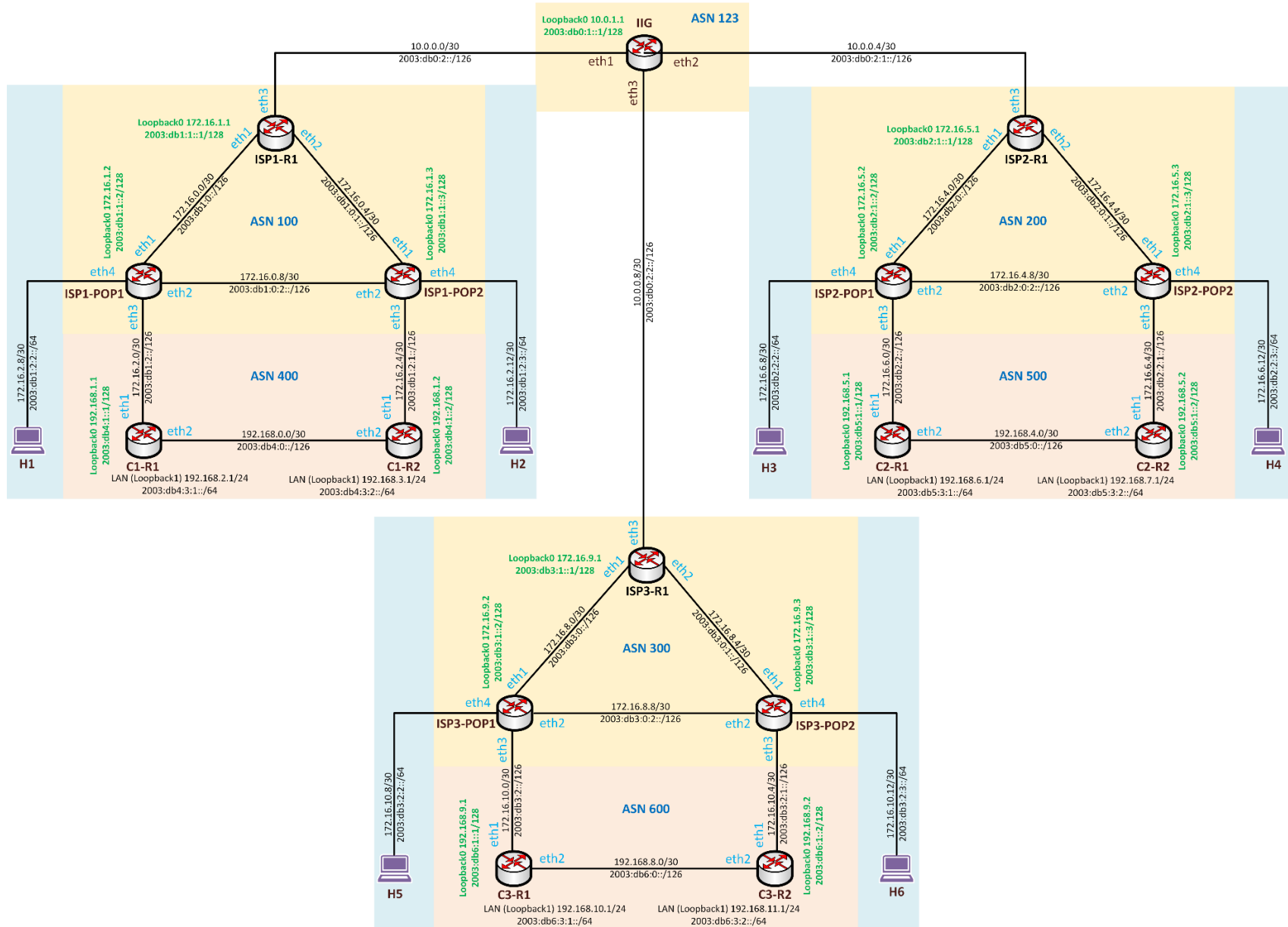


Lab-1: IP Config

bdNOG11 IPv6 Routing Workshop on MikroTik RouterOS – LAB Topology



IP Address Allocation

Organizations hold below number resources from RIR			
	ASN	IPv4	IPv6
IIG	123	10.0.0.0/22	2003:db0::/32
ISP1	100	172.16.0.0/22	2003:db1::/32
ISP2	200	172.16.4.0/22	2003:db2::/32
ISP3	300	172.16.8.0/22	2003:db3::/32
C1	400	192.168.0.0/22	2003:db4::/32
C2	500	192.168.4.0/22	2003:db5::/32
C3	600	192.168.8.0/22	2003:db6::/32

IP Address Breakdown Plan

IIG	2003:db0::/32	10.0.0.0/22	
	Infra P2P	2003:db0:0::/48	10.0.0.0/24
	Infra Loopback	2003:db0:1::/48	10.0.1.0/24
	PE-CE	2003:db0:2::/48	10.0.2.0/24
	CE LAN	2003:db0:3::/48	10.0.3.0/24

ISP1	2003:db1::/32	172.16.0.0/22	
	Infra P2P	2003:db1:0::/48	172.16.0.0/24
	Infra Loopback	2003:db1:1::/48	172.16.1.0/24
	PE-CE	2003:db1:2::/48	172.16.2.0/24
	CE LAN	2003:db1:3::/48	172.16.3.0/24

C1	2003:db4::/32	192.168.0.0/22	
	Infra P2P	2003:db4:0::/48	192.168.0.0/24
	Infra Loopback	2003:db4:1::/48	192.168.1.0/24
	PE-CE	2003:db4:2::/48	192.168.2.0/24
	CE LAN	2003:db4:3::/48	192.168.3.0/24

ISP2	2003:db2::/32	172.16.4.0/22	
	Infra P2P	2003:db2:0::/48	172.16.4.0/24
	Infra Loopback	2003:db2:1::/48	172.16.5.0/24
	PE-CE	2003:db2:2::/48	172.16.6.0/24
	CE LAN	2003:db2:3::/48	172.16.4.0/24

C2	2003:db5::/32	192.168.4.0/22	
	Infra P2P	2003:db5:0::/48	192.168.4.0/24
	Infra Loopback	2003:db5:1::/48	192.168.5.0/24
	PE-CE	2003:db5:2::/48	192.168.6.0/24
	CE LAN	2003:db5:3::/48	192.168.7.0/24

ISP3	2003:db3::/32	172.16.8.0/22	
	Infra P2P	2003:db3:0::/48	172.16.8.0/24
	Infra Loopback	2003:db3:1::/48	172.16.9.0/24
	PE-CE	2003:db3:2::/48	172.16.10.0/24
	CE LAN	2003:db3:3::/48	172.16.11.0/24

C3	2003:db6::/32	192.168.8.0/22	
	Infra P2P	2003:db6:0::/48	192.168.8.0/24
	Infra Loopback	2003:db6:1::/48	192.168.9.0/24
	PE-CE	2003:db6:2::/48	192.168.10.0/24
	CE LAN	2003:db6:3::/48	192.168.11.0/24

Final IP Plan

P2P IP				Loopback		LAN Block
Link Between		IPv4 Block	IPv6 Block	Router	IPv4 / IPv6	IPv4 / IPv6
IIG	ISP1-R1	10.0.0.0/30	2003:db0:2::/126	IIG	10.0.1.1	N/A
IIG	ISP2-R1	10.0.0.4/30	2003:db0:2:1::/126		2003:db0:1::1/128	N/A
IIG	ISP3-R1	10.0.0.8/30	2003:db0:2:2::/126			
ISP1-R1	ISP1-POP1	172.16.0.0/30	2003:db1:0::/126	ISP1-R1	172.16.1.1	N/A
ISP1-R1	ISP1-POP2	172.16.0.4/30	2003:db1:0:1::/126		2003:db1:1::1/128	N/A
ISP1-POP1	ISP1-POP2	172.16.0.8/30	2003:db1:0:2::/126	ISP1-POP1	172.16.1.2	N/A
ISP1-POP1	C1-R1	172.16.2.0/30	2003:db1:2::/126		2003:db1:1::2/128	N/A
ISP1-POP2	C1-R2	172.16.2.4/30	2003:db1:2:1::/126	ISP1-POP2	172.16.1.3	N/A
ISP1-POP1	H1	172.16.2.8/30	2003:db1:2:2::/64		2003:db1:1::3/128	N/A
ISP1-POP2	H2	172.16.2.12/30	2003:db1:2:3::/64			
ISP2-R1	ISP2-POP1	172.16.4.0/30	2003:db2:0::/126	ISP2-R1	172.16.5.1	N/A
ISP2-R1	ISP2-POP2	172.16.4.4/30	2003:db2:0:1::/126		2003:db2:1::1/128	N/A
ISP2-POP1	ISP2-POP2	172.16.4.8/30	2003:db2:0:2::/126	ISP2-POP1	172.16.5.2	N/A
ISP2-POP1	C2-R1	172.16.6.0/30	2003:db2:2::/126		2003:db2:1::2/128	N/A
ISP2-POP2	C2-R2	172.16.6.4/30	2003:db2:2:1::/126	ISP2-POP2	172.16.5.3	N/A
ISP2-POP1	H3	172.16.6.8/30	2003:db2:2:2::/64		2003:db2:1::3/128	N/A
ISP2-POP2	H4	172.16.6.12/30	2003:db2:2:3::/64			

P2P IP				Loopback		LAN Block
Link Between		IPv4 Block	IPv6 Block	Router	IPv4 / IPv6	IPv4 / IPv6
ISP3-R1	ISP3-POP1	172.16.8.0/30	2003:db3:0::/126	ISP3-R1	172.16.9.1	N/A
ISP3-R1	ISP3-POP2	172.16.8.4/30	2003:db3:0:1::/126		2003:db3:1::1/128	N/A
ISP3-POP1	ISP3-POP2	172.16.8.8/30	2003:db3:0:2::/126	ISP3-POP1	172.16.9.2	N/A
ISP3-POP1	C3-R1	172.16.10.0/30	2003:db3:2::/126		2003:db3:1::2/128	N/A
ISP3-POP2	C3-R2	172.16.10.4/30	2003:db3:2:1::/126	ISP3-POP2	172.16.9.3	N/A
ISP3-POP1	H5	172.16.10.8/30	2003:db3:2:2::/64		2003:db3:1::3/128	N/A
ISP3-POP2	H6	172.16.10.12/30	2003:db3:2:3::/64			
C1-R1	C1-R2	192.168.0.0/30	2003:db4:0::/126	C1-R1	192.168.1.1	192.168.2.1/24
					2003:db4:1::1/128	2003:db4:3:1::/64
				C1-R2	192.168.1.2	192.168.3.1/24
					2003:db4:1::2/128	2003:db4:3:2::/64
C2-R1	C2-R2	192.168.4.0/30	2003:db5:0::/126	C2-R1	192.168.5.1	192.168.6.1/24
					2003:db5:1::1/128	2003:db5:3:1::/64
				C2-R2	192.168.5.2	192.168.7.1/24
					2003:db5:1::2/128	2003:db5:3:2::/64
C3-R1	C3-R2	192.168.8.0/30	2003:db6:0::/126	C3-R1	192.168.9.1	192.168.10.1/24
					2003:db6:1::1/128	2003:db6:3:1::/64
				C3-R2	192.168.9.2	192.168.11.1/24
					2003:db6:1::2/128	2003:db6:3:2::/64

Baseline configuration for all routers

```
/system identity set name=host_name
```

```
/system package print
```

```
Flags: X - disabled
```

#	NAME	VERSION	SCHEDULED
0	routeros-x86	6.38	
1	system	6.38	
2	X ipv6	6.38	
3	ups	6.38	
4	wireless	6.38	
5	hotspot	6.38	
6	dhcp	6.38	
7	mpls	6.38	
8	routing	6.38	
9	ppp	6.38	
10	security	6.38	
11	advanced-tools	6.38	
12	dude	6.38	

```
/system package enable 2
```

```
/system reboot
```

```
Reboot, yes? [y/N]:
```

```
y
```

```
system will reboot shortly
```

Task-1: Configure Infrastructure IPv4 Addresses

IIG

```
/interface bridge add name=loopback0 auto-mac=no admin-mac=00:00:00:00:00:01
/ip address add address=10.0.1.1/32 interface=loopback0
/ip address add address=10.0.0.1/30 interface=ether1
/ip address add address=10.0.0.5/30 interface=ether2
/ip address add address=10.0.0.9/30 interface=ether3
```

```
/ip address print
```

Flags: X - disabled, I - invalid, D - dynamic

#	ADDRESS	NETWORK	INTERFACE
0	10.0.1.1/32	10.0.1.1	loopback0
1	10.0.0.1/30	10.0.0.0	ether1
2	10.0.0.5/30	10.0.0.4	ether2
3	10.0.0.9/30	10.0.0.8	ether3

ISP1-R1

```
/interface bridge add name=loopback0 auto-mac=no admin-mac=00:00:00:00:00:01
/ip address add address=172.16.1.1/32 interface=loopback0
/ip address add address=10.0.0.2/30 interface=ether3
/ip address add address=172.16.0.1/30 interface=ether1
/ip address add address=172.16.0.5/30 interface=ether2

/ip address print
```

ISP1-POP1

```
/interface bridge add name=loopback0 auto-mac=no admin-mac=00:00:00:00:00:01
/ip address add address=172.16.1.2/32 interface=loopback0
/ip address add address=172.16.0.2/30 interface=ether1
/ip address add address=172.16.0.9/30 interface=ether2
/ip address add address=172.16.2.1/30 interface=ether3
/ip address add address=172.16.2.9/30 interface=ether4

/ip address print
```

ISP1-POP2

```
/interface bridge add name=loopback0 auto-mac=no admin-mac=00:00:00:00:00:01
/ip address add address=172.16.1.3/32 interface=loopback0
/ip address add address=172.16.0.6/30 interface=ether1
/ip address add address=172.16.0.10/30 interface=ether2
/ip address add address=172.16.2.5/30 interface=ether3
/ip address add address=172.16.2.13/30 interface=ether4

/ip address print
```

C1-R1

```
/interface bridge add name=loopback0 auto-mac=no admin-mac=00:00:00:00:00:01
/interface bridge add name=loopback1 auto-mac=no admin-mac=00:00:00:00:00:01
/ip address add address=192.168.1.1/32 interface=loopback0
/ip address add address=192.168.2.1/24 interface=loopback1
/ip address add address=172.16.2.2/30 interface=ether1
/ip address add address=192.168.0.1/30 interface=ether2

/ip address print
```

C1-R2

```
/interface bridge add name=loopback0 auto-mac=no admin-mac=00:00:00:00:00:01
/interface bridge add name=loopback1 auto-mac=no admin-mac=00:00:00:00:00:01
/ip address add address=192.168.1.2/32 interface=loopback0
/ip address add address=192.168.3.1/24 interface=loopback1
/ip address add address=172.16.2.6/30 interface=ether1
/ip address add address=192.168.0.2/30 interface=ether2

/ip address print
```


ISP2-R1

```
/interface bridge add name=loopback0 auto-mac=no admin-mac=00:00:00:00:00:01
/ip address add address=172.16.5.1/32 interface=loopback0
/ip address add address=10.0.0.6/30 interface=ether3
/ip address add address=172.16.4.1/30 interface=ether1
/ip address add address=172.16.4.5/30 interface=ether2

/ip address print
```

ISP2-POP1

```
/interface bridge add name=loopback0 auto-mac=no admin-mac=00:00:00:00:00:01
/ip address add address=172.16.5.2/32 interface=loopback0
/ip address add address=172.16.4.2/30 interface=ether1
/ip address add address=172.16.4.9/30 interface=ether2
/ip address add address=172.16.6.1/30 interface=ether3
/ip address add address=172.16.6.9/30 interface=ether4

/ip address print
```

ISP2-POP2

```
/interface bridge add name=loopback0 auto-mac=no admin-mac=00:00:00:00:00:01
/ip address add address=172.16.5.3/32 interface=loopback0
/ip address add address=172.16.4.6/30 interface=ether1
/ip address add address=172.16.4.10/30 interface=ether2
/ip address add address=172.16.6.5/30 interface=ether3
/ip address add address=172.16.6.13/30 interface=ether4

/ip address print
```

C2-R1

```
/interface bridge add name=loopback0 auto-mac=no admin-mac=00:00:00:00:00:01
/interface bridge add name=loopback1 auto-mac=no admin-mac=00:00:00:00:00:01
/ip address add address=192.168.5.1/32 interface=loopback0
/ip address add address=192.168.6.1/24 interface=loopback1
/ip address add address=172.16.6.2/30 interface=ether1
/ip address add address=192.168.4.1/30 interface=ether2

/ip address print
```

C2-R2

```
/interface bridge add name=loopback0 auto-mac=no admin-mac=00:00:00:00:00:01
/interface bridge add name=loopback1 auto-mac=no admin-mac=00:00:00:00:00:01
/ip address add address=192.168.5.2/32 interface=loopback0
/ip address add address=192.168.7.1/24 interface=loopback1
/ip address add address=172.16.6.6/30 interface=ether1
/ip address add address=192.168.4.2/30 interface=ether2

/ip address print
```

ISP3-R1

```
/interface bridge add name=loopback0 auto-mac=no admin-mac=00:00:00:00:00:01
/ip address add address=172.16.9.1/32 interface=loopback0
/ip address add address=10.0.0.10/30 interface=ether3
/ip address add address=172.16.8.1/30 interface=ether1
/ip address add address=172.16.8.5/30 interface=ether2

/ip address print
```

ISP3-POP1

```
/interface bridge add name=loopback0 auto-mac=no admin-mac=00:00:00:00:00:01
/ip address add address=172.16.9.2/32 interface=loopback0
/ip address add address=172.16.8.2/30 interface=ether1
/ip address add address=172.16.8.9/30 interface=ether2
/ip address add address=172.16.10.1/30 interface=ether3
/ip address add address=172.16.10.9/30 interface=ether4

/ip address print
```

ISP3-POP2

```
/interface bridge add name=loopback0 auto-mac=no admin-mac=00:00:00:00:00:01
/ip address add address=172.16.9.3/32 interface=loopback0
/ip address add address=172.16.8.6/30 interface=ether1
/ip address add address=172.16.8.10/30 interface=ether2
/ip address add address=172.16.10.5/30 interface=ether3
/ip address add address=172.16.10.13/30 interface=ether4

/ip address print
```

C3-R1

```
/interface bridge add name=loopback0 auto-mac=no admin-mac=00:00:00:00:00:01
/interface bridge add name=loopback1 auto-mac=no admin-mac=00:00:00:00:00:01
/ip address add address=192.168.9.1/32 interface=loopback0
/ip address add address=192.168.10.1/24 interface=loopback1
/ip address add address=172.16.10.2/30 interface=ether1
/ip address add address=192.168.8.1/30 interface=ether2

/ip address print
```

C3-R2

```
/interface bridge add name=loopback0 auto-mac=no admin-mac=00:00:00:00:00:01
/interface bridge add name=loopback1 auto-mac=no admin-mac=00:00:00:00:00:01
/ip address add address=192.168.9.2/32 interface=loopback0
/ip address add address=192.168.11.1/24 interface=loopback1
/ip address add address=172.16.10.6/30 interface=ether1
/ip address add address=192.168.8.2/30 interface=ether2

/ip address print
```

Task-2: Verify Point to Point IPv4 Reachability among Routers

Task-3: Configure Infrastructure IPv6 Addresses

IIG

```
/ipv6 address add address=2003:db0:1::1/128 interface=loopback0
/ipv6 address add address=2003:db0:2::1/126 interface=ether1 advertise=no
/ipv6 address add address=2003:db0:2:1::1/126 interface=ether2 advertise=no
/ipv6 address add address=2003:db0:2:2::1/126 interface=ether3 advertise=no

/ipv6 address print
```

ISP1-R1

```
/ipv6 address add address=2003:db1:1::1/128 interface=loopback0
/ipv6 address add address=2003:db0:2::2/126 interface=ether3 advertise=no
/ipv6 address add address=2003:db1:0:0::1/126 interface=ether1 advertise=no
/ipv6 address add address=2003:db1:0:1::1/126 interface=ether2 advertise=no

/ipv6 address print
```

ISP1-POP1

```
/ipv6 address add address=2003:db1:1::2/128 interface=loopback0
/ipv6 address add address=2003:db1:0:0::2/126 interface=ether1 advertise=no
/ipv6 address add address=2003:db1:0:2::1/126 interface=ether2 advertise=no
/ipv6 address add address=2003:db1:2:0::1/126 interface=ether3 advertise=no
/ipv6 address add address=2003:db1:2:2::1/64 interface=ether4

/ipv6 address print
```

ISP1-POP2

```
/ipv6 address add address=2003:db1:1::3/128 interface=loopback0
/ipv6 address add address=2003:db1:0:1::2/126 interface=ether1 advertise=no
/ipv6 address add address=2003:db1:0:2::2/126 interface=ether2 advertise=no
/ipv6 address add address=2003:db1:2:1::1/126 interface=ether3 advertise=no
/ipv6 address add address=2003:db1:2:3::1/64 interface=ether4

/ipv6 address print
```

C1-R1

```
/ipv6 address add address=2003:db4:1::1/128 interface=loopback0
/ipv6 address add address=2003:db4:3:1::1/64 interface=loopback1
/ipv6 address add address=2003:db1:2:0::2/126 interface=ether1 advertise=no
/ipv6 address add address=2003:db4:0:0::1/126 interface=ether2 advertise=no

/ipv6 address print
```

C1-R2

```
/ipv6 address add address=2003:db4:1::2/128 interface=loopback0
/ipv6 address add address=2003:db4:3:2::1/64 interface=loopback1
/ipv6 address add address=2003:db1:2:1::2/126 interface=ether1 advertise=no
/ipv6 address add address=2003:db4:0:0::2/126 interface=ether2 advertise=no

/ipv6 address print
```

ISP2-R1

```
/ipv6 address add address=2003:db2:1::1/128 interface=loopback0
/ipv6 address add address=2003:db0:2:1::2/126 interface=ether3 advertise=no
/ipv6 address add address=2003:db2:0:0::1/126 interface=ether1 advertise=no
/ipv6 address add address=2003:db2:0:1::1/126 interface=ether2 advertise=no

/ipv6 address print
```

ISP2-POP1

```
/ipv6 address add address=2003:db2:1::2/128 interface=loopback0
/ipv6 address add address=2003:db2:0:0::2/126 interface=ether1 advertise=no
/ipv6 address add address=2003:db2:0:2::1/126 interface=ether2 advertise=no
/ipv6 address add address=2003:db2:2:0::1/126 interface=ether3 advertise=no
/ipv6 address add address=2003:db2:2:2::1/64 interface=ether4

/ipv6 address print
```

ISP2-POP2

```
/ipv6 address add address=2003:db2:1::3/128 interface=loopback0
/ipv6 address add address=2003:db2:0:1::2/126 interface=ether1 advertise=no
/ipv6 address add address=2003:db2:0:2::2/126 interface=ether2 advertise=no
/ipv6 address add address=2003:db2:2:1::1/126 interface=ether3 advertise=no
/ipv6 address add address=2003:db2:2:3::1/64 interface=ether4

/ipv6 address print
```

C2-R1

```
/ipv6 address add address=2003:db5:1::1/128 interface=loopback0
/ipv6 address add address=2003:db5:3:1::1/64 interface=loopback1
/ipv6 address add address=2003:db2:2:0::2/126 interface=ether1 advertise=no
/ipv6 address add address=2003:db5:0:0::1/126 interface=ether2 advertise=no

/ipv6 address print
```

C2-R2

```
/ipv6 address add address=2003:db5:1::2/128 interface=loopback0
/ipv6 address add address=2003:db5:3:2::1/64 interface=loopback1
/ipv6 address add address=2003:db2:2:1::2/126 interface=ether1 advertise=no
/ipv6 address add address=2003:db5:0:0::2/126 interface=ether2 advertise=no

/ipv6 address print
```


ISP3-R1

```
/ipv6 address add address=2003:db3:1::1/128 interface=loopback0
/ipv6 address add address=2003:db0:2:2::2/126 interface=ether3 advertise=no
/ipv6 address add address=2003:db3:0:0::1/126 interface=ether1 advertise=no
/ipv6 address add address=2003:db3:0:1::1/126 interface=ether2 advertise=no

/ipv6 address print
```

ISP3-POP1

```
/ipv6 address add address=2003:db3:1::2/128 interface=loopback0
/ipv6 address add address=2003:db3:0:0::2/126 interface=ether1 advertise=no
/ipv6 address add address=2003:db3:0:2::1/126 interface=ether2 advertise=no
/ipv6 address add address=2003:db3:2:0::1/126 interface=ether3 advertise=no
/ipv6 address add address=2003:db3:2:2::1/64 interface=ether4

/ipv6 address print
```

ISP3-POP2

```
/ipv6 address add address=2003:db3:1::3/128 interface=loopback0
/ipv6 address add address=2003:db3:0:1::2/126 interface=ether1 advertise=no
/ipv6 address add address=2003:db3:0:2::2/126 interface=ether2 advertise=no
/ipv6 address add address=2003:db3:2:1::1/126 interface=ether3 advertise=no
/ipv6 address add address=2003:db3:2:3::1/64 interface=ether4

/ipv6 address print
```

C3-R1

```
/ipv6 address add address=2003:db6:1::1/128 interface=loopback0
/ipv6 address add address=2003:db6:3:1::1/64 interface=loopback1
/ipv6 address add address=2003:db3:2:0::2/126 interface=ether1 advertise=no
/ipv6 address add address=2003:db6:0:0::1/126 interface=ether2 advertise=no

/ipv6 address print
```

C3-R2

```
/ipv6 address add address=2003:db6:1::2/128 interface=loopback0
/ipv6 address add address=2003:db6:3:2::1/64 interface=loopback1
/ipv6 address add address=2003:db3:2:1::2/126 interface=ether1 advertise=no
/ipv6 address add address=2003:db6:0:0::2/126 interface=ether2 advertise=no

/ipv6 address print
```

Task-4: Verify Point to Point IPv6 Reachability among Routers

**** Bug fixing is always welcome at info@mn-lab.net ****