2:s10-eth6 s8-eth3:s11-eth6 s8-eth4:s12-eth6 s8-et
h5:s13-eth6 s8-eth6:s1-eth2
s9 lo:  s9-eth1:h26-eth0 s9-eth2:h27-eth0 s9-eth3:h28-eth0 s9-eth4:h29-eth0 s9-e
th5:h30-eth0 s9-eth6:s8-eth1
s10 lo:  s10-eth1:h31-eth0 s10-eth2:h32-eth0 s10-eth3:h33-eth0 s10-eth4:h34-eth0
 s10-eth5:h35-eth0 s10-eth6:s8-eth2
s11 lo:  s11-eth1:h36-eth0 s11-eth2:h37-eth0 s11-eth3:h38-eth0 s11-eth4:h39-eth0
 s11-eth5:h40-eth0 s11-eth6:s8-eth3
s12 lo:  s12-eth1:h41-eth0 s12-eth2:h42-eth0 s12-eth3:h43-eth0 s12-eth4:h44-eth0
 s12-eth5:h45-eth0 s12-eth6:s8-eth4
s13 lo:  s13-eth1:h46-eth0 s13-eth2:h47-eth0 s13-eth3:h48-eth0 s13-eth4:h49-eth0
 s13-eth5:h50-eth0 s13-eth6:s8-eth5
s14 lo:  s14-eth1:s15-eth6 s14-eth2:s16-eth6 s14-eth3:s17-eth6 s14-eth4:s18-eth6
 s14-eth5:s19-eth6 s14-eth6:s1-eth3
s15 lo:  s15-eth1:h51-eth0 s15-eth2:h52-eth0 s15-eth3:h53-eth0 s15-eth4:h54-eth0
 s15-eth5:h55-eth0 s15-eth6:s14-eth1
s16 lo:  s16-eth1:h56-eth0 s16-eth2:h57-eth0 s16-eth3:h58-eth0 s16-eth4:h59-eth0
 s16-eth5:h60-eth0 s16-eth6:s14-eth2
s17 lo:  s17-eth1:h61-eth0 s17-eth2:h62-eth0 s17-eth3:h63-eth0 s17-eth4:h64-eth0
 s17-eth5:h65-eth0 s17-eth6:s14-eth3
s18 lo:  s18-eth1:h66-eth0 s18-eth2:h67-eth0 s18-eth3:h68-eth0 s18-eth4:h69-eth0
 s18-eth5:h70-eth0 s18-eth6:s14-eth4
s19 lo:  s19-eth1:h71-eth0 s19-eth2:h72-eth0 s19-eth3:h73-eth0 s19-eth4:h74-eth0
 s19-eth5:h75-eth0 s19-eth6:s14-eth5
s20 lo:  s20-eth1:s21-eth6 s20-eth2:s22-eth6 s20-eth3:s23-eth6 s20-eth4:s24-eth6
 s20-eth5:s25-eth6 s20-eth6:s1-eth4
s21 lo:  s21-eth1:h76-eth0 s21-eth2:h77-eth0 s21-eth3:h78-eth0 s21-eth4:h79-eth0
 s21-eth5:h80-eth0 s21-eth6:s20-eth1
s22 lo:  s22-eth1:h81-eth0 s22-eth2:h82-eth0 s22-eth3:h83-eth0 s22-eth4:h84-eth0
 s22-eth5:h85-eth0 s22-eth6:s20-eth2
s23 lo:  s23-eth1:h86-eth0 s23-eth2:h87-eth0 s23-eth3:h88-eth0 s23-eth4:h89-eth0
 s23-eth5:h90-eth0 s23-eth6:s20-eth3
s24 lo:  s24-eth1:h91-eth0 s24-eth2:h92-eth0 s24-eth3:h93-eth0 s24-eth4:h94-eth0
 s24-eth5:h95-eth0 s24-eth6:s20-eth4
s25 lo:  s25-eth1:h96-eth0 s25-eth2:h97-eth0 s25-eth3:h98-eth0 s25-eth4:h99-eth0
 s25-eth5:h100-eth0 s25-eth6:s20-eth5
s26 lo:  s26-eth1:s27-eth6 s26-eth2:s28-eth6 s26-eth3:s29-eth6 s26-eth4:s30-eth6
 s26-eth5:s31-eth6 s26-eth6:s1-eth5
s27 lo:  s27-eth1:h101-eth0 s27-eth2:h102-eth0 s27-eth3:h103-eth0 s27-eth4:h104-
eth0 s27-eth5:h105-eth0 s27-eth6:s26-eth1
s28 lo:  s28-eth1:h106-eth0 s28-eth2:h107-eth0 s28-eth3:h108-eth0 s28-eth4:h109-
eth0 s28-eth5:h110-eth0 s28-eth6:s26-eth2
s29 lo:  s29-eth1:h111-eth0 s29-eth2:h112-eth0 s29-eth3:h113-eth0 s29-eth4:h114-
eth0 s29-eth5:h115-eth0 s29-eth6:s26-eth3
s30 lo:  s30-eth1:h116-eth0 s30-eth2:h117-eth0 s30-eth3:h118-eth0 s30-eth4:h119-
eth0 s30-eth5:h120-eth0 s30-eth6:s26-eth4
s31 lo:  s31-eth1:h121-eth0 s31-eth2:h122-eth0 s31-eth3:h123-eth0 s31-eth4:h124-
eth0 s31-eth5:h125-eth0 s31-eth6:s26-eth5
c0
mininet>
```

Dump mostra os endereços IP e MAC mais as portas e interfaces de todos os dispositivos.



```
<Host h51: h51-eth0:10.0.0.51 pid=32129>
<Host h52: h52-eth0:10.0.0.52 pid=32131>
<Host h53: h53-eth0:10.0.0.53 pid=32133>
<Host h54: h54-eth0:10.0.0.54 pid=32135>
<Host h55: h55-eth0:10.0.0.55 pid=32137>
<Host h56: h56-eth0:10.0.0.56 pid=32139>
<Host h57: h57-eth0:10.0.0.57 pid=32141>
<Host h58: h58-eth0:10.0.0.58 pid=32143>
<Host h59: h59-eth0:10.0.0.59 pid=32145>
<Host h60: h60-eth0:10.0.0.60 pid=32147>
<Host h61: h61-eth0:10.0.0.61 pid=32149>
<Host h62: h62-eth0:10.0.0.62 pid=32151>
<Host h63: h63-eth0:10.0.0.63 pid=32153>
<Host h64: h64-eth0:10.0.0.64 pid=32155>
<Host h65: h65-eth0:10.0.0.65 pid=32157>
<Host h66: h66-eth0:10.0.0.66 pid=32159>
<Host h67: h67-eth0:10.0.0.67 pid=32161>
<Host h68: h68-eth0:10.0.0.68 pid=32163>
<Host h69: h69-eth0:10.0.0.69 pid=32165>
<Host h70: h70-eth0:10.0.0.70 pid=32167>
<Host h71: h71-eth0:10.0.0.71 pid=32169>
<Host h72: h72-eth0:10.0.0.72 pid=32171>
<Host h73: h73-eth0:10.0.0.73 pid=32173>
<Host h74: h74-eth0:10.0.0.74 pid=32175>
<Host h75: h75-eth0:10.0.0.75 pid=32177>
<Host h76: h76-eth0:10.0.0.76 pid=32179>
<Host h77: h77-eth0:10.0.0.77 pid=32181>
<Host h78: h78-eth0:10.0.0.78 pid=32183>
<Host h79: h79-eth0:10.0.0.79 pid=32185>
<Host h80: h80-eth0:10.0.0.80 pid=32187>
<Host h81: h81-eth0:10.0.0.81 pid=32189>
<Host h82: h82-eth0:10.0.0.82 pid=32191>
<Host h83: h83-eth0:10.0.0.83 pid=32193>
<Host h84: h84-eth0:10.0.0.84 pid=32195>
<Host h85: h85-eth0:10.0.0.85 pid=32197>
<Host h86: h86-eth0:10.0.0.86 pid=32199>
<Host h87: h87-eth0:10.0.0.87 pid=32201>
<Host h88: h88-eth0:10.0.0.88 pid=32203>
<Host h89: h89-eth0:10.0.0.89 pid=32205>
<Host h90: h90-eth0:10.0.0.90 pid=32207>
<Host h91: h91-eth0:10.0.0.91 pid=32209>
<Host h92: h92-eth0:10.0.0.92 pid=32211>
<Host h93: h93-eth0:10.0.0.93 pid=32213>
<Host h94: h94-eth0:10.0.0.94 pid=32215>
<Host h95: h95-eth0:10.0.0.95 pid=32217>
<Host h96: h96-eth0:10.0.0.96 pid=32219>
<Host h97: h97-eth0:10.0.0.97 pid=32221>
<Host h98: h98-eth0:10.0.0.98 pid=32223>
<Host h99: h99-eth0:10.0.0.99 pid=32225>
<Host h100: h100-eth0:10.0.0.100 pid=32227>
<Host h101: h101-eth0:10.0.0.101 pid=32229>
<Host h102: h102-eth0:10.0.0.102 pid=32231>
<Host h103: h103-eth0:10.0.0.103 pid=32233>
<Host h104: h104-eth0:10.0.0.104 pid=32235>
<Host h105: h105-eth0:10.0.0.105 pid=32237>
<Host h106: h106-eth0:10.0.0.106 pid=32239>
<Host h107: h107-eth0:10.0.0.107 pid=32241>
<Host h108: h108-eth0:10.0.0.108 pid=32243>
<Host h109: h109-eth0:10.0.0.109 pid=32245>
<Host h110: h110-eth0:10.0.0.110 pid=32247>
<Host h111: h111-eth0:10.0.0.111 pid=32249>
<Host h112: h112-eth0:10.0.0.112 pid=32251>
<Host h113: h113-eth0:10.0.0.113 pid=32253>
```

```
<Host h114: h114-eth0:10.0.0.114 pid=32255>
<Host h115: h115-eth0:10.0.0.115 pid=32257>
<Host h116: h116-eth0:10.0.0.116 pid=32259>
<Host h117: h117-eth0:10.0.0.117 pid=32261>
<Host h118: h118-eth0:10.0.0.118 pid=32263>
<Host h119: h119-eth0:10.0.0.119 pid=32265>
<Host h120: h120-eth0:10.0.0.120 pid=32267>
<Host h121: h121-eth0:10.0.0.121 pid=32269>
<Host h122: h122-eth0:10.0.0.122 pid=32271>
<Host h123: h123-eth0:10.0.0.123 pid=32273>
<Host h124: h124-eth0:10.0.0.124 pid=32275>
<Host h125: h125-eth0:10.0.0.125 pid=32277>
<OVSSwitch s1: lo:127.0.0.1,s1-eth1:None,s1-eth2:None,s1-eth3:None,s1-eth4:None,
s1-eth5:None pid=32282>
<OVSSwitch s2: lo:127.0.0.1,s2-eth1:None,s2-eth2:None,s2-eth3:None,s2-eth4:None,
s2-eth5:None,s2-eth6:None pid=32285>
<OVSSwitch s3: lo:127.0.0.1,s3-eth1:None,s3-eth2:None,s3-eth3:None,s3-eth4:None,
s3-eth5:None,s3-eth6:None pid=32288>
<OVSSwitch s4: lo:127.0.0.1,s4-eth1:None,s4-eth2:None,s4-eth3:None,s4-eth4:None,
s4-eth5:None,s4-eth6:None pid=32291>
<OVSSwitch s5: lo:127.0.0.1,s5-eth1:None,s5-eth2:None,s5-eth3:None,s5-eth4:None,
s5-eth5:None,s5-eth6:None pid=32294>
<OVSSwitch s6: lo:127.0.0.1,s6-eth1:None,s6-eth2:None,s6-eth3:None,s6-eth4:None,
s6-eth5:None,s6-eth6:None pid=32297>
<OVSSwitch s7: lo:127.0.0.1,s7-eth1:None,s7-eth2:None,s7-eth3:None,s7-eth4:None,
s7-eth5:None,s7-eth6:None pid=32300>
<OVSSwitch s8: lo:127.0.0.1,s8-eth1:None,s8-eth2:None,s8-eth3:None,s8-eth4:None,
s8-eth5:None,s8-eth6:None pid=32303>
<OVSSwitch s9: lo:127.0.0.1,s9-eth1:None,s9-eth2:None,s9-eth3:None,s9-eth4:None,
s9-eth5:None,s9-eth6:None pid=32306>
<OVSSwitch s10: lo:127.0.0.1,s10-eth1:None,s10-eth2:None,s10-eth3:None,s10-eth4:
None,s10-eth5:None,s10-eth6:None pid=32309>
<OVSSwitch s11: lo:127.0.0.1,s11-eth1:None,s11-eth2:None,s11-eth3:None,s11-eth4:
None,s11-eth5:None,s11-eth6:None pid=32312>
<OVSSwitch s12: lo:127.0.0.1,s12-eth1:None,s12-eth2:None,s12-eth3:None,s12-eth4:
None,s12-eth5:None,s12-eth6:None pid=32315>
<OVSSwitch s13: lo:127.0.0.1,s13-eth1:None,s13-eth2:None,s13-eth3:None,s13-eth4:
None,s13-eth5:None,s13-eth6:None pid=32318>
<OVSSwitch s14: lo:127.0.0.1,s14-eth1:None,s14-eth2:None,s14-eth3:None,s14-eth4:
None,s14-eth5:None,s14-eth6:None pid=32321>
<OVSSwitch s15: lo:127.0.0.1,s15-eth1:None,s15-eth2:None,s15-eth3:None,s15-eth4:
None,s15-eth5:None,s15-eth6:None pid=32324>
<OVSSwitch s16: lo:127.0.0.1,s16-eth1:None,s16-eth2:None,s16-eth3:None,s16-eth4:
None,s16-eth5:None,s16-eth6:None pid=32327>
<OVSSwitch s17: lo:127.0.0.1,s17-eth1:None,s17-eth2:None,s17-eth3:None,s17-eth4:
None,s17-eth5:None,s17-eth6:None pid=32330>
<OVSSwitch s18: lo:127.0.0.1,s18-eth1:None,s18-eth2:None,s18-eth3:None,s18-eth4:
None,s18-eth5:None,s18-eth6:None pid=32333>
<OVSSwitch s19: lo:127.0.0.1,s19-eth1:None,s19-eth2:None,s19-eth3:None,s19-eth4:
None,s19-eth5:None,s19-eth6:None pid=32336>
<OVSSwitch s20: lo:127.0.0.1,s20-eth1:None,s20-eth2:None,s20-eth3:None,s20-eth4:
None,s20-eth5:None,s20-eth6:None pid=32339>
<OVSSwitch s21: lo:127.0.0.1,s21-eth1:None,s21-eth2:None,s21-eth3:None,s21-eth4:
None,s21-eth5:None,s21-eth6:None pid=32342>
<OVSSwitch s22: lo:127.0.0.1,s22-eth1:None,s22-eth2:None,s22-eth3:None,s22-eth4:
None,s22-eth5:None,s22-eth6:None pid=32345>
<OVSSwitch s23: lo:127.0.0.1,s23-eth1:None,s23-eth2:None,s23-eth3:None,s23-eth4:
None,s23-eth5:None,s23-eth6:None pid=32348>
<OVSSwitch s24: lo:127.0.0.1,s24-eth1:None,s24-eth2:None,s24-eth3:None,s24-eth4:
None,s24-eth5:None,s24-eth6:None pid=32351>
<OVSSwitch s25: lo:127.0.0.1,s25-eth1:None,s25-eth2:None,s25-eth3:None,s25-eth4:
None,s25-eth5:None,s25-eth6:None pid=32354>
<OVSSwitch s26: lo:127.0.0.1,s26-eth1:None,s26-eth2:None,s26-eth3:None,s26-eth4:
```

```
None,s26-eth5:None,s26-eth6:None pid=32357>
<OVSSwitch s27: lo:127.0.0.1,s27-eth1:None,s27-eth2:None,s27-eth3:None,s27-eth4:
None,s27-eth5:None,s27-eth6:None pid=32360>
<OVSSwitch s28: lo:127.0.0.1,s28-eth1:None,s28-eth2:None,s28-eth3:None,s28-eth4:
None,s28-eth5:None,s28-eth6:None pid=32363>
<OVSSwitch s29: lo:127.0.0.1,s29-eth1:None,s29-eth2:None,s29-eth3:None,s29-eth4:
None,s29-eth5:None,s29-eth6:None pid=32366>
<OVSSwitch s30: lo:127.0.0.1,s30-eth1:None,s30-eth2:None,s30-eth3:None,s30-eth4:
None,s30-eth5:None,s30-eth6:None pid=32369>
<OVSSwitch s31: lo:127.0.0.1,s31-eth1:None,s31-eth2:None,s31-eth3:None,s31-eth4:
None,s31-eth5:None,s31-eth6:None pid=32372>
<Controller c0: 127.0.0.1:6653 pid=32022>
mininet>
```

O comando ifconfig -a permite que o usuário inspecione as informações de um nó específico. Nesse caso foram escolhidos o host h1 e o switch s1.

```
mininet> h1 ifconfig -a
h1-eth0   Link encap:Ethernet  HWaddr 00:00:00:00:00:01
          inet addr:10.0.0.1  Bcast:10.255.255.255  Mask:255.0.0.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

mininet>
```

```
mininet> s1 ifconfig -a
eth0      Link encap:Ethernet  HWaddr 08:00:27:7e:0f:24
          inet addr:192.168.56.104  Bcast:192.168.56.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:8618 errors:0 dropped:0 overruns:0 frame:0
          TX packets:12396 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:640104 (640.1 KB)  TX bytes:1558449 (1.5 MB)

eth1      Link encap:Ethernet  HWaddr 08:00:27:a7:c9:40
          inet addr:10.0.2.15  Bcast:10.0.2.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:771 errors:0 dropped:0 overruns:0 frame:0
          TX packets:781 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:69660 (69.6 KB)  TX bytes:67431 (67.4 KB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:81504 errors:0 dropped:0 overruns:0 frame:0
          TX packets:81504 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:4728048 (4.7 MB)  TX bytes:4728048 (4.7 MB)
```

```
ovs-system Link encap:Ethernet  HWaddr ea:f0:c8:29:e5:0b
          BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s1        Link encap:Ethernet  HWaddr fa:93:d7:5c:8a:46
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s2        Link encap:Ethernet  HWaddr 56:a9:8b:bb:4b:47
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s3        Link encap:Ethernet  HWaddr 72:ed:38:85:9c:48
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s4        Link encap:Ethernet  HWaddr 56:4b:5a:6c:cd:46
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s5        Link encap:Ethernet  HWaddr b2:bc:bf:4e:24:45
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s6        Link encap:Ethernet  HWaddr e2:04:d6:bd:e2:42
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s7        Link encap:Ethernet  HWaddr c6:6d:de:4f:16:43
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s8        Link encap:Ethernet  HWaddr b6:98:ae:19:fc:46
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s9        Link encap:Ethernet  HWaddr 6e:31:1a:b5:fe:42
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s10       Link encap:Ethernet  HWaddr ae:a8:49:ca:f7:42
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s11       Link encap:Ethernet  HWaddr 06:4d:f8:6c:51:40
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s12       Link encap:Ethernet  HWaddr 86:bf:62:ad:6a:41
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s13       Link encap:Ethernet  HWaddr 86:24:c2:ae:3c:42
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s14       Link encap:Ethernet  HWaddr a6:d1:f0:38:12:48
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s15       Link encap:Ethernet  HWaddr 7e:b6:19:2a:9b:4a
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s16       Link encap:Ethernet  HWaddr 5a:28:6c:e5:15:48
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s17       Link encap:Ethernet  HWaddr e6:b1:26:ac:07:4f
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s18       Link encap:Ethernet  HWaddr 86:bb:7b:13:7d:42
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s19       Link encap:Ethernet  HWaddr 82:e5:de:d5:2b:41
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s20       Link encap:Ethernet  HWaddr 2e:78:aa:99:ad:49
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s21       Link encap:Ethernet  HWaddr 02:2c:b4:98:2c:4d
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s22       Link encap:Ethernet  HWaddr b6:31:aa:47:92:46
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s23       Link encap:Ethernet  HWaddr 66:90:61:40:6e:49
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s24       Link encap:Ethernet  HWaddr ce:77:24:33:d7:4a
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s25       Link encap:Ethernet  HWaddr 82:17:3f:b2:23:4d
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s26       Link encap:Ethernet  HWaddr 9a:bd:1e:b2:ae:43
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s27       Link encap:Ethernet  HWaddr de:28:a8:e7:cf:42
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s28       Link encap:Ethernet  HWaddr ca:00:f2:6b:fc:4b
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s29       Link encap:Ethernet  HWaddr c2:ab:0c:e3:36:4e
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s30       Link encap:Ethernet  HWaddr ee:ed:2f:8f:04:46
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s31       Link encap:Ethernet  HWaddr 66:78:d9:8c:da:49
          UP BROADCAST RUNNING  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s1-eth1   Link encap:Ethernet  HWaddr ba:15:35:27:73:d6
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s1-eth2   Link encap:Ethernet  HWaddr 52:28:c0:71:0d:43
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s1-eth3   Link encap:Ethernet  HWaddr da:0e:d3:8d:ee:d6
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s1-eth4   Link encap:Ethernet  HWaddr 62:a2:8c:d9:fe:92
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s1-eth5   Link encap:Ethernet  HWaddr a6:40:86:ef:34:fd
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s10-eth1  Link encap:Ethernet  HWaddr 6a:e8:ec:c1:25:62
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s10-eth2  Link encap:Ethernet  HWaddr ca:95:39:25:2c:9b
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s10-eth3  Link encap:Ethernet  HWaddr 0e:62:b3:a9:c7:99
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s10-eth4  Link encap:Ethernet  HWaddr a6:9c:d2:56:eb:35
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s10-eth5  Link encap:Ethernet  HWaddr e6:b3:89:69:8f:19
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s10-eth6  Link encap:Ethernet  HWaddr 26:71:ee:d7:8d:d4
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s11-eth1  Link encap:Ethernet  HWaddr 06:40:03:47:b4:42
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s11-eth2  Link encap:Ethernet  HWaddr 9e:35:ad:fc:0f:ed
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
sl1-eth3  Link encap:Ethernet  HWaddr 16:9c:0c:48:b0:cb
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

sl1-eth4  Link encap:Ethernet  HWaddr 1a:6a:5b:7f:06:7f
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

sl1-eth5  Link encap:Ethernet  HWaddr fa:90:de:88:dd:56
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

sl1-eth6  Link encap:Ethernet  HWaddr 06:5a:48:6c:c4:12
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

sl2-eth1  Link encap:Ethernet  HWaddr fa:5f:d9:fa:12:6c
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

sl2-eth2  Link encap:Ethernet  HWaddr b2:4f:e2:6a:67:f5
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

sl2-eth3  Link encap:Ethernet  HWaddr fe:f9:a3:fl:7e:a7
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

sl2-eth4  Link encap:Ethernet  HWaddr 5e:7a:b4:92:19:41
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

sl2-eth5  Link encap:Ethernet  HWaddr 32:2d:26:d9:05:18
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s12-eth6  Link encap:Ethernet  HWaddr 92:36:dc:23:82:72
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s13-eth1  Link encap:Ethernet  HWaddr 12:56:55:28:52:d3
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s13-eth2  Link encap:Ethernet  HWaddr 46:f1:cf:8b:25:9f
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s13-eth3  Link encap:Ethernet  HWaddr 1e:b7:08:d9:cb:14
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s13-eth4  Link encap:Ethernet  HWaddr be:28:77:5f:d3:4e
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s13-eth5  Link encap:Ethernet  HWaddr b6:d8:d4:80:c9:fb
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s13-eth6  Link encap:Ethernet  HWaddr ea:8c:ae:a4:d3:44
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s14-eth1  Link encap:Ethernet  HWaddr 12:54:e2:30:9e:9e
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s14-eth2  Link encap:Ethernet  HWaddr f6:29:23:7d:a1:fa
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s14-eth3  Link encap:Ethernet  HWaddr 82:87:ea:b8:da:87
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s14-eth4  Link encap:Ethernet  HWaddr 22:71:b7:7a:72:e5
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s14-eth5  Link encap:Ethernet  HWaddr 4a:57:97:5d:04:2c
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s14-eth6  Link encap:Ethernet  HWaddr 82:80:b2:18:5e:0a
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s15-eth1  Link encap:Ethernet  HWaddr c6:cf:72:38:71:75
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s15-eth2  Link encap:Ethernet  HWaddr da:68:98:6f:2f:1f
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s15-eth3  Link encap:Ethernet  HWaddr 4e:f9:e6:9b:26:d0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s15-eth4  Link encap:Ethernet  HWaddr 86:d4:6b:9e:21:cd
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s15-eth5  Link encap:Ethernet  HWaddr 5a:fc:0d:fe:de:68
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
sl5-eth6  Link encap:Ethernet  HWaddr 22:9d:26:90:a8:61
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

sl6-eth1  Link encap:Ethernet  HWaddr 5e:e5:2f:32:df:67
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

sl6-eth2  Link encap:Ethernet  HWaddr 4e:3c:0e:24:0a:da
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

sl6-eth3  Link encap:Ethernet  HWaddr ca:76:82:2b:6f:87
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

sl6-eth4  Link encap:Ethernet  HWaddr 7e:90:68:41:1c:9c
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

sl6-eth5  Link encap:Ethernet  HWaddr 96:6f:4b:95:e4:40
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

sl6-eth6  Link encap:Ethernet  HWaddr 76:c4:29:f1:76:77
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

sl7-eth1  Link encap:Ethernet  HWaddr 6a:d5:ad:c9:fe:39
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

sl7-eth2  Link encap:Ethernet  HWaddr 5e:db:d7:a2:22:fa
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s17-eth3  Link encap:Ethernet  HWaddr 42:6d:95:fe:1b:01
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s17-eth4  Link encap:Ethernet  HWaddr c6:67:99:52:a5:7f
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s17-eth5  Link encap:Ethernet  HWaddr 16:ab:e1:38:ad:d0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s17-eth6  Link encap:Ethernet  HWaddr 22:2e:77:5b:10:f4
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s18-eth1  Link encap:Ethernet  HWaddr de:58:b9:4f:1c:75
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s18-eth2  Link encap:Ethernet  HWaddr 5a:6b:3b:69:c0:05
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s18-eth3  Link encap:Ethernet  HWaddr 62:01:5b:8b:f0:aa
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s18-eth4  Link encap:Ethernet  HWaddr d6:bc:2f:34:0f:db
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s18-eth5  Link encap:Ethernet  HWaddr 66:f6:c9:c9:9f:e2
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s18-eth6  Link encap:Ethernet  HWaddr 2e:33:68:f7:b4:c2
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s19-eth1  Link encap:Ethernet  HWaddr 86:2a:ff:c6:d0:bb
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s19-eth2  Link encap:Ethernet  HWaddr de:7d:46:85:18:4e
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s19-eth3  Link encap:Ethernet  HWaddr 22:6a:58:08:96:90
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s19-eth4  Link encap:Ethernet  HWaddr fa:31:12:2a:bl:ae
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s19-eth5  Link encap:Ethernet  HWaddr a6:65:4b:f1:ac:4a
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s19-eth6  Link encap:Ethernet  HWaddr f6:06:35:11:d5:2a
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s2-eth1   Link encap:Ethernet  HWaddr 9a:1a:1d:45:3e:bl
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s2-eth2   Link encap:Ethernet  HWaddr 8e:3d:38:83:6e:47
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s2-eth3   Link encap:Ethernet  HWaddr 3e:7c:06:bb:d2:6c
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s2-eth4   Link encap:Ethernet  HWaddr d2:79:b5:93:c8:d0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s2-eth5   Link encap:Ethernet  HWaddr da:dd:ad:cc:a2:db
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s2-eth6   Link encap:Ethernet  HWaddr 66:86:bd:ea:77:8d
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s20-eth1  Link encap:Ethernet  HWaddr fa:e3:35:98:67:31
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s20-eth2  Link encap:Ethernet  HWaddr 3a:2a:11:b3:ca:e5
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s20-eth3  Link encap:Ethernet  HWaddr 82:1a:c2:12:9d:ce
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s20-eth4  Link encap:Ethernet  HWaddr fe:c5:5f:a0:6d:8f
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s20-eth5  Link encap:Ethernet  HWaddr 1e:5e:ed:8b:fb:d5
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s20-eth6  Link encap:Ethernet  HWaddr de:1b:7c:88:21:09
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s21-eth1  Link encap:Ethernet  HWaddr 52:ec:51:5f:c9:cc
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s21-eth2  Link encap:Ethernet  HWaddr c6:b1:63:c7:fd:26
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s21-eth3  Link encap:Ethernet  HWaddr 1e:6c:4a:92:4f:0e
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s21-eth4  Link encap:Ethernet  HWaddr 3a:2e:76:67:c2:24
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s21-eth5  Link encap:Ethernet  HWaddr 66:c5:05:72:05:fc
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s21-eth6  Link encap:Ethernet  HWaddr be:4e:2c:fc:09:1c
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s22-eth1  Link encap:Ethernet  HWaddr 32:58:67:f0:5d:78
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s22-eth2  Link encap:Ethernet  HWaddr f2:fe:e1:07:c4:fa
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s22-eth3  Link encap:Ethernet  HWaddr f2:28:09:d3:1c:c4
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s22-eth4  Link encap:Ethernet  HWaddr e2:dd:dd:6a:4c:93
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s22-eth5  Link encap:Ethernet  HWaddr 9e:bb:5b:3a:cd:36
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s22-eth6  Link encap:Ethernet  HWaddr 92:39:20:89:72:d8
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s23-eth1  Link encap:Ethernet  HWaddr c6:3a:84:46:86:a5
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s23-eth2  Link encap:Ethernet  HWaddr de:91:95:b7:6b:fc
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s23-eth3  Link encap:Ethernet  HWaddr 1e:69:58:4e:01:30
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s23-eth4  Link encap:Ethernet  HWaddr 0e:04:54:6f:80:50
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s23-eth5  Link encap:Ethernet  HWaddr d6:d4:2b:46:f0:99
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s23-eth6  Link encap:Ethernet  HWaddr 36:5e:ce:95:26:fe
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s24-eth1  Link encap:Ethernet  HWaddr da:41:d4:17:41:6c
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s24-eth2  Link encap:Ethernet  HWaddr ee:66:6e:9d:39:39
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s24-eth3  Link encap:Ethernet  HWaddr 3a:0b:f4:50:95:af
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s24-eth4  Link encap:Ethernet  HWaddr 32:89:2d:1e:41:ab
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s24-eth5  Link encap:Ethernet  HWaddr 66:3c:8d:b5:c4:a3
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s24-eth6  Link encap:Ethernet  HWaddr 22:e3:18:17:15:31
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s25-eth1  Link encap:Ethernet  HWaddr 66:56:44:1c:18:cb
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s25-eth2  Link encap:Ethernet  HWaddr 8a:68:a8:92:7b:b1
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s25-eth3  Link encap:Ethernet  HWaddr 06:f5:b1:cb:34:d6
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s25-eth4  Link encap:Ethernet  HWaddr 86:9d:db:d9:cc:94
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s25-eth5  Link encap:Ethernet  HWaddr a2:fc:bb:26:bf:10
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s25-eth6  Link encap:Ethernet  HWaddr aa:c8:51:96:34:58
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s26-eth1  Link encap:Ethernet  HWaddr 02:5d:20:f5:a7:a1
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s26-eth2  Link encap:Ethernet  HWaddr a6:d2:eb:2e:2b:8f
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s26-eth3  Link encap:Ethernet  HWaddr 52:c2:0d:f5:38:3f
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s26-eth4  Link encap:Ethernet  HWaddr 7a:89:07:53:e8:3f
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s26-eth5  Link encap:Ethernet  HWaddr 8a:3c:96:7e:05:b3
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s26-eth6  Link encap:Ethernet  HWaddr fa:b7:a3:12:36:7c
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s27-eth1  Link encap:Ethernet  HWaddr b2:b3:b9:d9:a5:73
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s27-eth2  Link encap:Ethernet  HWaddr 7a:17:1f:15:f2:68
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s27-eth3  Link encap:Ethernet  HWaddr 5a:36:5e:b3:d0:41
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s27-eth4  Link encap:Ethernet  HWaddr 9e:66:42:2d:0f:ee
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s27-eth5  Link encap:Ethernet  HWaddr b6:05:0f:52:78:aa
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s27-eth6  Link encap:Ethernet  HWaddr 9e:0a:50:4d:e9:ad
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s28-eth1  Link encap:Ethernet  HWaddr e2:0c:90:f7:e5:ee
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s28-eth2  Link encap:Ethernet  HWaddr 3e:ba:75:a3:57:2c
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s28-eth3  Link encap:Ethernet  HWaddr 1e:c3:49:0a:07:a5
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s28-eth4  Link encap:Ethernet  HWaddr b2:44:c9:a8:d3:15
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s28-eth5  Link encap:Ethernet  HWaddr 6a:5e:17:90:94:1b
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s28-eth6  Link encap:Ethernet  HWaddr 22:ef:57:b1:48:0d
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s29-eth1  Link encap:Ethernet  HWaddr ba:2a:53:e7:84:fe
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s29-eth2  Link encap:Ethernet  HWaddr 4a:20:ae:ca:80:1f
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s29-eth3  Link encap:Ethernet  HWaddr 9e:2a:c9:28:e9:df
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s29-eth4  Link encap:Ethernet  HWaddr 9e:e9:5a:a4:84:d7
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s29-eth5  Link encap:Ethernet  HWaddr d6:41:bb:05:03:a0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s29-eth6  Link encap:Ethernet  HWaddr 2a:39:ab:1d:84:01
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s3-eth1   Link encap:Ethernet  HWaddr ca:b6:a3:52:2e:f6
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s3-eth2   Link encap:Ethernet  HWaddr ae:bf:a2:19:75:fc
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s3-eth3   Link encap:Ethernet  HWaddr 52:ae:89:2e:03:95
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s3-eth4   Link encap:Ethernet  HWaddr 6e:57:74:c2:6b:39
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s3-eth5   Link encap:Ethernet  HWaddr 72:7d:eb:74:7b:1c
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s3-eth6   Link encap:Ethernet  HWaddr ea:44:0c:0e:70:59
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s30-eth1  Link encap:Ethernet  HWaddr d6:b0:75:01:89:49
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s30-eth2  Link encap:Ethernet  HWaddr 0a:49:f7:a0:b1:b7
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s30-eth3  Link encap:Ethernet  HWaddr 06:0b:c0:62:93:f6
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s30-eth4  Link encap:Ethernet  HWaddr 8e:4b:66:4d:cf:5a
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s30-eth5  Link encap:Ethernet  HWaddr ba:fd:ea:e0:f0:7e
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s30-eth6  Link encap:Ethernet  HWaddr 6e:91:e5:be:55:9b
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s31-eth1  Link encap:Ethernet  HWaddr 92:9c:79:ad:3c:76
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s31-eth2  Link encap:Ethernet  HWaddr e2:e9:0c:ca:0a:fc
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s31-eth3  Link encap:Ethernet  HWaddr ee:e8:28:71:1c:9a
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s31-eth4  Link encap:Ethernet  HWaddr a6:cb:95:c5:ed:1b
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s31-eth5  Link encap:Ethernet  HWaddr 92:da:d0:48:da:9d
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s31-eth6  Link encap:Ethernet  HWaddr aa:7d:e8:89:43:a1
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s4-eth1   Link encap:Ethernet  HWaddr 62:6a:32:58:3f:27
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s4-eth2   Link encap:Ethernet  HWaddr f6:22:52:8b:ca:cc
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s4-eth3   Link encap:Ethernet  HWaddr d2:e6:8d:69:72:13
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s4-eth4   Link encap:Ethernet  HWaddr a6:38:92:6a:80:49
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s4-eth5   Link encap:Ethernet  HWaddr 52:a9:10:2c:83:ca
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s4-eth6   Link encap:Ethernet  HWaddr 86:54:33:7d:c5:b3
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s5-eth1   Link encap:Ethernet  HWaddr 1e:a0:2e:7b:d5:77
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s5-eth2   Link encap:Ethernet  HWaddr 72:a0:2e:5d:55:c8
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s5-eth3   Link encap:Ethernet  HWaddr ba:03:ca:ab:12:df
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s5-eth4   Link encap:Ethernet  HWaddr 12:35:1e:2f:7b:b8
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s5-eth5   Link encap:Ethernet  HWaddr 7e:e2:4a:33:4c:21
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s5-eth6   Link encap:Ethernet  HWaddr 46:b1:25:8b:4d:64
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s6-eth1   Link encap:Ethernet  HWaddr f6:a4:4a:58:7e:f8
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s6-eth2   Link encap:Ethernet  HWaddr 66:50:96:c6:61:a2
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s6-eth3   Link encap:Ethernet  HWaddr 96:ba:83:4b:53:67
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s6-eth4   Link encap:Ethernet  HWaddr 6e:6b:96:50:8a:70
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s6-eth5   Link encap:Ethernet  HWaddr b2:25:12:8c:44:a0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s6-eth6   Link encap:Ethernet  HWaddr 06:29:2d:e4:69:c5
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s7-eth1   Link encap:Ethernet  HWaddr ba:28:16:c0:88:21
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s7-eth2   Link encap:Ethernet  HWaddr 52:c9:f7:ff:4c:c1
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s7-eth3   Link encap:Ethernet  HWaddr 96:ed:8f:e2:4f:48
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s7-eth4   Link encap:Ethernet  HWaddr ca:f0:cd:d8:c2:74
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s7-eth5   Link encap:Ethernet  HWaddr fe:ce:cc:0f:f0:a1
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s7-eth6   Link encap:Ethernet  HWaddr f2:1f:75:85:c8:3e
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s8-eth1   Link encap:Ethernet  HWaddr d6:cd:d4:69:cf:18
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s8-eth2   Link encap:Ethernet  HWaddr 9a:b5:2f:96:9e:f8
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s8-eth3   Link encap:Ethernet  HWaddr b6:a2:54:fd:46:bl
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s8-eth4   Link encap:Ethernet  HWaddr 66:c9:2e:db:2f:3a
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s8-eth5   Link encap:Ethernet  HWaddr a2:e7:0e:13:c7:da
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s8-eth6   Link encap:Ethernet  HWaddr de:40:c9:35:b5:cl
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s9-eth1   Link encap:Ethernet  HWaddr fe:d6:7f:4d:c2:5c
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s9-eth2   Link encap:Ethernet  HWaddr b6:c0:55:79:76:9f
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s9-eth3   Link encap:Ethernet  HWaddr 72:8a:9d:80:08:80
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

s9-eth4   Link encap:Ethernet  HWaddr de:6a:e9:ac:57:69
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

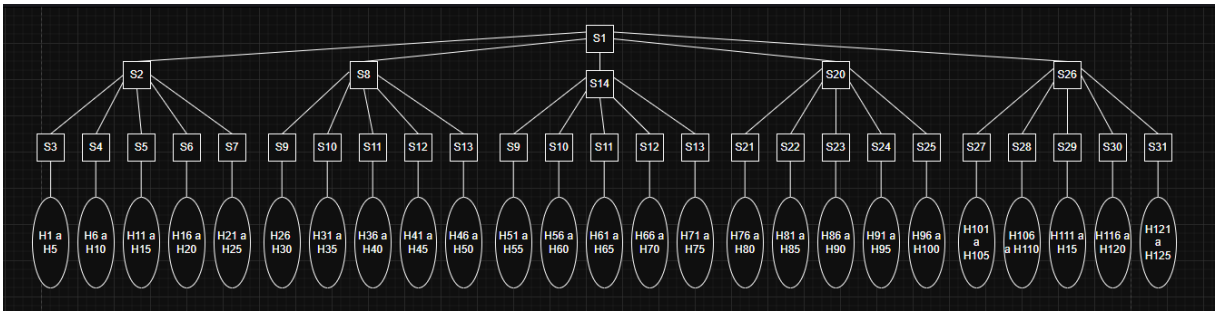
s9-eth5   Link encap:Ethernet  HWaddr 4e:60:c6:69:2e:88
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
s9-eth6   Link encap:Ethernet  HWaddr 72:09:81:7e:4e:92
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

mininet>
```

## c - Desenho da Topologia:

Usando o comando sudo ~/mininet/examples/miniedit.py, é possível utilizar o MiniEdit, uma interface gráfica que permite ao usuário montar a topologia de forma manual em formato de desenho. Para esse relatório, foi utilizado o site draw.io pois a topografia era grande demais para caber na interface do MiniEdit.




## d - Testes de Ping:

Para fazer os testes de conectividade, foram utilizados os comandos pingall, que permite ao usuário transmitir mensagens através de todos os nós da topologia, e ping, que transmite pacotes de um nó para o outro, sendo possível determinar a quantidade de pacotes transmitidos.

```
mininet> pingall
*** Ping: testing ping reachability
h1 -> h2 h3 h4 h5 h6 h7 h8 h9 h10 h11 h12 h13 h14 h15 h16 h17 h18 h19 h20 h21 h2
2 h23 h24 h25 h26 h27 h28 h29 h30 h31 h32 h33 h34 h35 h36 h37 h38 h39 h40 h41 h4
2 h43 h44 h45 h46 h47 h48 h49 h50 h51 h52 h53 h54 h55 h56 h57 h58 h59 h60 h61 h6
2 h63 h64 h65 h66 h67 h68 h69 h70 h71 h72 h73 h74 h75 h76 h77 h78 h79 h80 h81 h8
2 h83 h84 h85 h86 h87 h88 h89 h90 h91 h92 h93 h94 h95 h96 h97 h98 h99 h100 h101
h102 h103 h104 h105 h106 h107 h108 h109 h110 h111 h112 h113 h114 h115 h116 h117
h118 h119 h120 h121 h122 h123 h124 h125
```

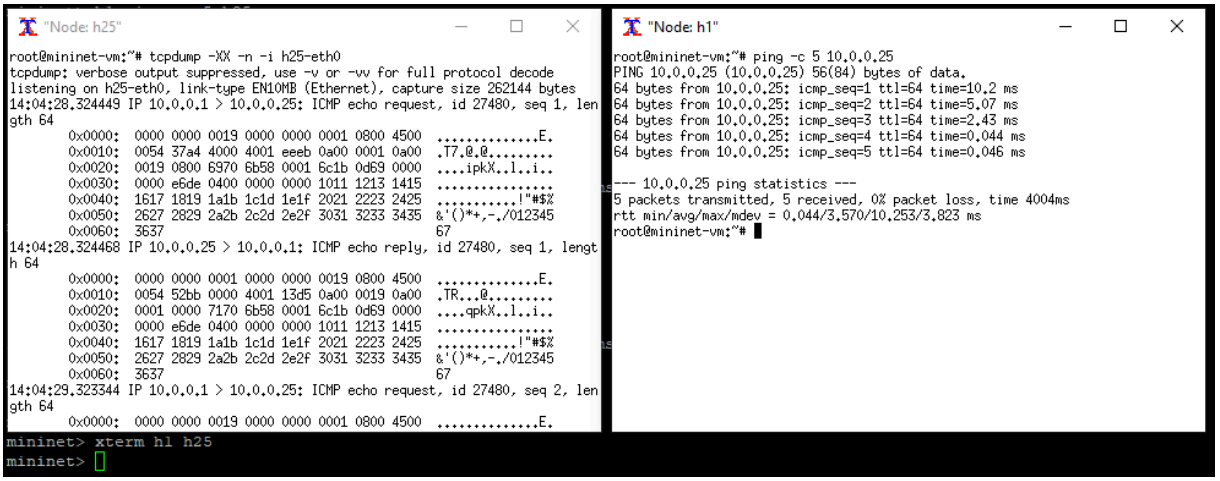
No pingall, o mininet envia pacotes de um host para os demais hosts. Como o número de hosts é muito alto, foi escolhido mostrar apenas o primeiro caso como um exemplo do funcionamento do comando.

```
mininet> h1 ping -c 5 h25
PING 10.0.0.25 (10.0.0.25) 56(84) bytes of data.
64 bytes from 10.0.0.25: icmp_seq=1 ttl=64 time=24.3 ms
64 bytes from 10.0.0.25: icmp_seq=2 ttl=64 time=0.314 ms
64 bytes from 10.0.0.25: icmp_seq=3 ttl=64 time=0.038 ms
64 bytes from 10.0.0.25: icmp_seq=4 ttl=64 time=0.039 ms
64 bytes from 10.0.0.25: icmp_seq=5 ttl=64 time=0.045 ms

--- 10.0.0.25 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4000ms
rtt min/avg/max/mdev = 0.038/4.958/24.355/9.699 ms
mininet> h25 ping -c 2 h1
PING 10.0.0.1 (10.0.0.1) 56(84) bytes of data.
64 bytes from 10.0.0.1: icmp_seq=1 ttl=64 time=12.8 ms
64 bytes from 10.0.0.1: icmp_seq=2 ttl=64 time=0.242 ms

--- 10.0.0.1 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1002ms
rtt min/avg/max/mdev = 0.242/6.567/12.893/6.326 ms
mininet>
```

Um terceiro comando para testes de conectividade é o tcpdump, que imprime os pacotes recebidos por um nó. Para usá-lo, é necessário abrir terminais pelo xterm, configurar o nó que irá receber os pacotes e dar ping utilizando o ip do host alvo.



```
root@mininet-vm:~# tcpdump -XX -n -i h25-eth0
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on h25-eth0, link-type EN10MB (Ethernet), capture size 262144 bytes
14:04:28.324449 IP 10.0.0.1 > 10.0.0.25: ICMP echo request, id 27480, seq 1, len
gth 64
        0x0000:  0000 0000 0019 0000 0000 0001 0800 4500  ..............E.
        0x0010:  0054 37a4 4000 4001 eeeb 0a00 0001 0a00  .T7.@.@.........
        0x0020:  0019 0800 6970 6b58 0001 6c1b 0d69 0000  ....ipkX..l..i..
        0x0030:  0000 e6de 0400 0000 0000 1011 1213 1415  ................
        0x0040:  1617 1819 1a1b 1c1d 1e1f 2021 2223 2425  ..........!"#$%
        0x0050:  2627 2829 2a2b 2c2d 2e2f 3031 3233 3435  &'()*+,-./012345
        0x0060:  3637                                     67
14:04:28.324468 IP 10.0.0.25 > 10.0.0.1: ICMP echo reply, id 27480, seq 1, lengt
h 64
        0x0000:  0000 0000 0001 0000 0000 0019 0800 4500  ..............E.
        0x0010:  0054 52bb 0000 4001 13d5 0a00 0019 0a00  .TR...@.........
        0x0020:  0001 0000 7170 6b58 0001 6c1b 0d69 0000  ....qpkX..l..i..
        0x0030:  0000 e6de 0400 0000 0000 1011 1213 1415  ................
        0x0040:  1617 1819 1a1b 1c1d 1e1f 2021 2223 2425  ..........!"#$%
        0x0050:  2627 2829 2a2b 2c2d 2e2f 3031 3233 3435  &'()*+,-./012345
        0x0060:  3637                                     67
14:04:29.323344 IP 10.0.0.1 > 10.0.0.25: ICMP echo request, id 27480, seq 2, len
gth 64
        0x0000:  0000 0000 0019 0000 0000 0001 0800 4500  ..............E.
        0x0010:  0054 37c5 4000 4001 eeca 0a00 0001 0a00  .T7.@.@.........
        0x0020:  0019 0800 0b6a 6b58 0002 6d1b 0d69 0000  .....jkX..m..i..
        0x0030:  0000 43e4 0400 0000 0000 1011 1213 1415  ..C.............
        0x0040:  1617 1819 1a1b 1c1d 1e1f 2021 2223 2425  ..........!"#$%
        0x0050:  2627 2829 2a2b 2c2d 2e2f 3031 3233 3435  &'()*+,-./012345
        0x0060:  3637                                     67
14:04:29.323357 IP 10.0.0.25 > 10.0.0.1: ICMP echo reply, id 27480, seq 2, lengt
h 64
        0x0000:  0000 0000 0001 0000 0000 0019 0800 4500  ..............E.
        0x0010:  0054 539e 0000 4001 12f2 0a00 0019 0a00  .TS...@.........
        0x0020:  0001 0000 136a 6b58 0002 6d1b 0d69 0000  .....jkX..m..i..
        0x0030:  0000 43e4 0400 0000 0000 1011 1213 1415  ..C.............
        0x0040:  1617 1819 1a1b 1c1d 1e1f 2021 2223 2425  ..........!"#$%
        0x0050:  2627 2829 2a2b 2c2d 2e2f 3031 3233 3435  &'()*+,-./012345
        0x0060:  3637                                     67
14:04:30.322417 IP 10.0.0.1 > 10.0.0.25: ICMP echo request, id 27480, seq 3, len
gth 64
        0x0000:  0000 0000 0019 0000 0000 0001 0800 4500  ..............E.
        0x0010:  0054 37cd 4000 4001 eec2 0a00 0001 0a00  .T7.@.@.........
        0x0020:  0019 0800 aa62 6b58 0003 6e1b 0d69 0000  .....bkX..n..i..
        0x0030:  0000 a3ea 0400 0000 0000 1011 1213 1415  ................
        0x0040:  1617 1819 1a1b 1c1d 1e1f 2021 2223 2425  ..........!"#$%
        0x0050:  2627 2829 2a2b 2c2d 2e2f 3031 3233 3435  &'()*+,-./012345
        0x0060:  3637                                     67
14:04:30.322443 IP 10.0.0.25 > 10.0.0.1: ICMP echo reply, id 27480, seq 3, lengt
h 64
        0x0000:  0000 0000 0001 0000 0000 0019 0800 4500  ..............E.
        0x0010:  0054 5443 0000 4001 124d 0a00 0019 0a00  .TTC..@..M......
        0x0020:  0001 0000 b262 6b58 0003 6e1b 0d69 0000  .....bkX..n..i..
        0x0030:  0000 a3ea 0400 0000 0000 1011 1213 1415  ................
        0x0040:  1617 1819 1a1b 1c1d 1e1f 2021 2223 2425  ..........!"#$%
        0x0050:  2627 2829 2a2b 2c2d 2e2f 3031 3233 3435  &'()*+,-./012345
        0x0060:  3637                                     67
14:04:31.324011 IP 10.0.0.1 > 10.0.0.25: ICMP echo request, id 27480, seq 4, len
gth 64
        0x0000:  0000 0000 0019 0000 0000 0001 0800 4500  ..............E.
        0x0010:  0054 3893 4000 4001 edfc 0a00 0001 0a00  .T8.@.@.........
        0x0020:  0019 0800 bc5a 6b58 0004 6f1b 0d69 0000  .....ZkX..o..i..
        0x0030:  0000 90f1 0400 0000 0000 1011 1213 1415  ................
        0x0040:  1617 1819 1a1b 1c1d 1e1f 2021 2223 2425  ..........!"#$%
        0x0050:  2627 2829 2a2b 2c2d 2e2f 3031 3233 3435  &'()*+,-./012345
        0x0060:  3637                                     67
14:04:31.324022 IP 10.0.0.25 > 10.0.0.1: ICMP echo reply, id 27480, seq 4, lengt
h 64
        0x0000:  0000 0000 0001 0000 0000 0019 0800 4500  ..............E.
        0x0010:  0054 5520 0000 4001 1170 0a00 0019 0a00  .TU...@..p......
        0x0020:  0001 0000 c45a 6b58 0004 6f1b 0d69 0000  .....ZkX..o..i..
        0x0030:  0000 90f1 0400 0000 0000 1011 1213 1415  ................
        0x0040:  1617 1819 1a1b 1c1d 1e1f 2021 2223 2425  ..........!"#$%
        0x0050:  2627 2829 2a2b 2c2d 2e2f 3031 3233 3435  &'()*+,-./012345
        0x0060:  3637                                     67
14:04:32.323711 IP 10.0.0.1 > 10.0.0.25: ICMP echo request, id 27480, seq 5, len
gth 64
```

```
14:04:32.323724 IP 10.0.0.25 > 10.0.0.1: ICMP echo reply, id 27480, seq 5, lengt
h 64
        0x0000:  0000 0000 0001 0000 0000 0019 0800 4500  ..............E.
        0x0010:  0054 5522 0000 4001 116e 0a00 0019 0a00  .TU"..@..n......
        0x0020:  0001 0000 ef5a 6b58 0005 701b 0d69 0000  .....ZkX..p..i..
        0x0030:  0000 64f0 0400 0000 0000 1011 1213 1415  ..d.............
        0x0040:  1617 1819 1a1b 1c1d 1e1f 2021 2223 2425  ...........!"#$%
        0x0050:  2627 2829 2a2b 2c2d 2e2f 3031 3233 3435  &'()*+,-./012345
        0x0060:  3637                                     67
14:04:33.327762 ARP, Request who-has 10.0.0.1 tell 10.0.0.25, length 28
        0x0000:  0000 0000 0001 0000 0000 0019 0806 0001  ................
        0x0010:  0800 0604 0001 0000 0000 0019 0a00 0019  ................
        0x0020:  0000 0000 0000 0a00 0001                 ..........
14:04:33.334900 ARP, Reply 10.0.0.1 is-at 00:00:00:00:00:01, length 28
        0x0000:  0000 0000 0019 0000 0000 0001 0806 0001  ................
        0x0010:  0800 0604 0002 0000 0000 0001 0a00 0001  ................
        0x0020:  0000 0000 0019 0a00 0019                 ..........
```

## d - Testes de Desempenho:

Para verificar o tamanho dos dados transmitidos entre duas hosts e a banda utilizada, é necessário realizar testes iperf por meio de terminais xterm. Neste caso, foi considerado um relatório por segundo durante um período de testes de 20 segundos. A porta 5555 do host h1 foi configurada como sendo um servidor tcp e host h2 como sendo um cliente. Foram feitos testes para larguras de 30 Mbps e 40 Mbps, neste último caso sendo necessário reconstruir a topologia.

O comando utilizado para configurar o host h1 foi o iperf -s -p 5555 -i 1: -s significa modo servidor, -p define a porta do servidor e -i configura o intervalo de relatório. Para configurar o host 2, foi utilizado o comando iperf -c 10.0.0.1 -p 5555 -i 1 -t 20: -c significa modo cliente, 10.0.0.1 é ip do host h1 e -t define a duração do teste em segundos.

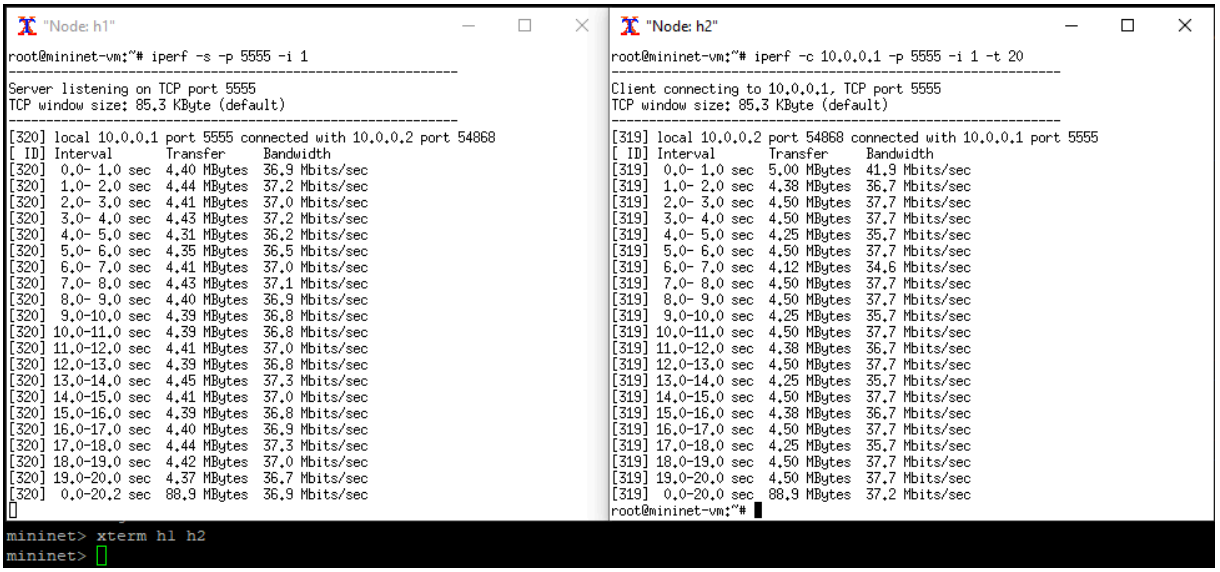
"Node: h1"

```
root@mininet-vm:~# iperf -s -p 5555 -i 1
------------------------------------------------------------
Server listening on TCP port 5555
TCP window size: 85.3 KByte (default)
------------------------------------------------------------
[320] local 10.0.0.1 port 5555 connected with 10.0.0.2 port 54562
[ ID] Interval       Transfer     Bandwidth
[320]  0.0- 1.0 sec  3.32 MBytes  27.9 Mbits/sec
[320]  1.0- 2.0 sec  3.37 MBytes  28.3 Mbits/sec
[320]  2.0- 3.0 sec  3.21 MBytes  26.9 Mbits/sec
[320]  3.0- 4.0 sec  3.35 MBytes  28.1 Mbits/sec
[320]  4.0- 5.0 sec  3.33 MBytes  27.9 Mbits/sec
[320]  5.0- 6.0 sec  3.34 MBytes  28.0 Mbits/sec
[320]  6.0- 7.0 sec  3.34 MBytes  28.0 Mbits/sec
[320]  7.0- 8.0 sec  3.33 MBytes  28.0 Mbits/sec
[320]  8.0- 9.0 sec  3.36 MBytes  28.1 Mbits/sec
[320]  9.0-10.0 sec  3.34 MBytes  28.0 Mbits/sec
[320] 10.0-11.0 sec  3.36 MBytes  28.2 Mbits/sec
[320] 11.0-12.0 sec  3.35 MBytes  28.1 Mbits/sec
[320] 12.0-13.0 sec  3.34 MBytes  28.0 Mbits/sec
[320] 13.0-14.0 sec  3.35 MBytes  28.1 Mbits/sec
[320] 14.0-15.0 sec  3.34 MBytes  28.0 Mbits/sec
[320] 15.0-16.0 sec  3.34 MBytes  28.0 Mbits/sec
[320] 16.0-17.0 sec  3.36 MBytes  28.1 Mbits/sec
[320] 17.0-18.0 sec  3.36 MBytes  28.1 Mbits/sec
[320] 18.0-19.0 sec  3.35 MBytes  28.1 Mbits/sec
[320] 19.0-20.0 sec  3.35 MBytes  28.1 Mbits/sec
[320]  0.0-20.2 sec  67.4 MBytes  28.0 Mbits/sec
```

"Node: h2"

```
root@mininet-vm:~# iperf -c 10.0.0.1 -p 5555 -i 1 -t 20
------------------------------------------------------------
Client connecting to 10.0.0.1, TCP port 5555
TCP window size: 85.3 KByte (default)
------------------------------------------------------------
[319] local 10.0.0.2 port 54562 connected with 10.0.0.1 port 5555
[ ID] Interval       Transfer     Bandwidth
[319]  0.0- 1.0 sec  3.88 MBytes  32.5 Mbits/sec
[319]  1.0- 2.0 sec  3.25 MBytes  27.3 Mbits/sec
[319]  2.0- 3.0 sec  3.25 MBytes  27.3 Mbits/sec
[319]  3.0- 4.0 sec  3.38 MBytes  28.3 Mbits/sec
[319]  4.0- 5.0 sec  3.25 MBytes  27.3 Mbits/sec
[319]  5.0- 6.0 sec  3.38 MBytes  28.3 Mbits/sec
[319]  6.0- 7.0 sec  3.38 MBytes  28.3 Mbits/sec
[319]  7.0- 8.0 sec  3.12 MBytes  26.2 Mbits/sec
[319]  8.0- 9.0 sec  3.38 MBytes  28.3 Mbits/sec
[319]  9.0-10.0 sec  3.38 MBytes  28.3 Mbits/sec
[319] 10.0-11.0 sec  3.62 MBytes  30.4 Mbits/sec
[319] 11.0-12.0 sec  3.25 MBytes  27.3 Mbits/sec
[319] 12.0-13.0 sec  3.38 MBytes  28.3 Mbits/sec
[319] 13.0-14.0 sec  3.38 MBytes  28.3 Mbits/sec
[319] 14.0-15.0 sec  3.38 MBytes  28.3 Mbits/sec
[319] 15.0-16.0 sec  3.38 MBytes  28.3 Mbits/sec
[319] 16.0-17.0 sec  3.38 MBytes  28.3 Mbits/sec
[319] 17.0-18.0 sec  3.25 MBytes  27.3 Mbits/sec
[319] 18.0-19.0 sec  3.38 MBytes  28.3 Mbits/sec
[319] 19.0-20.0 sec  3.25 MBytes  27.3 Mbits/sec
[319]  0.0-20.1 sec  67.4 MBytes  28.2 Mbits/sec
root@mininet-vm:~#
```

```
mininet> xterm h1 h2
mininet>
```




# Parte 2: Topologia Customizada Feita em Python

## a - Criação da Topologia:

Infelizmente não foi possível acessar a topologia criada em Python pelo mininet. Tentei de tudo mas não consegui resultado. Contudo irei prosseguir como se tivesse tido sucesso, mesmo sem prints dos resultados.

Para executar o script da topologia, é necessário usar o comando sudo python3 topo-3sw-5host. O parâmetro switch=OVSSwitch permite que a topologia aceite comandos para visualização e alteração de fluxos, já controller=none define o controlador como sendo manual. Por sua vez, autoSetMacs=True padroniza os endereços ip dos hosts.

## b - Inspeção das Informações da Rede

Usando o comando nodes, os nós da topologia podem ser visualizados. Eles são: h1, h2, h3, h4, h5, s1, s2 e s3.

Usando o comando net fará com que o mininet exiba as conexões entre os nós, como por exemplo:

- h1 h1-eth0:s1-eth1;
- h2 h2-eth0:s1-eth2;

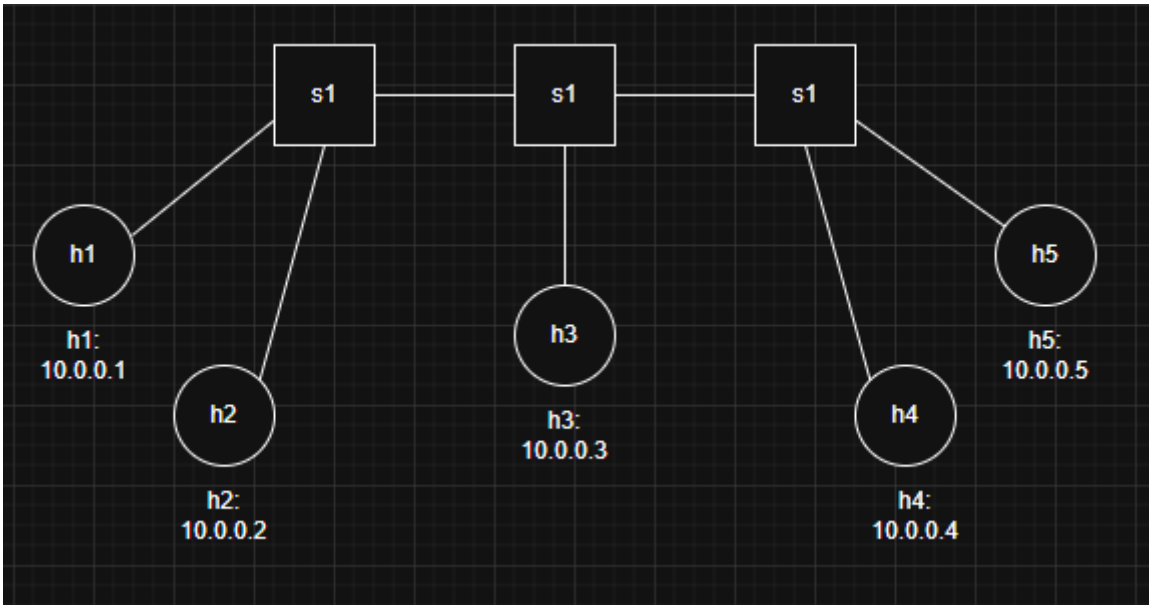
- h3 h3-eth0:s2-eth1;
- h4 h4-eth0:s3-eth1;
- h5 h5-eth0:s3-eth2;
- s1 lo: s1-eth1:h1-eth0 s1-eth2:h2-eth0 s1-eth3:s2-eth2;
- s2 lo: s2-eth1:h3-eth0 s2-eth2:s1-eth3 s2-eth3:s3-eth3;
- s3 lo: s3-eth1:h4-eth0 s3-eth2:h5-eth0 s3-eth3:s2-eth3.

Usando o comando dump, é possível verificar os endereços ips dos hosts:

- h1: 10.0.0.1;
- h2:10.0.0.2;
- h3: 10.0.0.3;
- h4:10.0.0.4;
- h5: 10.0.0.5.

Usando o comando ifconfig para cada host, é possível perceber que os endereços dos hosts foram padronizados, além de conferir informações das interfaces.

## c - Desenho da Topologia:




## d - Testes de Ping:

Ping e pingall devem funcionar corretamente.

# e - Regras de fluxo dos pacotes:

Apagar regras dos switches:

- sh ovs-ofctl del-flows s1;
- sh ovs-ofctl del-flows s2;
- sh ovs-ofctl del-flows s3;