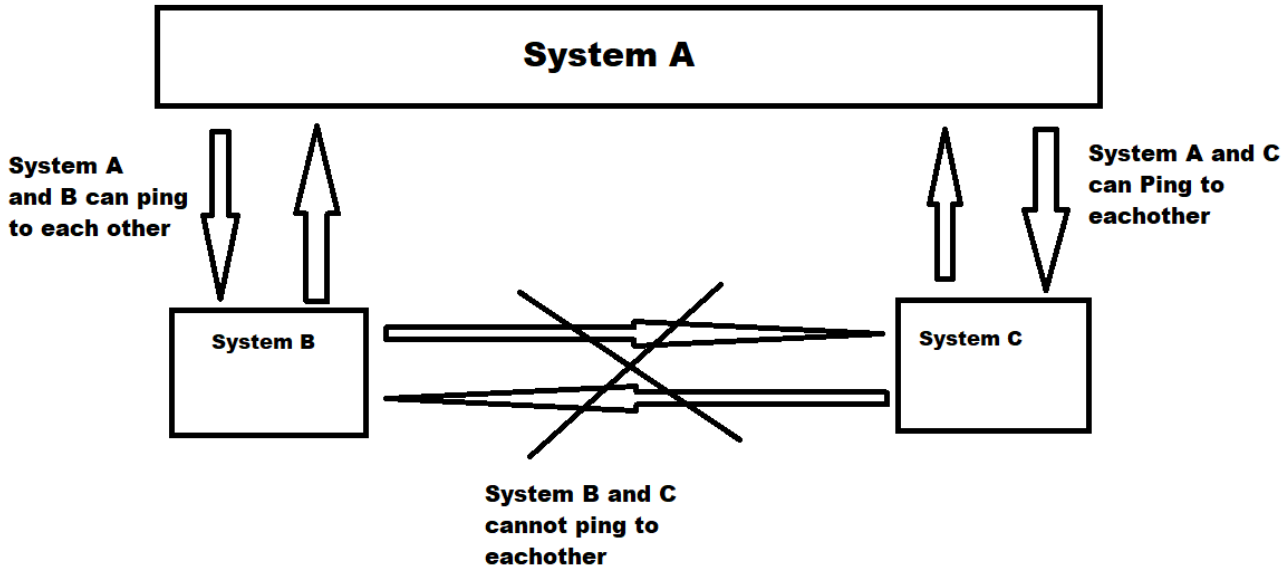
Task 14.1 : **Create a Network Topology where there are three systems and the architecture is as follows:**



First Check the IPs of the Three Systems

System A

```
root@MiWiFi-R3L-srv:~
File  Edit  View  Search  Terminal  Help
[root@MiWiFi-R3L-srv ~]# ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.31.195  netmask 255.255.255.0  broadcast 192.168.31.255
        inet6 fe80::dd42:7df:88f4:e828  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:2c:04:a8  txqueuelen 1000  (Ethernet)
        RX packets 2087  bytes 2941628 (2.8 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 522  bytes 46574 (45.4 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

System B

```
[root@MiWiFi-R3L-srv ~]# ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.31.181  netmask 255.255.255.0  broadcast 192.168.31.255
        inet6 fe80::99d7:dedc:4930:9766  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:11:a6:d4  txqueuelen 1000  (Ethernet)
        RX packets 135  bytes 20753 (20.2 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 90  bytes 12429 (12.1 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

System C

```
[root@MiWiFi-R3L-srv ~]# ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.31.87  netmask 255.255.255.0  broadcast 192.168.31.255
        inet6 fe80::2c14:9b8d:9ab6:1894  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:a3:c1:86  txqueuelen 1000  (Ethernet)
        RX packets 165  bytes 26629 (26.0 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 73  bytes 8897 (8.6 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Giving all the Systems a temporary Ip which will revert back on Reboot

System A

```
[root@MiWiFi-R3L-srv ~]# ifconfig enp0s3 192.168.31.1
[root@MiWiFi-R3L-srv ~]# ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.31.1  netmask 255.255.255.0  broadcast 192.168.31.255
        inet6 fe80::dd42:7df:88f4:e828  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:2c:04:a8  txqueuelen 1000  (Ethernet)
        RX packets 2101  bytes 2942618 (2.8 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 540  bytes 48878 (47.7 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

System B

```
[root@MiWiFi-R3L-srv ~]# ifconfig enp0s3 192.168.31.2
[root@MiWiFi-R3L-srv ~]# ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.31.2  netmask 255.255.255.0  broadcast 192.168.31.255
        inet6 fe80::99d7:dedc:4930:9766  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:11:a6:d4  txqueuelen 1000  (Ethernet)
        RX packets 165  bytes 23867 (23.3 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 110  bytes 14943 (14.5 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

System C

```
[root@MiWiFi-R3L-srv ~]# ifconfig enp0s3 192.168.31.3
[root@MiWiFi-R3L-srv ~]# ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.31.3  netmask 255.255.255.0  broadcast 192.168.31.255
        inet6 fe80::2c14:9b8d:9ab6:1894  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:a3:c1:86  txqueuelen 1000  (Ethernet)
        RX packets 203  bytes 31267 (30.5 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 91  bytes 11261 (10.9 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Adjust the Routing Table of System A so that it can ping to both systems

```
[root@MiWiFi-R3L-srv ~]# route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
192.168.122.0   0.0.0.0         255.255.255.0   U     0      0        0 virbr0
[root@MiWiFi-R3L-srv ~]# route add -net 192.168.31.0/24 enp0s3
[root@MiWiFi-R3L-srv ~]# route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
192.168.31.0    0.0.0.0         255.255.255.0   U     0      0        0 enp0s3
192.168.122.0   0.0.0.0         255.255.255.0   U     0      0        0 virbr0
```

Adjust the Routing Table of System B so that it can ping to A but not to C

```
[root@MiWiFi-R3L-srv ~]# route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
192.168.122.0   0.0.0.0         255.255.255.0   U     0      0        0 virbr0
[root@MiWiFi-R3L-srv ~]# route add -net 192.168.31.0/31 enp0s3
[root@MiWiFi-R3L-srv ~]# route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
192.168.31.0    0.0.0.0         255.255.255.254 U     0      0        0 enp0s3
192.168.122.0   0.0.0.0         255.255.255.0   U     0      0        0 virbr0
[root@MiWiFi-R3L-srv ~]#
```

Adjust the Routing Table of System C so that it can ping to A but not to B

```
[root@MiWiFi-R3L-srv ~]# route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
192.168.122.0   0.0.0.0         255.255.255.0   U     0      0        0 virbr0
[root@MiWiFi-R3L-srv ~]# route add -net 192.168.31.0/31 enp0s3
[root@MiWiFi-R3L-srv ~]# route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
192.168.31.0    0.0.0.0         255.255.255.254 U     0      0        0 enp0s3
192.168.122.0   0.0.0.0         255.255.255.0   U     0      0        0 virbr0
[root@MiWiFi-R3L-srv ~]#
```

Checking Connection in System A – It can ping to both Systems

```
[root@MiWiFi-R3L-srv ~]# ping 192.168.31.2
PING 192.168.31.2 (192.168.31.2) 56(84) bytes of data.
64 bytes from 192.168.31.2: icmp_seq=1 ttl=64 time=0.642 ms
64 bytes from 192.168.31.2: icmp_seq=2 ttl=64 time=0.278 ms
64 bytes from 192.168.31.2: icmp_seq=3 ttl=64 time=0.283 ms
^C
--- 192.168.31.2 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 30ms
rtt min/avg/max/mdev = 0.278/0.401/0.642/0.170 ms
[root@MiWiFi-R3L-srv ~]# ping 192.168.31.3
PING 192.168.31.3 (192.168.31.3) 56(84) bytes of data.
64 bytes from 192.168.31.3: icmp_seq=1 ttl=64 time=1.00 ms
64 bytes from 192.168.31.3: icmp_seq=2 ttl=64 time=0.357 ms
64 bytes from 192.168.31.3: icmp_seq=3 ttl=64 time=0.329 ms
^C
--- 192.168.31.3 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 27ms
rtt min/avg/max/mdev = 0.329/0.562/1.001/0.310 ms
[root@MiWiFi-R3L-srv ~]#
```

Checking Connection in System B – It can ping to A but not to C

```
[root@MiWiFi-R3L-srv ~]# ping 192.168.31.3
connect: Network is unreachable
[root@MiWiFi-R3L-srv ~]# ping 192.168.31.1
PING 192.168.31.1 (192.168.31.1) 56(84) bytes of data.
64 bytes from 192.168.31.1: icmp_seq=1 ttl=64 time=17.3 ms
64 bytes from 192.168.31.1: icmp_seq=2 ttl=64 time=4.32 ms
64 bytes from 192.168.31.1: icmp_seq=3 ttl=64 time=5.21 ms
64 bytes from 192.168.31.1: icmp_seq=4 ttl=64 time=46.0 ms
^C
--- 192.168.31.1 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 16ms
rtt min/avg/max/mdev = 4.320/18.198/46.004/16.848 ms
[root@MiWiFi-R3L-srv ~]# ping 192.168.31.3
connect: Network is unreachable
```

Checking Connection in System C – It can ping to A but not to B

```
[root@MiWiFi-R3L-srv ~]# ping 192.168.31.1
PING 192.168.31.1 (192.168.31.1) 56(84) bytes of data.
64 bytes from 192.168.31.1: icmp_seq=1 ttl=64 time=38.6 ms
64 bytes from 192.168.31.1: icmp_seq=2 ttl=64 time=0.900 ms
64 bytes from 192.168.31.1: icmp_seq=3 ttl=64 time=30.3 ms
64 bytes from 192.168.31.1: icmp_seq=4 ttl=64 time=8.83 ms
^C
--- 192.168.31.1 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 48ms
rtt min/avg/max/mdev = 0.900/19.658/38.573/15.335 ms
[root@MiWiFi-R3L-srv ~]# ping 192.168.31.2
connect: Network is unreachable
```

Hence the Architecture is Created