



Computer Networks

Mini Internet Project(phase 1)

AS: 8

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1.1 In this query, we were asked to create one subnet, so we kept the same mask for the interface of each host and router that is connected on a switch (8.200.0.0/23). 23 means that the 23 first bits of each address must be the same. We had remaining 9 bits, so we could choose from 2^9 numbers to create the wanted IP addresses. We changed the 8 last and we created the following (we kept a pattern for design purposes ID+0=staffID, ID+ID=studentID, numofSwitchesconnected=GENE,ZURI).

```
root@student 1:~# ifconfig
8-CERN: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 8.200.0.11 netmask 255.255.254.0 broadcast 0.0.0.0
    ether 56:43:24:8f:9e:b0 txqueuelen 1000 (Ethernet)
    RX packets 1021300 bytes 53228399 (50.7 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 573 bytes 35221 (34.3 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 363 bytes 36473 (35.6 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 363 bytes 36473 (35.6 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

ssh: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 158.8.11.5 netmask 255.255.0.0 broadcast 0.0.0.0
    ether 6e:24:f1:7d:1e:01 txqueuelen 1000 (Ethernet)
    RX packets 16060 bytes 1796644 (1.7 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 8059 bytes 1049780 (1.0 MiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

student1:8.200.0.11/23

```
root@student 2:~# ifconfig
8-ETHZ: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 8.200.0.22 netmask 255.255.254.0 broadcast 0.0.0.0
    ether 0a:01:0b:93:7d:99 txqueuelen 1000 (Ethernet)
    RX packets 1021276 bytes 53217332 (50.7 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 48 bytes 4040 (3.9 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

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

ssh: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 158.8.11.7 netmask 255.255.0.0 broadcast 0.0.0.0
    ether e2:b7:08:60:11:97 txqueuelen 1000 (Ethernet)
    RX packets 4903 bytes 738062 (720.7 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 1346 bytes 174653 (170.5 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

student2:8.200.0.22/23

```
root@student 3:~# ifconfig
8-EPFL: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 8.200.0.33 netmask 255.255.254.0 broadcast 0.0.0.0
    ether 0a:71:c5:f7:1c:c1 txqueuelen 1000 (Ethernet)
    RX packets 1021513 bytes 53232642 (50.7 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 127 bytes 10167 (9.9 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 8 bytes 896 (896.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 8 bytes 896 (896.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

ssh: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 158.8.11.9 netmask 255.255.0.0 broadcast 0.0.0.0
    ether 12:cb:b0:7a:fd:1b txqueuelen 1000 (Ethernet)
    RX packets 6353 bytes 880858 (860.2 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 2242 bytes 297755 (290.7 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

student3:8.200.0.33/23

```
root@staff 1:~# ifconfig
8-CERN: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 8.200.0.10 netmask 255.255.254.0 broadcast 0.0.0.0
    ether da:f4:14:cc:4e:7e txqueuelen 1000 (Ethernet)
    RX packets 1021385 bytes 53224192 (50.7 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 42 bytes 2634 (2.5 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 20 bytes 2016 (1.9 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 20 bytes 2016 (1.9 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

ssh: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 158.8.11.6 netmask 255.255.0.0 broadcast 0.0.0.0
    ether 62:dd:15:a1:01:e7 txqueuelen 1000 (Ethernet)
    RX packets 6292 bytes 864152 (843.8 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 2066 bytes 265066 (258.8 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

staff1:8.200.0.10/23

```
root@staff 2:~# ifconfig
8-ETHZ: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 8.200.0.20 netmask 255.255.254.0 broadcast 0.0.0.0
    ether 0e:8d:aa:af:f9:53 txqueuelen 1000 (Ethernet)
    RX packets 1021401 bytes 53223649 (50.7 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 87 bytes 6511 (6.3 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 12 bytes 1344 (1.3 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 12 bytes 1344 (1.3 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

ssh: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 158.8.11.8 netmask 255.255.0.0 broadcast 0.0.0.0
    ether 96:68:30:30:8a:4b txqueuelen 1000 (Ethernet)
    RX packets 4781 bytes 725322 (708.3 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 1240 bytes 157454 (153.7 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

staff2:8.200.0.20/23

```
root@staff 3:~# ifconfig
8-EPFL: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 8.200.0.30 netmask 255.255.254.0 broadcast 0.0.0.0
    ether 8e:95:23:65:5d:f2 txqueuelen 1000 (Ethernet)
    RX packets 1021631 bytes 53236984 (50.7 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 44 bytes 2408 (2.3 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    loop txqueuelen 1000 (Local Loopback)
    RX packets 16 bytes 1612 (1.5 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 16 bytes 1612 (1.5 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

ssh: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 158.8.11.10 netmask 255.255.0.0 broadcast 0.0.0.0
    ether f2:24:bf:61:b7:70 txqueuelen 1000 (Ethernet)
    RX packets 4956 bytes 738128 (720.8 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 1270 bytes 156113 (152.4 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

staff3:8.200.0.30/23

```

ZURI_router# show ip route connected
Codes: K - kernel route, C - connected, S - static, R - RIP,
       O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP,
       T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP,
       F - PBR, f - OpenFabric,
       > - selected route, * - FIB route, q - queued route, r - rejected route

C>* 8.0.199.0/24 is directly connected, measurement_8, 03w3d03h
C>* 8.200.0.0/23 is directly connected, ZURI-L2, 00:00:12
C>* 158.8.0.0/16 is directly connected, ssh, 03w3d01h

```

ZURI:8.200.0.1/23

```

GENE_router# show ip route connected
Codes: K - kernel route, C - connected, S - static, R - RIP,
       O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP,
       T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP,
       F - PBR, f - OpenFabric,
       > - selected route, * - FIB route, q - queued route, r - rejected route

C>* 8.200.0.0/23 is directly connected, GENE-L2, 5d23h07m
C>* 158.8.0.0/16 is directly connected, ssh, 03w3d01h

```

GENE:8.200.0.2/23

```

root@staff_2:~# ping -c 4 8.200.0.1
PING 8.200.0.1 (8.200.0.1) 56(84) bytes of data.
64 bytes from 8.200.0.1: icmp_seq=1 ttl=64 time=9.16 ms
64 bytes from 8.200.0.1: icmp_seq=2 ttl=64 time=2.36 ms
64 bytes from 8.200.0.1: icmp_seq=3 ttl=64 time=2.23 ms
64 bytes from 8.200.0.1: icmp_seq=4 ttl=64 time=2.24 ms

--- 8.200.0.1 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3003ms
rtt min/avg/max/mdev = 2.231/4.000/9.166/2.983 ms

```

ping:staff2 to ZURI

```

root@student_1:~# ping -c 4 8.200.0.2
PING 8.200.0.2 (8.200.0.2) 56(84) bytes of data.
64 bytes from 8.200.0.2: icmp_seq=1 ttl=64 time=3.64 ms
64 bytes from 8.200.0.2: icmp_seq=2 ttl=64 time=2.22 ms
64 bytes from 8.200.0.2: icmp_seq=3 ttl=64 time=2.22 ms
64 bytes from 8.200.0.2: icmp_seq=4 ttl=64 time=2.22 ms

--- 8.200.0.2 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3004ms
rtt min/avg/max/mdev = 2.225/2.581/3.643/0.613 ms

```

ping:student1 to GENE

1.2 In this part we changed the mask in order to be able to create two different subnets. One for the staff and one for the students. This way our vlans are going to be able to work smoothly. We set up the trunks on the routers and the switches and tags on the hosts accordingly. The subnet 8.200.1.0/24 belongs to stuff and the subnet 8.200.0.0/24 to students. Now, GENE.20(8.200.0.220/24) and ZENE.20(8.200.0.120/24) belong to the later subnet and GENE.10(8.200.1.210/24) and ZENE.10(8.200.1.110/24) belong to 8.200.1.0/24 subnet. The pattern followed on the ending of each IP of the hosts is the same as 1.1 for design purposes.

```
traceroute to 8.200.1.30 (8.200.1.30), 30 hops max, 60 byte packets
 1  8.200.0.220 (8.200.0.220)  20.924 ms  20.520 ms  20.245 ms
 2  8.200.1.30 (8.200.1.30)  30.721 ms  30.618 ms  30.448 ms
```

traceroute: EPFLstudent to EPFLstuff (3 to 3)

```
traceroute to 8.200.1.20 (8.200.1.20), 30 hops max, 60 byte packets
 1  8.200.0.220 (8.200.0.220)  7.477 ms  7.343 ms  7.317 ms
 2  8.200.1.20 (8.200.1.20)  13.677 ms  13.822 ms  13.624 ms
```

traceroute: EPFLstudent to ETHZstuff (3 to 2)

```
traceroute to 8.200.0.33 (8.200.0.33), 30 hops max, 60 byte packets
 1  8.200.1.110 (8.200.1.110)  7.755 ms  7.413 ms  7.256 ms
 2  8.200.0.33 (8.200.0.33)  15.342 ms  15.244 ms  15.207 ms
```

traceroute: ETHZstuff to EPFLstudent(2 to 3)

We observe that the package in every case will go through the router that is set as the default gateway as there is no direct communication between staff and students.

1.3

```
root@PARI_host:~# traceroute 8.107.0.1
traceroute to 8.107.0.1 (8.107.0.1), 30 hops max, 60 byte packets
 1  PARI-host.group8 (8.103.0.2)  0.645 ms  0.463 ms  0.451 ms
 2  MIAM-PARI.group8 (8.0.6.2)  0.718 ms NEWY-PARI.group8 (8.0.5.2)  2.297 ms MIAM-PARI.
group8 (8.0.6.2)  0.318 ms
 3  ATLA-NEWY.group8 (8.0.11.2)  2.550 ms  2.447 ms ATLA-MIAM.group8 (8.0.13.1)  0.799 m
s
 4  host-ATLA.group8 (8.107.0.1)  0.892 ms  0.826 ms  1.414 ms
```

traceroute: PARI host to ATLA host

1.4 To understand the configuration of our network we run the following:

```
root@PARI_host:~# iperf3 --client 8.105.0.1 --time 5
Connecting to host 8.105.0.1, port 5201
[ 4] local 8.103.0.1 port 43106 connected to 8.105.0.1 port 5201
[ ID] Interval            Transfer          Bandwidth        Retr  Cwnd
[ 4]  0.00-1.00    sec    2.60 MBytes    21.8 Mbits/sec    235   2.83 KBytes
[ 4]  1.00-2.00    sec   1018 KBytes    8.34 Mbits/sec     90   9.90 KBytes
[ 4]  2.00-3.00    sec    1.37 MBytes   11.5 Mbits/sec    167   5.66 KBytes
[ 4]  3.00-4.00    sec   1018 KBytes    8.34 Mbits/sec    112  15.6 KBytes
[ 4]  4.00-5.00    sec    1.30 MBytes   10.9 Mbits/sec    129  12.7 KBytes
- - - - -
[ ID] Interval            Transfer          Bandwidth        Retr
[ 4]  0.00-5.00    sec    7.26 MBytes   12.2 Mbits/sec    733
[ 4]  0.00-5.00    sec    6.77 MBytes   11.4 Mbits/sec
                                sender
                                receiver
```

NEWY-PARI

```
root@LOND_host:~# iperf3 --client 8.106.0.1 --time 5
Connecting to host 8.106.0.1, port 5201
[ 4] local 8.101.0.1 port 42378 connected to 8.106.0.1 port 5201
[ ID] Interval            Transfer          Bandwidth        Retr  Cwnd
[ 4]  0.00-1.00    sec   15.1 MBytes   127 Mbits/sec   2274   222 KBytes
[ 4]  1.00-2.00    sec   11.0 MBytes   92.2 Mbits/sec     0   257 KBytes
[ 4]  2.00-3.01    sec   11.8 MBytes   97.9 Mbits/sec     26   202 KBytes
[ 4]  3.01-4.00    sec   10.4 MBytes   88.2 Mbits/sec     0   242 KBytes
[ 4]  4.00-5.00    sec   12.0 MBytes   101 Mbits/sec     0   272 KBytes
- - - - -
[ ID] Interval            Transfer          Bandwidth        Retr
[ 4]  0.00-5.00    sec   60.3 MBytes   101 Mbits/sec   2300
[ 4]  0.00-5.00    sec   56.6 MBytes   95.0 Mbits/sec
                                sender
                                receiver
```

BOST-LOND

```
root@PARI_host:~# iperf3 --client 8.108.0.1 --time 5
Connecting to host 8.108.0.1, port 5201
[ 4] local 8.103.0.1 port 36428 connected to 8.108.0.1 port 5201
[ ID] Interval            Transfer          Bandwidth        Retr  Cwnd
[ 4]  0.00-1.00    sec    6.82 MBytes   57.1 Mbits/sec   456   9.90 KBytes
[ 4]  1.00-2.00    sec    8.21 MBytes   68.9 Mbits/sec   844   1.41 KBytes
[ 4]  2.00-3.00    sec    6.15 MBytes   51.6 Mbits/sec   464   43.8 KBytes
[ 4]  3.00-4.00    sec    7.33 MBytes   61.6 Mbits/sec   582   19.8 KBytes
[ 4]  4.00-5.00    sec    5.53 MBytes   46.4 Mbits/sec   401   7.07 KBytes
- - - - -
[ ID] Interval            Transfer          Bandwidth        Retr
[ 4]  0.00-5.00    sec   34.0 MBytes   57.1 Mbits/sec   2747
[ 4]  0.00-5.00    sec   33.6 MBytes   56.3 Mbits/sec
                                sender
                                receiver
```

MIAM-PARI

```

root@student_1:~# iperf3 --client 8.108.0.1 --time 5
Connecting to host 8.108.0.1, port 5201
[ 4] local 8.200.0.11 port 60296 connected to 8.108.0.1 port 5201
[ ID] Interval      Transfer    Bandwidth   Retr  Cwnd
[ 4]  0.00-1.00    sec   1.61 MBytes  13.5 Mbits/sec  110  1.41 KBytes
[ 4]  1.00-2.00    sec   63.6 KBytes   521 Kbits/sec   17  2.83 KBytes
[ 4]  2.00-3.00    sec   127 KBytes   1.04 Mbits/sec   24  2.83 KBytes
[ 4]  3.00-4.00    sec   127 KBytes   1.04 Mbits/sec   15  2.83 KBytes
[ 4]  4.00-5.00    sec   127 KBytes   1.04 Mbits/sec   18  2.83 KBytes
-- -- -- -- --
[ ID] Interval      Transfer    Bandwidth   Retr
[ 4]  0.00-5.00    sec   2.05 MBytes  3.44 Mbits/sec  184
[ 4]  0.00-5.00    sec   1.53 MBytes  2.57 Mbits/sec
sender
receiver

```

MIAM-GENE

Conclusion : via the server-client method we deduced that our AS is set according to configuration 1 (look at graph provided alongside the project).

OSPF weights used : -fast routes above land : 10

-fast submarine routes : 15

-medium routes :20

-low routes :30

We used these specific weights in order to be able to still choose medium routes in case there is a possibility of choosing two fast routes (instead of the medium single route)

Looking at the result of the traceroute from ATLA host to ZURI loopback interface, we get the expected outcome. OSPF calculates the shortest path(or the shortest path that is similar to other short paths = they have equal sum of weight). For instance (using the weights we assigned above) the path chosen has a weight of 45(ATLA-host -> MIAM -> PARI->ZURI -> loopback)(including the weight of the ZURI to host aka loopback) , which is preferred over let's say ATLA->NEWY->PARI->ZURI->loopback , a route with a sum of weights equal to 50. Using this specific method we also make sure that the packets from a said continent with the desired destination being in the same continent , stay in fact in the same continent (always only use one sub marine route). In case loopback has no weight adjusted to it we subtract 10 from the final weight.

```

root@ATLA_host:~# traceroute 8.152.0.1
traceroute to 8.152.0.1 (8.152.0.1), 30 hops max, 60 byte packets
 1  ATLA-host.group8 (8.107.0.2)  0.639 ms  0.471 ms  0.429 ms
 2  MIAM-ATLA.group8 (8.0.13.2)   0.772 ms  1.152 ms  1.026 ms
 3  PARI-MIAM.group8 (8.0.6.1)    1.298 ms  1.275 ms  1.614 ms
 4  8.152.0.1 (8.152.0.1)  1.993 ms  1.548 ms  1.339 ms

```

traceroute: ATLA host to ZURI lo

1.5 In order to establish direct communication between ATLA host and NEWY host we assigned weight 10 on their direct connection(ATLA -> NEWY and vice versa). We know this ensures the direct connection between them because every other path rather than that has more weight. To redirect the traffic from ATLA and NEWY we use a static route on the ATLA and NEWY router. This static route redirects every packet from ATLA (that wants to go to the IP of NEWY) to MIAM. Similarly , every packet is being redirected from NEWY (that wants to go to the IP of ATLA) to MIAM.The following is before establishing a static route(direct connection):

```
root@ATLA_host:~# traceroute 8.105.0.1
traceroute to 8.105.0.1 (8.105.0.1), 30 hops max, 60 byte packets
 1  ATLA-host.group8 (8.107.0.2)  2.966 ms  2.721 ms  2.693 ms
 2  NEWY-ATLA.group8 (8.0.11.1)  4.585 ms  4.496 ms  4.476 ms
 3  host-NEWY.group8 (8.105.0.1)  6.710 ms  6.516 ms  6.609 ms
```

traceroute: ATLA host to NEWY host

After implementing the static route:

```
root@ATLA_host:~# traceroute 8.105.0.1
traceroute to 8.105.0.1 (8.105.0.1), 30 hops max, 60 byte packets
 1  ATLA-host.group8 (8.107.0.2)  0.652 ms  0.201 ms  0.052 ms
 2  MIAM-ATLA.group8 (8.0.13.2)  0.509 ms  0.416 ms  0.380 ms
 3  NEWY-MIAM.group8 (8.0.12.1)  0.602 ms  0.431 ms  0.388 ms
 4  host-NEWY.group8 (8.105.0.1)  2.939 ms  2.363 ms  2.343 ms
```

traceroute: ATLA host to NEWY host

```
Codes: K - kernel route, C - connected, S - static, R - RIP,
O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP,
T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP,
F - FRR, f - OpenFabric,
> - selected route, * - FIB route, q - queued route, r - rejected route

O>* 8.0.1.0/24 [110/25] via 8.0.6.1, port_PARI, 2d08h18m
O>* 8.0.2.0/24 [110/35] via 8.0.6.1, port_PARI, 2d08h18m
O>* 8.0.3.0/24 [110/25] via 8.0.6.1, port_PARI, 2d08h18m
O>* 8.0.4.0/24 [110/25] via 8.0.6.1, port_PARI, 2d08h18m
O>* 8.0.5.0/24 [110/30] via 8.0.12.1, port_NEWY, 2d08h15m
O 8.0.6.0/24 [110/15] is directly connected, port_PARI, 2d08h18m
C>* 8.0.6.0/24 is directly connected, port_PARI, 2d13h08m
O>* 8.0.7.0/24 [110/35] via 8.0.12.1, port_NEWY, 2d08h17m
O>* 8.0.8.0/24 [110/30] via 8.0.12.1, port_NEWY, 2d08h18m
O 8.0.9.0/24 [110/30] is directly connected, port_GENE, 2d08h18m
C>* 8.0.9.0/24 is directly connected, port_GENE, 2d13h08m
O>* 8.0.10.0/24 [110/20] via 8.0.12.1, port_NEWY, 2d11h32m
O>* 8.0.11.0/24 [110/20] via 8.0.12.1, port_NEWY, 2d11h32m
*
O 8.0.12.0/24 [110/10] is directly connected, port_NEWY, 2d11h33m
C>* 8.0.12.0/24 is directly connected, port_NEWY, 2d13h09m
O 8.0.13.0/24 [110/10] is directly connected, port_ATLA, 2d11h33m
C>* 8.0.13.0/24 is directly connected, port_ATLA, 2d13h10m
O>* 8.0.198.0/24 [110/25] via 8.0.6.1, port_PARI, 2d08h18m
O>* 8.0.199.0/24 [110/35] via 8.0.6.1, port_PARI, 2d08h18m
O>* 8.101.0.0/24 [110/35] via 8.0.6.1, port_PARI, 2d08h18m
O>* 8.102.0.0/24 [110/25] via 8.0.6.1, port_PARI, 2d08h18m
S>* 8.105.0.0/24 [1/0] via 8.0.12.1, port_NEWY, 2d06h12m
O 8.105.0.0/24 [110/20] via 8.0.12.1, port_NEWY, 2d11h32m
O>* 8.106.0.0/24 [110/30] via 8.0.12.1, port_NEWY, 2d11h32m
S>* 8.107.0.0/24 [1/0] via 8.0.13.1, port_ATLA, 2d06h10m
O 8.107.0.0/24 [110/20] via 8.0.13.1, port_ATLA, 2d11h32m
O 8.108.0.0/24 [110/10] is directly connected, host, 2d11h33m
C>* 8.108.0.0/24 is directly connected, host, 2d12h29m
O>* 8.151.0.1/32 [110/25] via 8.0.6.1, port_PARI, 00:09:16
O>* 8.152.0.1/32 [110/25] via 8.0.6.1, port_PARI, 2d08h01m
O>* 8.153.0.1/32 [110/15] via 8.0.6.1, port_PARI, 2d08h02m
O>* 8.154.0.1/32 [110/25] via 8.0.6.1, port_PARI, 2d08h01m
O>* 8.155.0.1/32 [110/10] via 8.0.12.1, port_NEWY, 2d08h02m
O>* 8.156.0.1/32 [110/20] via 8.0.12.1, port_NEWY, 2d08h04m
O>* 8.157.0.1/32 [110/10] via 8.0.13.1, port_ATLA, 2d08h03m
C>* 8.158.0.0/24 is directly connected, lo, 2d12h45m
O>* 8.158.0.1/32 [110/0] is directly connected, lo, 2d08h02m
O>* 8.200.0.0/24 [110/35] via 8.0.6.1, port_PARI, 2d08h18m
O>* 8.200.1.0/24 [110/35] via 8.0.6.1, port_PARI, 2d08h18m
C>* 158.8.0.0/16 is directly connected, ssh, 03w6d12h
O>* 198.8.0.0/24 [110/35] via 8.0.6.1, port_PARI, 2d08h18m
MIAM_router#
```

show ip route MIAM router

