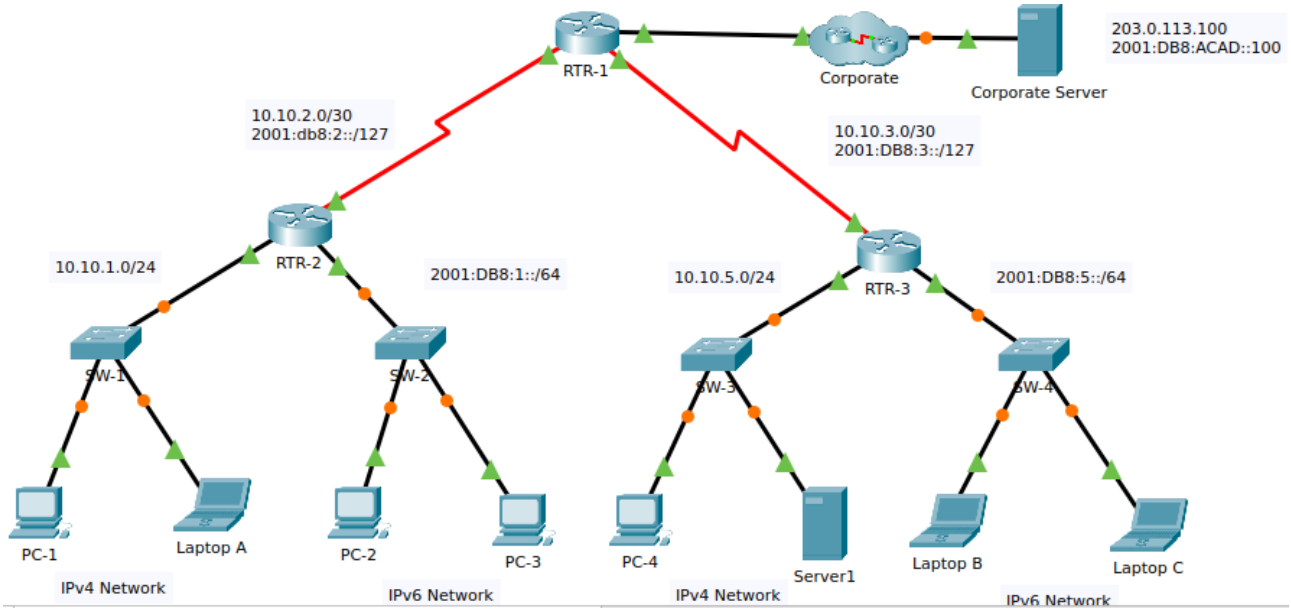
Packet Tracer - Use ICMP to Test and Correct Network Connectivity

Addressing Table

Device	Interface	Address	Mask/Prefix	Default Gateway
RTR-1	G/0/0/0	192.168.1.1	255.255.255.0	N/A
		2001:db8:4::1	/64	N/A
	S0/1/0	10.10.2.2	255.255.255.252	N/A
		2001:db8:2::2	/126	N/A
	S0/1/1	10.10.3.1	255.255.255.252	N/A
		2001:db8:3::1	/126	N/A
RTR-2	G/0/0/0	10.10.1.1	255.255.255.0	N/A
	G0/0/1	2001:db8:1::1	/64	N/A
	S0/1/0	10.10.2.1	255.255.255.252	N/A
		2001:db8:2::1	/126	N/A
RTR-3	G0/0/0	10.10.5.1	255.255.255.0	N/A
	G0/0/1	2001:db8:5::1	/64	N/A
	S0/1/0	10.10.3.2	255.255.255.252	N/A
		2001:db8:3::2	/126	N/A
PC-1	NIC	10.10.1.10	255.255.255.0	10.10.1.1
Laptop A	NIC	10.10.1.20	255.255.255.0	10.10.1.1
PC-2	NIC	2001:db8:1::10	/64	fe80::1
PC-3	NIC	2001:db8:1::20	/64	fe80::1
PC-4	NIC	10.10.5.10	255.255.255.0	10.10.5.1
Server 1	NIC	10.10.5.20	255.255.255.0	10.10.5.1
Laptop B	NIC	2001:db8:5::10	/64	fe80::1
Laptop C	NIC	2001:db8:5::20	/64	fe80::1
Corporate Server	NIC	203.0.113.100	255.255.255.0	203.0.113.1
		2001:db8:acad::100	/64	fe80::1

The network topology



Background

Customers have been complaining that they can't reach some network resources. You have been asked to test connectivity in the network. You use ICMP to find out which resources are unreachable and the locations from which they can't be reached. Then, you use trace to locate the point at which network connectivity is broken. Finally, you fix the errors that you find to restore connectivity to the network.

Instructions

All hosts should have connectivity to all other hosts and the Corporate Server.

- Wait until all link lights are green.
- Select a host and use ICMP ping to determine which hosts are reachable from that host.
- If a host is found to be unreachable, use ICMP trace to locate the general location of the network errors.
- Locate the specific errors and correct them.

Test between 10.10.1.0/24 and the Corporate Server

- Test PC1

```
C:\>ping 203.0.113.100

Pinging 203.0.113.100 with 32 bytes of data:

Reply from 203.0.113.100: bytes=32 time=17ms TTL=125
Reply from 203.0.113.100: bytes=32 time=15ms TTL=125
Reply from 203.0.113.100: bytes=32 time=13ms TTL=125
Reply from 203.0.113.100: bytes=32 time=9ms TTL=125

Ping statistics for 203.0.113.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 9ms, Maximum = 17ms, Average = 13ms
```

Test between 2001:DB8:1::/64 and the Corporate Server

- Test PC2

```
C:\>ping 2001:db8:acad::100

Pinging 2001:db8:acad::100 with 32 bytes of data:

Reply from 2001:DB8:ACAD::100: bytes=32 time=1ms TTL=125
Reply from 2001:DB8:ACAD::100: bytes=32 time=12ms TTL=125
Reply from 2001:DB8:ACAD::100: bytes=32 time=12ms TTL=125
Reply from 2001:DB8:ACAD::100: bytes=32 time=6ms TTL=125

Ping statistics for 2001:DB8:ACAD::100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 12ms, Average = 7ms
```

Test between 10.10.5.0/24 and the Corporate Server

- Test PC4

```
C:\>ping 203.0.113.100

Pinging 203.0.113.100 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 203.0.113.100:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
C:\>tracert 203.0.113.100

Tracing route to 203.0.113.100 over a maximum of 30 hops:

  1    *        *        *        Request timed out.
  2    *        *        *        Request timed out.
  3    *        *        *        Request timed out.
  4    *        *        *        Request timed out.
```

No route found, let's find the defauld gateway

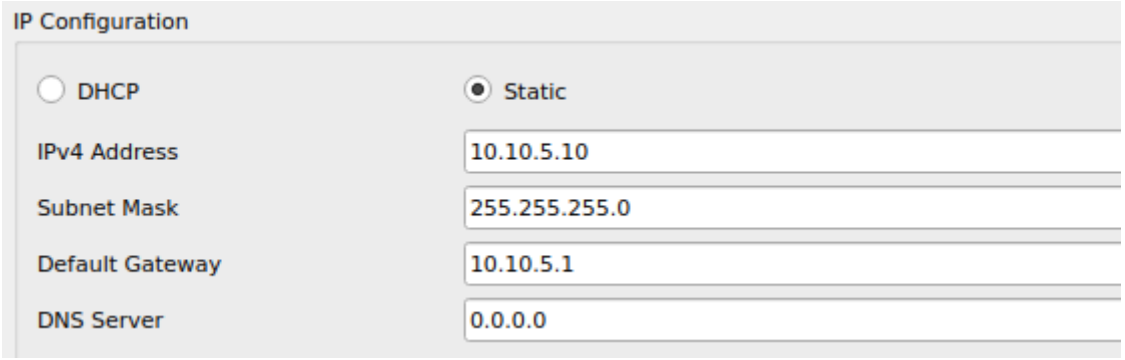
```
C:\>ipconfig

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.........: FE80::206:2AFF:FE54:699E
   IPv6 Address....................: ::
   IPv4 Address....................: 10.10.5.10
   Subnet Mask.....................: 255.255.255.0
   Default Gateway.................: ::
                                     10.10.5.11

Bluetooth Connection:

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.........: ::
   IPv6 Address....................: ::
   IPv4 Address....................: 0.0.0.0
   Subnet Mask.....................: 0.0.0.0
   Default Gateway.................: ::
                                     0.0.0.0
```

```
C:\>ping 10.10.5.100

Pinging 10.10.5.100 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.10.5.100:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

As the connection to the gateway failed, let's verify the IP from the router RTR-3 :

```
RTR-3#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0/0   10.10.5.1       YES manual up                    up
GigabitEthernet0/0/1   unassigned      YES unset  up                    up
Serial0/1/0            10.10.3.2       YES manual up                    up
Serial0/1/1            unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
```

We can see that the RTR-3's address at GigabitEthernet0/0/0 is not the same as the PC4's Defaut gateway's. Let's correct it from PC4:



Now, let's ping the Corporate Server again.

```
C:\>ping 203.0.113.100

Pinging 203.0.113.100 with 32 bytes of data:

Reply from 203.0.113.100: bytes=32 time=11ms TTL=125
Reply from 203.0.113.100: bytes=32 time=6ms TTL=125
Reply from 203.0.113.100: bytes=32 time=8ms TTL=125
Reply from 203.0.113.100: bytes=32 time=1ms TTL=125

Ping statistics for 203.0.113.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 11ms, Average = 6ms
```

It is successful.

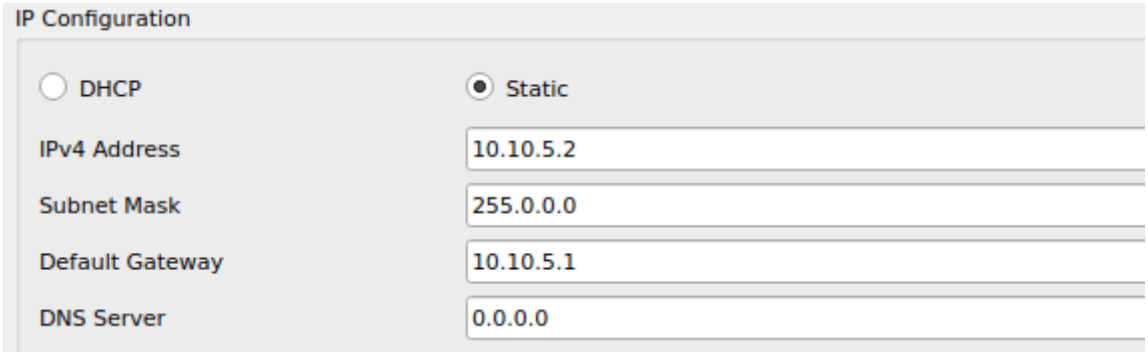
-Test on Server1

```
C:\>ping 203.0.113.100

Pinging 203.0.113.100 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 203.0.113.100:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

It fails. Let's see the network configuration along with the gateway's address.

```
C:\>ipconfig

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.........: FE80::260:47FF:FEAE:145A
   IPv6 Address....................: ::
   Autoconfiguration IPv4 Address..: 169.254.20.91
   Subnet Mask.....................: 255.255.0.0
   Default Gateway.................: ::
                                     0.0.0.0
```

There is no gateway, and the device doe not belong to the same network. Let's configure it from Server1.



Let’s ping again the Corporate Server

```
C:\>ping 203.0.113.100

Pinging 203.0.113.100 with 32 bytes of data:

Reply from 203.0.113.100: bytes=32 time=37ms TTL=125
Reply from 203.0.113.100: bytes=32 time=25ms TTL=125
Reply from 203.0.113.100: bytes=32 time=40ms TTL=125
Reply from 203.0.113.100: bytes=32 time=1ms TTL=125

Ping statistics for 203.0.113.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 40ms, Average = 25ms
```

It works this time.

Test between 2001:db8:5::/64 and the Corporate Server

- Test Laptop B

```
C:\>ping 2001:db8:acad::100

Pinging 2001:db8:acad::100 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 2001:DB8:ACAD::100:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

It failed. Let’s troubleshoot it. Let’s find what route works.

```
C:\>tracert 2001:db8:acad::100

Tracing route to 2001:db8:acad::100 over a maximum of 30 hops:

  1    *        *        *        Request timed out.
  2    *        *        *        Request timed out.
  3    *        *        *        Request timed out.
  4    *        *        *        Request timed out.
  5    *        *        *        Request timed out.
```

None work, let’s find the gateway.

```
C:\>ipconfig

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: FE80::290:CFF:FE88:648B
   IPv6 Address.....: 2001:DB8:5::10
   IPv4 Address.....: 0.0.0.0
   Subnet Mask.....: 0.0.0.0
   Default Gateway.....: FE80::1
                         0.0.0.0

Bluetooth Connection:

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: ::
   IPv6 Address.....: ::
   IPv4 Address.....: 0.0.0.0
   Subnet Mask.....: 0.0.0.0
   Default Gateway.....: ::
                         0.0.0.0
```

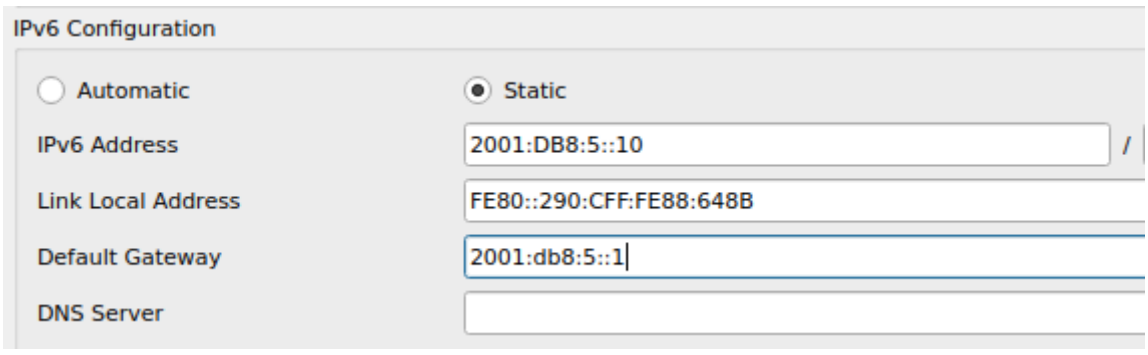
Let's compare the Gateway's address to RTR-3's

```
RTR-3#show ipv6 interface brief
GigabitEthernet0/0/0       [up/up]
    unassigned
GigabitEthernet0/0/1       [up/up]
    FE80::1
    2001:DB8:6::1
Serial0/1/0                [up/up]
    FE80::20C:CFFF:FE29:1B43
    2001:DB8:3::2
Serial0/1/1                [administratively down/down]
    unassigned
Vlan1                      [administratively down/down]
    unassigned
```

RTR-3's address does not match the one in the Addressing table. So, let's correct it. Do not forget to remove the address before changing it.

```
RTR-3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
RTR-3(config)#interface g0/0/1
RTR-3(config-if)#no ipv6 address
RTR-3(config-if)#ipv6 address 2001:db8:5::1/64
RTR-3(config-if)#no shutdown
RTR-3(config-if)#end
```

The gateway on Laptop B is not the same as RTR-3. So let's correct it.



Now, let's ping again the Corporate Server

```
C:\>ping 2001:db8:acad::100

Pinging 2001:db8:acad::100 with 32 bytes of data:

Reply from 2001:DB8:ACAD::100: bytes=32 time=1ms TTL=125
Reply from 2001:DB8:ACAD::100: bytes=32 time=45ms TTL=125
Reply from 2001:DB8:ACAD::100: bytes=32 time=22ms TTL=125
Reply from 2001:DB8:ACAD::100: bytes=32 time=1ms TTL=125

Ping statistics for 2001:DB8:ACAD::100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 45ms, Average = 17ms
```

It is successful.

- Test on Laptop C

```
C:\>ping 2001:db8:acad::100

Pinging 2001:db8:acad::100 with 32 bytes of data:

Reply from 2001:DB8:ACAD::100: bytes=32 time=20ms TTL=125
Reply from 2001:DB8:ACAD::100: bytes=32 time=48ms TTL=125
Reply from 2001:DB8:ACAD::100: bytes=32 time=18ms TTL=125
Reply from 2001:DB8:ACAD::100: bytes=32 time=19ms TTL=125

Ping statistics for 2001:DB8:ACAD::100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 18ms, Maximum = 48ms, Average = 26ms
```

It works.