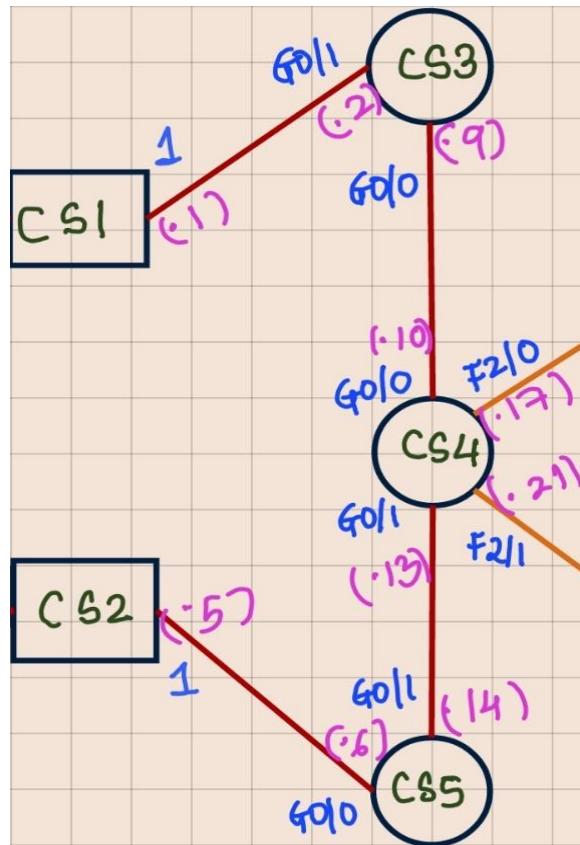


Routing - Command Ship, Star Destroyer and DSv4:

1. Considerations on Command Ship = AS#65011 (cs1, cs2, cs3, cs4, cs5):



- OSPF is used as an IGP on all the devices.
- cs4 runs BGP and Command Ship is dual homed to Star Destroyer (sd)

We made a call to simply have a default route from sd1 and sd2 which connect directly to cs4.

Then cs4 originates that default route using **default-information originate** and it is propagated using OSPF to all the other devices. It gets this default route from ISP devices sd1 and sd2.

```

SD1#show ip bgp 0.0.0.0
BGP routing table entry for 0.0.0.0/0, version 4
Paths: (1 available, no best path)
Multipath: iBGP
    Advertised to update-groups:
        6
    Local, (default-originate)
        0.0.0.0 from 0.0.0.0 (10.0.1.33)
            Origin IGP, localpref 100, external
    
```

```

SD2#show ip bgp 0.0.0.0
BGP routing table entry for 0.0.0.0/0, version 9
Paths: (1 available, no best path)
Multipath: iBGP
    Advertised to update-groups:
        2
    Local, (default-originate)
        0.0.0.0 from 0.0.0.0 (100.0.0.5)
            Origin IGP, localpref 100, external
    
```

```

CS4#show ip route 0.0.0.0
Routing entry for 0.0.0.0/0, supernet
Known via "bgp 65011", distance 20, metric 0, candidate default path
Tag 65012, type external
Last update from 10.0.1.18 1d04h ago
Routing Descriptor Blocks:
* 10.0.1.22, from 10.0.1.22, 1d04h ago
    Route metric is 0, traffic share count is 1
    AS Hops 1
    Route tag 65012
    MPLS label: none
10.0.1.18, from 10.0.1.18, 1d04h ago
    Route metric is 0, traffic share count is 1
    AS Hops 1
    Route tag 65012
    MPLS label: none

```

```

CS1#show ip route 0.0.0.0
Routing entry for 0.0.0.0/0, supernet
Known via "ospf 1", distance 110, metric 1, candidate default path
Tag 1, type extern 2, forward metric 2
Last update from 10.0.1.2 on GigabitEthernet1/0/1, 00:11:50 ago
Routing Descriptor Blocks:
* 10.0.1.2, from 10.0.1.21, 00:11:50 ago, via GigabitEthernet1/0/1
    Route metric is 1, traffic share count is 1
    Route tag 1

```

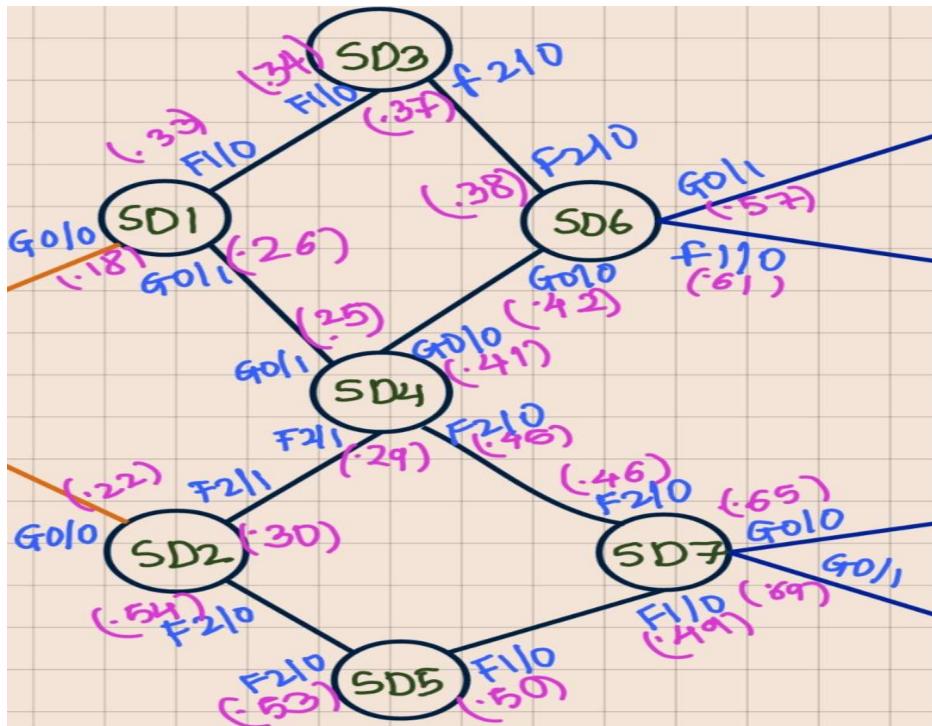
```

CS2#show ip route 0.0.0.0
Routing entry for 0.0.0.0/0, supernet
Known via "ospf 1", distance 110, metric 1, candidate default path
Tag 1, type extern 2, forward metric 2
Last update from 10.0.1.6 on GigabitEthernet3/0/1, 00:14:13 ago
Routing Descriptor Blocks:
* 10.0.1.6, from 10.0.1.21, 00:14:13 ago, via GigabitEthernet3/0/1
    Route metric is 1, traffic share count is 1
    Route tag 1

```

cs4 has BGP ECMP enabled on it so that we can sustain 1 link failure and 1 device powered down from the Star Destroyer with sub-second loss.

2. Considerations on Star Destroyer = AS#65012 (sd1, sd2, sd3, sd4, sd5, sd6, sd7):



To have better convergence, we can use IGP convergence instead of next-hop-self:

We match the next-hop IP of the command ship (cs4) using a prefix list then use a route-map to redistribute it in OSPF as below. Using next-hop-self, the BGP NH is always reachable but using below configuration we ensure that IGP convergence can be leveraged to converge the ECMP paths on the routers inside ISP. We also tune OSPF and BGP timers to 1 and 3.

```
ip prefix-list CONNECTED_ROUTES seq 5 permit 10.0.1.20/30
!
!
!
!
route-map RM_CONNECTED permit 10
  match ip address prefix-list CONNECTED_ROUTES

router ospf 11
  redistribute connected subnets route-map RM_CONNECTED
  network 10.0.1.28 0.0.0.3 area 0
  network 10.0.1.52 0.0.0.3 area 0
  network 100.0.0.5 0.0.0.0 area 0
```

sd1 and sd2 peer with cs4 using eBGP.

sd1, sd2, sd3, sd4, sd5, sd6, sd7 peer with each other using full mesh iBGP over loopbacks and their loopback as advertised in OSPF which is an underlay IGP.

For sd6 and sd7 to have 2 unique paths for iBGP ECMP:

1. sd4 has chosen a best path with next-hop 10.0.1.17 and it advertises the same to sd6 and sd7
2. We will have ECMP on sd7 since, it has paths with different next-hop IPs i.e. 10.0.1.17 advertised by sd4 and 10.0.1.21 advertised by sd5
3. But on sd6, best path for both sd3 and sd4 are with next-hop 10.0.1.17 so **we do a trick mentioned below:**

route-map to set a different next-hop on sd6 when accepting the BGP updates from sd4

```
route-map CHANGE_NH permit 10
  match source-protocol bgp 65012
  set ip next-hop 10.0.1.21
```

apply it on sd6

```
neighbor 10.0.1.41 route-map CHANGE_NH in
```

sd3, sd4, sd5 are configured as route reflectors.

sd6 and sd7 peer with relays (dsR).

We perform the similar action to leverage IGP for BGP convergence for dSR next-hop IPs.

Each device has BGP ECMP enabled using “maximum-paths” for eBGP and “maximum-paths ibgp” for iBGP. We can have redundant paths inside the ISP network.

3. Considerations on Death Star for dSR with BGP, GLBP and IPSLA= AS#65013



dSR - NW, NE are eBGP peers towards ISP router sd6

dSR - SW, SE are eBGP peers towards ISP router sd7

All the dSR routers are configured as GLBP routers with virtual IP of 11.0.0.254

Track the direct link failures towards ISP and decrement the GLBP weighting to 0 so that the GLBP router resigns as an AVF.

```
track 1 interface GigabitEthernet0/1 ip routing
```

```
glbp 1 ip 11.0.0.254
glbp 1 timers 1 3
glbp 1 weighting 110
glbp 1 authentication md5 key-string k2ps
glbp 1 weighting track 1 decrement 110
```

We define an IPSLA to ping the load-balancer virtual IP. Then, we track the reachability of the IPSLA configured but change it to down after a delay of 12 secs for LB side failure to converge.

```
DSR-NW#sh run | sec sla
track 11 ip sla 1 reachability
  delay down 12
track 12 ip sla 2 reachability
  delay down 12
ip sla 1
  icmp-echo 11.0.0.9 source-interface GigabitEthernet0/0
  frequency 5
ip sla schedule 1 life forever start-time now
ip sla 2
  icmp-echo 11.0.0.10 source-interface GigabitEthernet0/0
  frequency 5
ip sla schedule 2 life forever start-time now
DSR-NW#
```

We delay the state change to down as we will do a drastic change of shutting down the interface towards ISP based on the event track state.

```
event manager applet SHUT_ISP_INTERFACE1
  event track 12 state down
    action 1.0 cli command "enable"
    action 1.5 cli command "config t"
    action 2.0 cli command "interface GigabitEthernet0/1"
    action 2.5 cli command "shutdown"
    action 3.0 cli command "end"
event manager applet UNSHUT_ISP_INTERFACE
  event track 11 state up
    action 1.0 cli command "enable"
    action 1.5 cli command "config t"
    action 2.0 cli command "interface GigabitEthernet0/1"
    action 2.5 cli command "no shutdown"
    action 3.0 cli command "end"
```

IPSLA on ISP routers sd6 and sd7:

Ping the loopback IP on cs4 from sd6 and sd7 loopbacks after advertising them in BGP

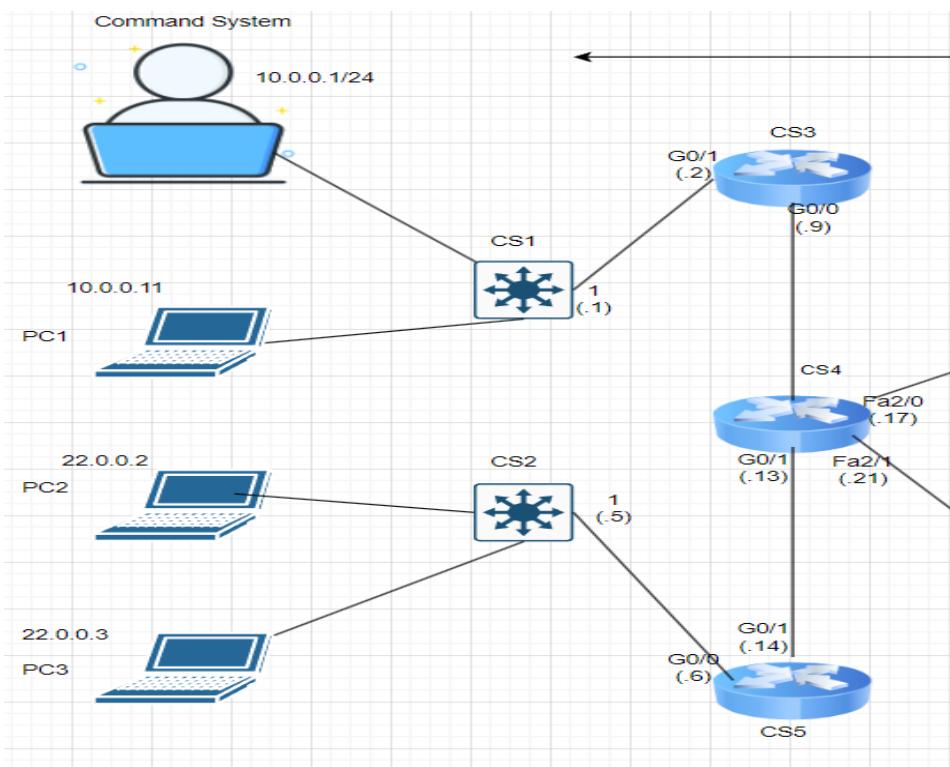
```
ip sla 1
  icmp-echo 100.0.0.1 source-ip 100.0.0.2
  frequency 5
ip sla schedule 1 life forever start-time now
```

Track the IPSLA reachability as below and delay the state change by 5 secs to allow IGP to converge before we shut down the interface which is a drastic change. We want to take a call on if we want to influence the GLBP routers to resign the role faster or not.

```
track 11 ip sla 1 reachability
  delay down 5

event manager applet SHUT_INTERFACE
  event track 11 state down
    action 1.0 cli command "enable"
    action 1.5 cli command "config t"
    action 2.0 cli command "interface GigabitEthernet0/1"
    action 2.1 cli command "shutdown"
    action 2.2 cli command "interface FastEthernet1/0"
    action 2.5 cli command "shutdown"
    action 3.0 cli command "end"
event manager applet UNSHUT_INTERFACE
  event track 11 state up
    action 1.0 cli command "enable"
    action 1.5 cli command "config t"
    action 2.0 cli command "interface GigabitEthernet0/1"
    action 2.1 cli command "no shutdown"
    action 2.2 cli command "interface FastEthernet1/0"
    action 2.5 cli command "no shutdown"
    action 3.0 cli command "end"
```

QOS:



QOS settings have been established on CS3 and CS5 routers. By employing access lists and matching the Command ship's IP, 16Mbps of bandwidth has been allocated to the command ship. Counters within the QOS will increment with any management traffic originating from or directed towards the Command ship, that is both outbound and inbound traffic.

Similarly, PC1's bandwidth has been restricted to a minimum of 5Mbps and a maximum of 5.1Mbps through policing configurations on both CS3 and CS5 routers.

Below screenshot shows the increment of counters on PC1 and the access list hit by the class map.

```
Class-map: fwd-pc1-egress-cm (match-all)
 2509432 packets, 3779246451 bytes
 5 minute offered rate 0 bps, drop rate 0 bps
 Match: dscp af31 (26)
 Queueing
 queue limit 64 packets
 (queue depth/total drops/no-buffer drops) 0/0/0
 (pkts output/bytes output) 2235550/3364984360
 bandwidth 5000 kbps
 police:
   cir 5100000 bps, bc 159375 bytes
   conformed 2235551 packets, 3364985874 bytes; actions:
     transmit
   exceeded 273880 packets, 414259063 bytes; actions:
     drop
   conformed 0 bps, exceed 0 bps
```

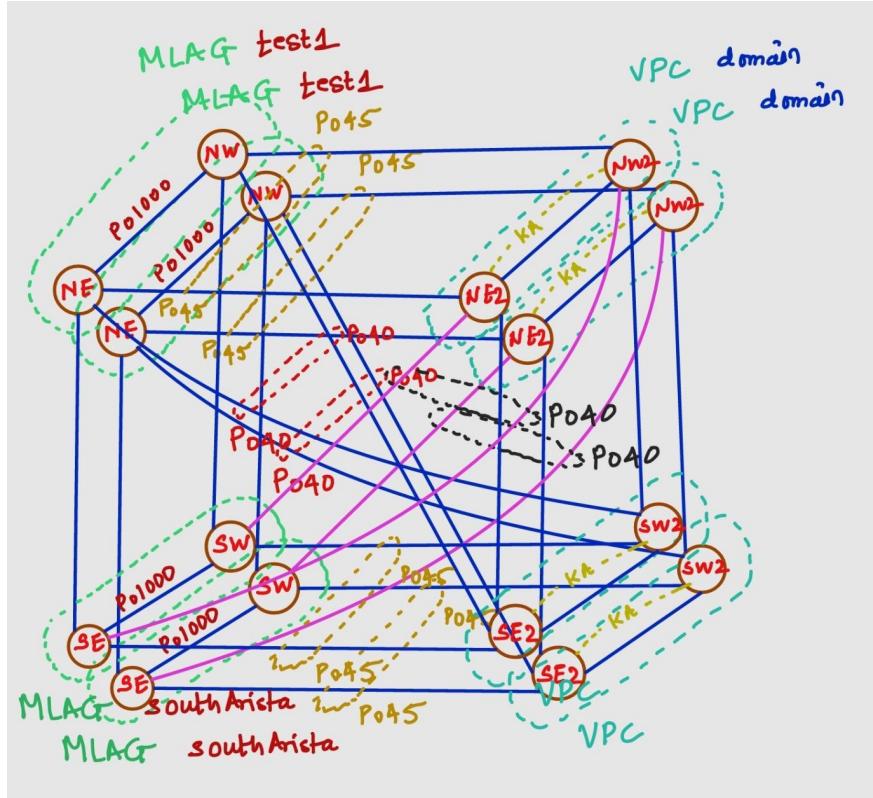
```
Class-map: rev-pc1-marking-cm (match-all)
 1442274 packets, 90208191 bytes
 5 minute offered rate 0 bps, drop rate 0 bps
 Match: access-group 112
 QoS Set
   dscp af31
   Packets marked 1442274
```

```
CS3#sh ip access-list
Extended IP access list 100
 10 permit icmp host 10.0.0.1 any echo (8 matches)
 20 permit tcp host 10.0.0.1 any eq 22
 30 permit tcp host 10.0.0.1 any eq telnet (38 matches)
Extended IP access list 101
 10 permit icmp any host 10.0.0.1 echo-reply (8 matches)
 20 permit tcp any host 10.0.0.1 eq 22
 30 permit tcp any host 10.0.0.1 eq telnet
Extended IP access list 102
 10 permit tcp host 10.0.0.1 any eq ftp
 20 permit tcp host 10.0.0.1 any eq ftp-data
Extended IP access list 103
 10 permit tcp any host 10.0.0.1 eq ftp
 20 permit tcp any host 10.0.0.1 eq ftp-data
Extended IP access list 111
 10 permit ip host 10.0.0.11 any (6390953 matches)
Extended IP access list 112
 10 permit ip any host 10.0.0.11 (9275394 matches)
Extended IP access list 122
 10 permit ip host 22.0.0.2 any
Extended IP access list 123
 10 permit ip any host 22.0.0.2
Extended IP access list 132
 10 permit ip host 22.0.0.3 any
Extended IP access list 133
 10 permit ip any host 22.0.0.3
CS3#
```

PC2 has been allotted a minimum bandwidth of 3Mbps with a maximum cap of 3.1Mbps. PC3's bandwidth has been limited to a minimum and maximum of 2Mbps and 2.1Mbps.

MLAG and VPC design consideration :

4 Arista switches are used facing towards the Gateway GLBP routers, and 4 Cisco Nexus routers are used facing towards the LoadBalancer/ Virtual Machines in the network.



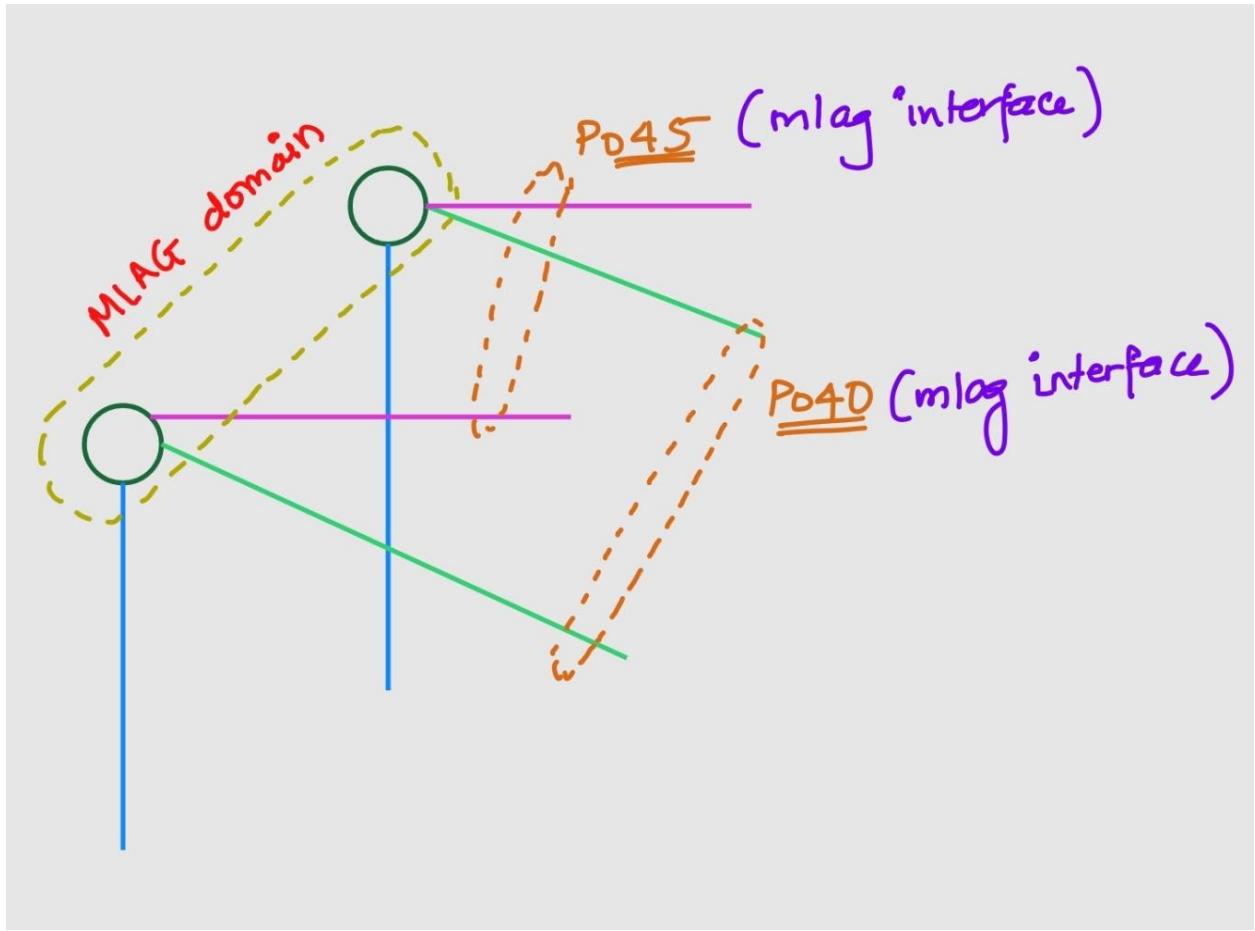
This suffices the requirement of using at least 4 Arista switches in the network topology.

For MLAG we have created below domains:

- 1) Between the North East and North West switch (**domain Name : test1**)
- 2) Between the South East and South West switch (**domain Name : SouthArista**)

MLAG interfaces:

We have created two MLAG interfaces **Port-Channel 40** and **Port-Channel 45** in the below fashion. Although there exists a single link in each Port-Channel due to hardware limitations of the lab, we have created Port-channel to represent link failover through the redundancy of links.



Additionally, to make Port-Channel detect link failure quickly, we have configured **LACP timers fast** on all the Port-Channel, making the exchange of LACP BPDUs more aggressive at intervals of 1 second, rather than the default of 30 seconds.

Peer-link:

The peer link between the MLAG domain is configured with an isolated VLAN, only allowing **VLAN 4094** traffic through, thus not allowing data traffic to pass through.

For failover, the peer link is configured to be a Port-channel, with LACP fast timers.

Peer Link failure:

In an event of link failure, the Arista switches would behave as dual primary (split brains). However, if all the links in the peer-link Port-channel are intentionally pulled out, Arista's L2 Agent detects a link failure and causes the MLAG interfaces to shut completely. From a datacenter perspective, this behavior is useless, as it brings down the switch, by shutting all the MLAG interfaces. Thus we have provided non-MLAG interfaces which connect

the switch to other switches in a vertical fashion, allowing at least few interfaces to remain connected.

MLAG primary is selected based on the lowest MAC address between the two peer switches. The global STP parameters like priority, timers, etc are derived from the **primary MLAG peer** and the **secondary peer's** parameters are ignored.

We have configured RSTP and since each switch in the cube is just 2 hop away we have configured STP parameters, to the lowest possible of

Timers	Value
Hello Time	1.000 sec
Max Age	6 sec
Forward Delay	4 sec

This STP behavior is common for MLAG as well as non MLAG interfaces. Since, the primary MLAG peer's STP parameters are used, the BPDUs from both the peer switches over the non-MLAG interfaces are advertised identically.

MLAG Peer Status (North Peers)

SW-NW1(config)# sh mlag detail	SW1-NE1(config)# sh mlag detail
MLAG Configuration:	MLAG Configuration:
domain-id : test1	domain-id : test1
local-interface : Vlan4094	local-interface : Vlan4094
peer-address : 1.1.1.2	peer-address : 1.1.1.1
peer-link : Port-Channel1000	peer-link : Port-Channel1000
peer-config : consistent	peer-config : consistent
MLAG Status:	MLAG Status:
state : Active	state : Active
negotiation status : Connected	negotiation status : Connected
peer-link status : Up	peer-link status : Up
local-int status : Up	local-int status : Up
system-id : 2a:99:3a:3c:78:b1	system-id : 2a:99:3a:3c:78:b1
MLAG Ports:	MLAG Ports:
Disabled : 0	Disabled : 0
Configured : 0	Configured : 0
Inactive : 0	Inactive : 0
Active-partial : 0	Active-partial : 0
Active-full : 2	Active-full : 2
MLAG Detailed Status:	MLAG Detailed Status:
State : secondary	State : primary
State changes : 10	State changes : 33
Last state change time : 1 day, 16:31:00 ago	Last state change time : 1 day, 16:31:00 ago
Hardware ready : True	Hardware ready : True
Failover : False	Failover : False
Last failover change time : 1 day, 16:33:14 ago	Last failover change time : 6 days, 16:42:17 ago
Secondary from failover : False	Secondary from failover : False
Peer MAC address : 28:99:3a:3c:78:b1	Peer MAC address : 28:99:3a:3c:f9:ad
Peer MAC routing supported : True	Peer MAC routing supported : True
Reload delay : 300 seconds	Reload delay : 300 seconds
Non-MLAG reload delay : 300 seconds	Non-MLAG reload delay : 300 seconds
Ports errdisabled : False	Peer ports errdisabled : False
Lacp standby : False	Lacp standby : False
Configured heartbeat interval : 4000 ms	Configured heartbeat interval : 4000 ms
Effective heartbeat interval : 4000 ms	Effective heartbeat interval : 4000 ms
Heartbeat timeout : 60000 ms	Heartbeat timeout : 60000 ms
Last heartbeat timeout : never	Last heartbeat timeout : never
Heartbeat timeouts since reboot : 0	Heartbeat timeouts since reboot : 0
UDP heartbeat alive : True	UDP heartbeat alive : True
Heartbeats sent/received : 144544/96982	Heartbeats sent/received : 147638/99250
Peer monotonic clock offset : 12391.572795 seconds	Peer monotonic clock offset : -12391.572799 seconds
Agent should be running : True	Agent should be running : True
P2p mount state changes : 23	P2p mount state changes : 23
Fast MAC redirection enabled : True	Fast MAC redirection enabled : True

STP for MLAG peer switches (North)

<pre>SW-NW1(config)#sh spanning-tree MST0 Spanning tree enabled protocol rstp Root ID Priority 1 Address 0023.04ee.be0a Cost 1999 (Ext) 0 (Int) Port 101 (Port-Channel45) Hello Time 1.000 sec Max Age 6 sec Forward Delay 4 sec Bridge ID Priority 32768 (priority 32768 sys-id-ext 0) Address 2a99.3a3c.78b1 Hello Time 1.000 sec Max Age 6 sec Forward Delay 4 sec Interface Role State Cost Prio.Nbr Type ----- ---- ----- ----- ----- ----- Et1 designated forwarding 20000 128.201 P2p Edge Et2 designated forwarding 2000 128.202 P2p PEt1 designated forwarding 2000 128.1 P2p PEt2 designated forwarding 20000 128.2 P2p Edge Po40 alternate discarding 1999 128.102 P2p Po45 root forwarding 1999 128.101 P2p SW-NW1(config)#</pre>	<pre>SW1-NE1(config)# SW1-NE1(config)# SW1-NE1(config)#sh spanning-tree MST0 Spanning tree enabled protocol rstp Root ID Priority 1 Address 0023.04ee.be0a Cost 1999 (Ext) 0 (Int) Port 101 (Port-Channel45) Hello Time 1.000 sec Max Age 6 sec Forward Delay 4 sec Bridge ID Priority 32768 (priority 32768 sys-id-ext 0) Address 2a99.3a3c.78b1 Hello Time 1.000 sec Max Age 6 sec Forward Delay 4 sec Interface Role State Cost Prio.Nbr Type ----- ---- ----- ----- ----- ----- Et1 designated forwarding 2000 128.1 P2p Et2 designated forwarding 20000 128.2 P2p Edge PEt1 designated forwarding 20000 128.201 P2p Edge PEt2 designated forwarding 2000 128.202 P2p Po40 alternate discarding 1999 128.102 P2p Po45 root forwarding 1999 128.101 P2p SW1-NE1(config)#+</pre>
--	---

MLAG interfaces (North peers)

<pre>SW-NW1(config)#sh mlag interfaces mlag desc state local remote local/remote 1 active-full 2 active-full SW-NW1(config)#+</pre>	<pre>SW1-NE1(config)#sh mlag interfaces mlag desc state local remote local/remote 1 active-full 2 active-full SW1-NE1(config)#+</pre>
--	--

MLAG Peer Status (South Switches)

<pre>SW-SW1> SW-SW1>sh mlag detail MLAG Configuration: domain-id : SouthArista local-interface : Vlan4094 peer-address : 1.1.1.2 peer-link : Port-Channel1000 peer-config : consistent MLAG Status: state : Active negotiation status : Connected peer-link status : Up local-int status : Up system-id : 2a:99:3a:3c:93:9b MLAG Ports: Disabled : 0 Configured : 0 Inactive : 0 Active-partial : 0 Active-full : 2 MLAG Detailed Status: State : primary State changes : 2 Last state change time : 6 days, 18:45:35 ago Hardware ready : True Failover : False Last failover change time : 6 days, 9:24:24 ago Secondary from failover : False Peer MAC address : 28:99:3a:3c:d5:1d Peer MAC routing supported : True Reload delay : 300 seconds Non-MLAG reload delay : 300 seconds Peer ports errdisabled : False Lacp standby : False Configured heartbeat interval : 4000 ms Effective heartbeat interval : 4000 ms Heartbeat timeout : 60000 ms Last heartbeat timeout : never Heartbeat timeouts since reboot : 0 UDP heartbeat alive : True Heartbeats sent/received : 147706/145656 Peer monotonic clock offset : -3.110761 seconds Agent should be running : True P2p mount state changes : 3 Fast MAC redirection enabled : True SW-SW1> SW-SW1> SW-SW1></pre>	<pre>SW-SE1>sh mlag detail MLAG Configuration: domain-id : SouthArista local-interface : Vlan4094 peer-address : 1.1.1.1 peer-link : Port-Channel1000 peer-config : consistent MLAG Status: state : Active negotiation status : Connected peer-link status : Up local-int status : Up system-id : 2a:99:3a:3c:93:9b MLAG Ports: Disabled : 0 Configured : 0 Inactive : 0 Active-partial : 0 Active-full : 2 MLAG Detailed Status: State : secondary State changes : 4 Last state change time : 6 days, 9:24:27 ago Hardware ready : True Failover : False Last failover change time : 6 days, 9:24:27 ago Secondary from failover : True Peer MAC address : 28:99:3a:3c:93:9b Peer MAC routing supported : True Reload delay : 300 seconds Non-MLAG reload delay : 300 seconds Ports errdisabled : False Lacp standby : False Configured heartbeat interval : 4000 ms Effective heartbeat interval : 4000 ms Heartbeat timeout : 60000 ms Last heartbeat timeout : never Heartbeat timeouts since reboot : 0 UDP heartbeat alive : True Heartbeats sent/received : 147703/145655 Peer monotonic clock offset : 3.110772 seconds Agent should be running : True P2p mount state changes : 3 Fast MAC redirection enabled : True SW-SE1></pre>
---	--

STP for MLAG peer switches (South)

<pre> SW-SW1# SW-SW1# SW-SW1#sh spanning-tree MST0 Spanning tree enabled protocol rstp Root ID Priority 1 Address 0023.04ee.be0a Cost 1999 (Ext) 0 (Int) Port 102 (Port-Channel40) Hello Time 1.000 sec Max Age 6 sec Forward Delay 4 sec Bridge ID Priority 32768 (priority 32768 sys-id-ext 0) Address 2a99.3a3c.939b Hello Time 1.000 sec Max Age 6 sec Forward Delay 4 sec Interface Role State Cost Prio.Nbr Type ----- ----- Et1 designated forwarding 20000 128.1 P2p Edge Et3 alternate discarding 2000 128.3 P2p PEt1 designated forwarding 20000 128.201 P2p Edge PEt4 alternate discarding 2000 128.204 P2p Po40 root forwarding 1999 128.102 P2p Po45 alternate discarding 1999 128.101 P2p </pre>	<pre> SW-SE1# SW-SE1#sh spanning-tree MST0 Spanning tree enabled protocol rstp Root ID Priority 1 Address 0023.04ee.be0a Cost 1999 (Ext) 0 (Int) Port 102 (Port-Channel40) Hello Time 1.000 sec Max Age 6 sec Forward Delay 4 sec Bridge ID Priority 32768 (priority 32768 sys-id-ext 0) Address 2a99.3a3c.939b Hello Time 1.000 sec Max Age 6 sec Forward Delay 4 sec Interface Role State Cost Prio.Nbr Type ----- ----- Et1 designated forwarding 20000 128.201 P2p Edge Et4 alternate discarding 2000 128.204 P2p PEt1 designated forwarding 20000 128.1 P2p Edge PEt3 alternate discarding 2000 128.3 P2p Po40 root forwarding 1999 128.102 P2p Po45 alternate discarding 1999 128.101 P2p </pre>
---	---

MLAG interfaces (South peers)

SW-SW1#						SW-SE1#					
SW-SW1#sh mlag interfaces						SW-SE1#sh mlag interfaces					
mlag	desc	state	local	remote	local/remote status	mlag	desc	state	local	remote	local/remote status
1		active-full	Po40	Po40	up/up	1		active-full	Po40	Po40	up/up
3		active-full	Po45	Po45	up/up	3		active-full	Po45	Po45	up/up

Dual Primary:

We have enabled dual primary detection to avoid issues that are caused w.r.t to unreachability in case of split brain. To tackle this, we enabled dual primary detection and actions as errdisabled. This would cause the **mlag** links on the secondary interfaces to go into **err disabled** state.

For VPC we have created below domains:

For VPC we have created below domains:

- 1) Between the North East and North West switch (**domain : 10**)
- 2) Between the South East and South West switch (**domain : 20**)

VPC interfaces are created in a similar fashion and the Port-Channel are numbered the same. We have considered below scenarios -

- 1) In the event of a data center or power outage, both vPC peers formed by Cisco Nexus switches experience downtime. In an event where both cannot be restored at the same time, a single switch cannot be brought up with VPC configurations, since the vPC peer-link and vPC peer-keepalive link are down. Thus, the vPC will not be established, even if the first Cisco Nexus switch is back online.
- 2) When the vPC peer-link is down, and the Keep Alive link is still up; the VPC secondary peer device triggers dual active detection and brings down all its vPC

member ports. If in this case the primary peer goes down, the traffic will be blackholed since it has detected dual primary.

To solve this problem, we have enabled **auto-recovery** where in if both keep-alive and peer-link are down, and in case only secondary peer is up, it waits for the recovery-delay timeout of **240 seconds** and would then bring up all of its VPC member ports and bypass consistency checks.

- 3) When the VPC peer is a root bridge and if the bridge goes down, the topology goes through STP finite state machine causing traffic disruption. Since, the other peer will advertise BPDU with its own Bridge Id, convergence is triggered. To avoid this, a **peer-switch** feature is enabled, through which a common bridgeld is used for sending BPDU and it doesn't change the topology in case of peer-switch failure, with a root role.

VPC split brain -

- 1) If the peer-link cable is pulled out the secondary switch would shut all of its VPC member links
- 2) If the Keep-alive link is pulled out and then the peer link is pulled out we observe, split brain scenario, where both the peer take primary roles, STP is still not affected.

VPC domain 10 between north bridges and VPC interfaces marked as:

<pre>SW-NE2(config)# sh vpc Legend: (*) - local vPC is down, forwarding via vPC peer-link vPC domain id : 10 Peer status : peer adjacency formed ok vPC keep-alive status : peer is alive Configuration consistency status : success Per-vlan consistency status : success Type-2 consistency status : success vPC role : primary, operational secondary Number of vPCs configured : 2 Peer Gateway : Disabled Dual-active excluded VLANs : - Graceful Consistency Check : Enabled Auto-recovery status : Enabled, timer is off.(timeout = 240s) Delay-restore status : Timer is off.(timeout = 30s) Delay-restore SVI status : Timer is off.(timeout = 10s) vPC Peer-link status ----- id Port Status Active vlangs -- -- -- -- -- 1 Po10 up 1 vPC status ----- id Port Status Consistency Reason Active vlangs -- -- -- -- -- -- 1 Po45 up success success 1 2 Po40 up success success 1 SW-NE2(config)# </pre>	<pre>SW-NW2(config)# sh vpc Legend: (*) - local vPC is down, forwarding via vPC peer-link vPC domain id : 10 Peer status : peer adjacency formed ok vPC keep-alive status : peer is alive Configuration consistency status : success Per-vlan consistency status : success Type-2 consistency status : success vPC role : secondary, operational primary Number of vPCs configured : 2 Peer Gateway : Disabled Dual-active excluded VLANs : - Graceful Consistency Check : Enabled Auto-recovery status : Enabled, timer is off.(timeout = 240s) Delay-restore status : Timer is off.(timeout = 30s) Delay-restore SVI status : Timer is off.(timeout = 10s) vPC Peer-link status ----- id Port Status Active vlangs -- -- -- -- -- 1 Po10 up 1 vPC status ----- id Port Status Consistency Reason Active vlangs -- -- -- -- -- -- 1 Po45 up success success 1 2 Po40 up success success 1 SW-NW2(config)# </pre>
--	--

STP on north bridges:

```

SW-NE2# sh sp
spanning-tree srom
SW-NE2# sh spanning-tree

VLAN0001
  Spanning tree enabled protocol rstp
  Root ID Priority 1
    Address 0023.04ee.be0a
    This bridge is the root
    Hello Time 1 sec Max Age 6 sec Forward Delay 4 sec

  Bridge ID Priority 1 (priority 0 sys-id-ext 1)
    Address 0023.04ee.be0a
    Hello Time 1 sec Max Age 6 sec Forward Delay 4 sec

Interface Role Sts Cost Prio.Nbr Type
-----+-----+-----+-----+-----+
Po10   Root FWD 2     128.4105 (vPC peer-link) Network P2p
Po40   Desg FWD 1    128.4135 (vPC) P2p
Po45   Desg FWD 1    128.4140 (vPC) P2p
Eth1/17 Desg FWD 2    128.17      P2p
Eth1/39 Desg FWD 4     128.39      P2p
Eth1/41 Desg FWD 4     128.41      P2p Peer(STP)

SW-NE2# |-----+-----+-----+-----+-----+
SW-NW2# sh spanning-tree

VLAN0001
  Spanning tree enabled protocol rstp
  Root ID Priority 1
    Address 0023.04ee.be0a
    This bridge is the root
    Hello Time 1 sec Max Age 6 sec Forward Delay 4 sec

  Bridge ID Priority 1 (priority 0 sys-id-ext 1)
    Address 0023.04ee.be0a
    Hello Time 1 sec Max Age 6 sec Forward Delay 4 sec

Interface Role Sts Cost Prio.Nbr Type
-----+-----+-----+-----+-----+
Po10   Desg FWD 2     128.4105 (vPC peer-link) Network P2p
Po40   Desg FWD 1    128.4135 (vPC) P2p
Po45   Desg FWD 1    128.4140 (vPC) P2p
Eth1/1  Desg FWD 2    128.1      P2p
Eth1/39 Desg FWD 4     128.39      P2p
Eth1/40 Desg FWD 4     128.40      P2p
Eth1/41 Desg FWD 4     128.41      P2p Peer(STP)

SW-NW2# |-----+-----+-----+-----+-----+

```

Because of ***peer-switch*** both the peer bridges are root bridges and share the same MAC address.

VPC domain 20 between south bridges and VPC interface marked as:

```

SW-SE2# sh vpc
Legend: (*) - local vPC is down, forwarding via vPC peer-link

vPC domain id : 20
Peer status : peer adjacency formed ok
vPC keep-alive status : peer is alive
Configuration consistency status : success
Per-vlan consistency status : success
Type-2 inconsistency reason : Consistency Check Not Performed
vPC role : primary
Number of vPCs configured : 2
Peer Gateway : Disabled
Dual-active excluded VLANs : -
Graceful Consistency Check : Enabled
Auto-recovery status : Enabled, timer is off.(timeout = 240s)
Delay-restore status : Timer is off.(timeout = 30s)
Delay-restore SVI status : Timer is off.(timeout = 10s)

vPC Peer-link status
-----
id Port Status Active vlans
-- --
1 Po1000 up 1

vPC status
-----
id Port Status Consistency Reason Active vlans
-- --
4 Po40 up success success 1
5 Po45 up success success 1

SW-SE2# |
```



```

SW-SW2# sh vpc
Legend: (*) - local vPC is down, forwarding via vPC peer-link

vPC domain id : 20
Peer status : peer adjacency formed ok
vPC keep-alive status : peer is alive
Configuration consistency status : success
Per-vlan consistency status : success
Type-2 inconsistency reason : Consistency Check Not Performed
vPC role : secondary
Number of vPCs configured : 2
Peer Gateway : Disabled
Dual-active excluded VLANs : -
Graceful Consistency Check : Enabled
Auto-recovery status : Enabled, timer is off.(timeout = 240s)
Delay-restore status : Timer is off.(timeout = 30s)
Delay-restore SVI status : Timer is off.(timeout = 10s)

vPC Peer-link status
-----
id Port Status Active vlans
-- --
1 Po1000 up 1

vPC status
-----
id Port Status Consistency Reason Active vlans
-- --
4 Po40 up success success 1
5 Po45 up success success 1

SW-SW2# |
```

STP:

```

spanning-tree sprom
SW-SE2# sh spanning-tree

VLAN0001
  Spanning tree enabled protocol rstp
    Root ID    Priority 1
      Address  0023.04ee.be0a
      Cost        2
      Port       17 (Ethernet1/17)
      Hello Time 1 sec Max Age 6 sec Forward Delay 4 sec

  Bridge ID  Priority 32769 (priority 32768 sys-id-ext 1)
    Address  0023.04ee.be14
    Hello Time 1 sec Max Age 6 sec Forward Delay 4 sec

Interface   Role Sts Cost    Prio.Nbr Type
-----+-----+-----+-----+-----+-----+
Po40        Desg FWD 1     128.4135 (vPC) P2p
Po45        Desg FWD 1     128.4140 (vPC) P2p
Po1000      Desg FWD 2     128.5095 (vPC peer-link) Network P2p
Eth1/15      Desg FWD 2     128.15    P2p
Eth1/17      Root FWD 2     128.17    P2p
Eth1/39      Desg FWD 4     128.39    P2p
Eth1/40      Desg FWD 4     128.40    P2p
Eth1/41      Desg FWD 4     128.41    P2p Peer(STP)

SW-SE2# sh |
```



```

SW-SW2# sh sp
spanning-tree sprom
SW-SW2# sh spanning-tree

VLAN0001
  Spanning tree enabled protocol rstp
    Root ID    Priority 1
      Address  0023.04ee.be0a
      Cost        4
      Port       5095 (port-channel1000)
      Hello Time 1 sec Max Age 6 sec Forward Delay 4 sec

  Bridge ID  Priority 32769 (priority 32768 sys-id-ext 1)
    Address  0023.04ee.be14
    Hello Time 1 sec Max Age 6 sec Forward Delay 4 sec

Interface   Role Sts Cost    Prio.Nbr Type
-----+-----+-----+-----+-----+-----+
Po40        Desg FWD 1     128.4135 (vPC) P2p
Po45        Desg FWD 1     128.4140 (vPC) P2p
Po1000      Root FWD 2     128.5095 (vPC peer-link) Network P2p
Eth1/14      Altn BLK 2     128.14    P2p
Eth1/15      Ethln BLK 2     128.15    P2p
Eth1/39      Desg FWD 4     128.39    P2p
Eth1/41      Desg FWD 4     128.41    P2p Peer(STP)

SW-SW2# sh |
```

Radius AAA Authentication:

We have hosted the AAA RADIUS server on DELL. This server is connected to our management network. If the AAA RADIUS server is not available, the Cisco Nexus and Arista switches are configured to fall back to local login.

We are using the EAP method for administrative login to the switches.

Verification -

```
(admin@12.12.12.100) Password:  
dclab@sp-PowerEdge-R430:~$ ssh admin@12.12.12.100  
(admin@12.12.12.100) Password:  
Last login: Wed Dec  6 16:56:09 2023 from 12.12.12.99  
SW-NW1>|
```

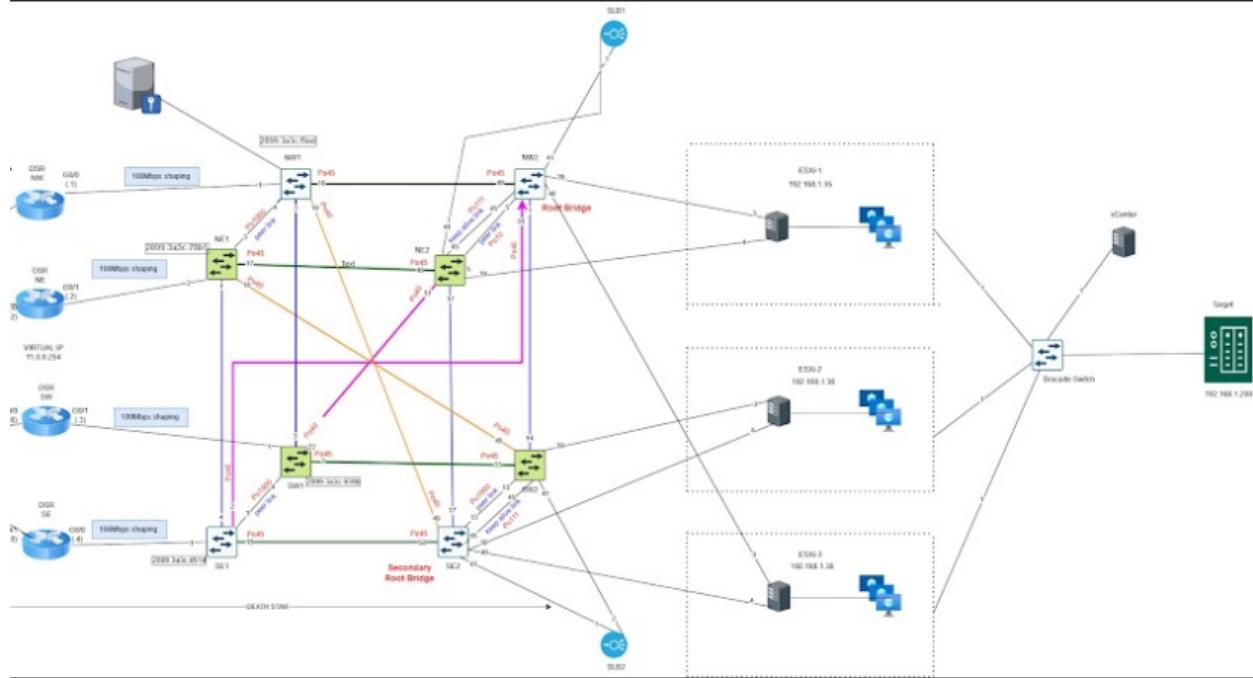
Radius logs -

```
listening on proxy address :: port 46448  
ready to process requests  
9) Received Access-Request Id 182 from 12.12.12.100:52641 to 12.12.12.99:1812 length 81  
9) User-Name = "admin"  
9) User-Password = "admin"  
9) NAS-Port-Id = "ssh"  
9) Calling-Station-Id = "12.12.12.99"  
9) Service-Type = NAS-Prompt-User  
9) NAS-Port = 0  
9) NAS-IP-Address = 12.12.12.100  
9) # Executing section authorize from file /etc/freeradius/3.0/sites-enabled/default  
9) authorize {  
9)   policy filter_username {  
9)     if (&User-Name) {  
9)       if (&User-Name) -> TRUE  
9)       if (&User-Name) {  
9)         if (&User-Name =~ / /) {  
9)           if (&User-Name =~ / /) -> FALSE  
9)           if (&User-Name =~ /[^\@]*@\@/) {  
9)             if (&User-Name =~ /[^\@]*@\@/) -> FALSE  
9)             if (&User-Name =~ /\@.. /) {  
9)               if (&User-Name =~ /\@.. /) -> FALSE  
9)               if ((&User-Name =~ /\@/) && (&User-Name !~ /@(.+)\.(.+)$/)) {  
9)                 if ((&User-Name =~ /\@/) && (&User-Name !~ /@(.+)\.(.+)$/)) -> FALSE  
9)                 if (&User-Name =~ /\@.\$/) {  
9)                   if (&User-Name =~ /\@.\$/) -> FALSE  
9)                   if (&User-Name =~ /\@.\@/) {  
9)                     if (&User-Name =~ /\@.\@/) -> FALSE  
9)                     } # if (&User-Name) = notfound  
9)                 } # policy filter_username = notfound  
9)               [preprocess] = ok  
9)               [chap] = noop  
9)               [mschap] = noop  
9)               [digest] = noop  
9)             suffix: Checking for suffix after "@"  
9)             suffix: No '@' in User-Name = "admin", looking up realm NULL  
9)             suffix: No such realm "NULL"  
9)             [suffix] = noop  
9)             eap: No EAP-Message, not doing EAP  
9)             [eap] = noop  
9)             files: users: Matched entry admin at line 41  
9)             [files] = ok  
9)             [expiration] = noop  
9)             [logintime] = noop  
9)             [pap] = updated  
9)           } # authorize = updated  
9)           Found Auth-Type = PAP  
9)           # Executing group from file /etc/freeradius/3.0/sites-enabled/default  
9)           Auth-Type PAP {  
9)             pap: Login attempt with password  
9)             pap: Comparing with "known good" Cleartext-Password  
9)             pap: User authenticated successfully  
9)           }
```

Config -

```
SW-NW1#sh run | sec radius  
radius-server timeout 1  
radius-server retransmit 0  
radius-server host 12.12.12.99 key 7 09584B081457  
!  
aaa authentication login default group radius local  
SW-NW1#|
```

Load balancing and NAS Setup:



We implemented a DSR load balancing mechanism where requests first come to load balancer, load balancer in round-robin fashion sends the request to server and server replies back directly to client instead of going to load balancer again.

For load balancing setup we have two load balancers primary and secondary. Primary is connected to NE2, NW2 and secondary is connected to SE2, SW2. We have a multi-homing setup for both load balancers. So, if any one link goes down, the load balancer is still reachable from the backup path.

These layer 2 based load balancers communicate with each other by sending heartbeat messages to check availability of each other. If the primary load balancer goes down, the secondary load balancer takes over the control. We are NATing the server source IP to VIP in our setup. Clients don't know about the real server IPs, they know only the virtual IP.

Virtual machines serving the HTTP and FTP are deployed on ESXi hosts with DRS and HA feature enabled. DRS enables managing the VMs dynamically based on the compute resources required by each VM and available resources on each host. HA feature allows the vMotion of VM from one host to another if the host on which VM is running goes down. In HA, the VM is loaded and restarted on another available host which takes some couple of minutes to restore the service. To manage all the hosts, one host is installed with vSphere vCenter which provides centralized management.

SLB1:

```
SLB-telnet@SLB1_KP2S#show server bind

Bind info

Virtual server: HTTPVIP           Status: enabled  IP: 11.0.0.10
                                         symmetric VIP state: Owner
    http -----> web1-vm1: 11.0.0.11,  http (Active)
                    web2-vm2: 11.0.0.12,  http (Active)
                    web3-vm3: 11.0.0.21,  http (Active)
                    web4-vm4: 11.0.0.22,  http (Active)

Virtual server: FTPVIP            Status: enabled  IP: 11.0.0.9
                                         symmetric VIP state: Owner
    ftp -----> web1-vm1: 11.0.0.11,  ftp (Active)
                    web2-vm2: 11.0.0.12,  ftp (Active)
                    web3-vm3: 11.0.0.21,  ftp (Active)
                    web4-vm4: 11.0.0.22,  ftp (Active)

SLB-telnet@SLB1_KP2S#
```

The above log shows SLB1 is Owner which means it is in a active state.

```
server real web2-vm2 11.0.0.12
weight 50 0
port http
port http keepalive
port http url "HEAD /"
port ftp
!
server real web3-vm3 11.0.0.21
weight 50 0
port http
port http keepalive
port http url "HEAD /"
port ftp
!
server real web4-vm4 11.0.0.22
weight 50 0
port http
port http keepalive
port http url "HEAD /"
port ftp
!
server real web1-vm1 11.0.0.11
weight 50 0
port http
port http keepalive
port http url "HEAD /"
port ftp
!
!
server virtual HTTPVIP 11.0.0.10
sym-priority 101
sym-active
port http
bind http web1-vm1 http web2-vm2 http web3-vm3 http web4-vm4 http
!
server virtual FTPVIP 11.0.0.9
sym-priority 101
sym-active
port ftp
bind ftp web1-vm1 ftp web2-vm2 ftp web3-vm3 ftp web4-vm4 ftp
!
```

The above log shows the configuration of binding http and ftp to real IP and then binding the real IPs to virtual IP on SLB1.

SLB2:

```
SLB-telnet@SLB2_KP2S#show server bind

Bind info

Virtual server: HTTPVIP           Status: enabled  IP: 11.0.0.10
                                         symmetric VIP state: non-Owner
    http -----> web1-vm1: 11.0.0.11,  http (Active)
                    web2-vm2: 11.0.0.12,  http (Active)
                    web3-vm3: 11.0.0.21,  http (Active)
                    web4-vm4: 11.0.0.22,  http (Active)

Virtual server: FTPVIP            Status: enabled  IP: 11.0.0.9
                                         symmetric VIP state: non-Owner
    ftp -----> web1-vm1: 11.0.0.11,  ftp (Active)
                    web2-vm2: 11.0.0.12,  ftp (Active)
                    web3-vm3: 11.0.0.21,  ftp (Active)
                    web4-vm4: 11.0.0.22,  ftp (Active)

SLB-telnet@SLB2_KP2S#
```

The above log shows SLB2 is non-owner which means it is in non-active state.

```
server real web2-vm2 11.0.0.12
  weight 50 0
  port http
  port http keepalive
  port http url "HEAD /"
  port ftp
!
server real web3-vm3 11.0.0.21
  weight 50 0
  port http
  port http keepalive
  port http url "HEAD /"
  port ftp
!
server real web4-vm4 11.0.0.22
  weight 50 0
  port http
  port http keepalive
  port http url "HEAD /"
  port ftp
!
server real web1-vm1 11.0.0.11
  weight 50 0
  port http
  port http keepalive
  port http url "HEAD /"
  port ftp
!
!
server virtual HTTPVIP 11.0.0.10
  sym-priority 101
  sym-active
  port http
  bind http web1-vm1 http web2-vm2 http web3-vm3 http web4-vm4 http
!
server virtual FTPVIP 11.0.0.9
  sym-priority 101
  sym-active
  port ftp
  bind ftp web1-vm1 ftp web2-vm2 ftp web3-vm3 ftp web4-vm4 ftp
!
```

The above log shows the configuration of binding http and ftp to real IP and then binding the real IPs to virtual IP on SLB2.

VMWare:

The screenshot shows the vSphere Client interface for the Data Center "Team2DC". The left sidebar shows the hierarchy: 192.168.1.202 > Team2DC > mycluster. Under mycluster, there are three hosts: 192.168.1.35, 192.168.1.36, and 192.168.1.38. There are also four VMs listed: 11VM, VM12, VM21, and VM22. The main pane displays the "Capacity and Usage" summary for the cluster, showing resource utilization across CPU, Memory, and Storage.

The above log shows the inventory of the Data Center consisting of cluster “mycluster”, three hosts “192.168.1.35”, “192.168.1.36”, and “192.168.1.38” and four VMs “11VM”, “VM12”, “VM21”, and “VM22”.

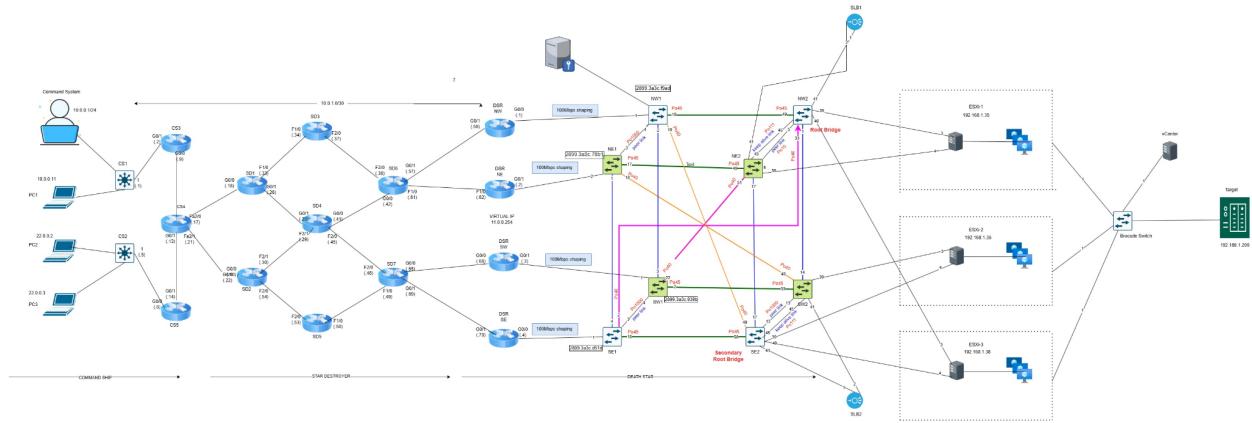
The screenshot shows the "Configure" tab for the Data Center "mycluster". Under the "vSphere DRS" section, it is indicated that "vSphere DRS is Turned ON". The configuration details include "DRS Automation" set to "Fully Automated", "Additional Options" expanded, "Power Management" set to "Off", and "Advanced Options" expanded. Other sections like "vSphere Availability" and "Configuration" are also visible.

The above log shows the vSphere DRS is turned on which balances VMs across multiple hosts in a cluster based on resource utilization.

The screenshot shows the "Configure" tab for the Data Center "mycluster". Under the "vSphere Availability" section, it is indicated that "vSphere HA is Turned ON". The configuration details include "Proactive HA is Turned OFF" and a table for "Failure conditions and responses". The table lists three entries: "Host failure" (Response: "Restart VMs", Details: "Restart VMs using VM restart priority ordering."), "Proactive HA" (Response: "Disabled", Details: "Proactive HA is not enabled."), and "Host Isolation" (Response: "Power off and restart VMs", Details: "VMs on isolated hosts will be powered off and restarted on available hosts").

The above log shows that HA feature is enabled that provides automatic restart of virtual machines (VMs) on other hosts in case of host failure.

Appendix Section A: Network Diagram and it's Labeling



Appendix Section B: Final Configurations on the Devices

```
CS1#sh run
Building configuration...

Current configuration : 3497 bytes
!
version 12.2
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname CS1
!
boot-start-marker
boot-end-marker
!
enable password admin
!
!
!
no aaa new-model
switch 1 provision ws-c3750g-24ts-lu
system mtu routing 1500
ip routing
!
!
!
!
crypto pki trustpoint TP-self-signed-2
```

```
enrollment selfsigned
subject-name cn=IOS-Self-Signed-Certificate-2135090176
revocation-check none
rsakeypair TP-self-signed-2135090176
!
!
crypto pki certificate chain TP-self-signed-2135090176
certificate self-signed 01
3082023C 308201A5 A0030201 02020101 300D0609 2A864886 F70D0101 04050030
31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D 43657274
69666963 6174652D 32313335 30393031 3736301E 170D3933 30333031 30303032
33395A17 0D323030 31303130 30303030 305A3031 312F302D 06035504 03132649
4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D32 31333530
39303137 3630819F 300D0609 2A864886 F70D0101 01050003 818D0030 81890281
8100BF4B BC25938C 92AE3287 9AB45F85 C30B7F94 AFBAE819 5DF6CB17 D76E695C
4D5F69F2 D8748647 38306C39 72540481 6BCECAC0 2B5B580F DFE39951 F4E4B937
74B0EC00 FB39128D 588728D7 ED27F569 10F06E5D 9FCDB1B2 1F62EED4 8AB7217A
7B73D25B C63E5452 643F7652 33E6EAB8 99E181AF 67978154 5F1B277B 989B7F51
54770203 010001A3 64306230 0F060355 1D130101 FF040530 030101FF 300F0603
551D1104 08300682 04435331 2E301F06 03551D23 04183016 8014E0C9 E08D55D2
692E09E4 605848FB FA3AF284 5ACF301D 0603551D 0E041604 14E0C9E0 8D55D269
2E09E460 5848FBFA 3AF2845A CF300D06 092A8648 86F70D01 01040500 03818100
884C6566 002D7B68 167653A9 5C45C32A 13FA937E 0DDB8CF0 0F20069C 4C6DBC7C
C5531577 AD21341E 5FFB2C16 88123557 DE2C759C 0DBCD4FF 169B761E 0598637C
D993549A F0F2AC07 4C31F5D4 CEC4CA58 19CD85B5 A2B1FAAD F62F6B52 1522B825
5AC2E59F EC705BC5 A8042456 0C31F2CD 6ADF1B3D EF702581 B00F0178 66AC76C1
quit
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
vlan internal allocation policy ascending
!
!
!
interface GigabitEthernet1/0/1
no switchport
ip address 10.0.1.1 255.255.255.252
!
interface GigabitEthernet1/0/2
!
interface GigabitEthernet1/0/3
!
interface GigabitEthernet1/0/4
```

```
!
interface GigabitEthernet1/0/5
!
interface GigabitEthernet1/0/6
!
interface GigabitEthernet1/0/7
!
interface GigabitEthernet1/0/8
!
interface GigabitEthernet1/0/9
!
interface GigabitEthernet1/0/10
!
interface GigabitEthernet1/0/11
!
interface GigabitEthernet1/0/12
!
interface GigabitEthernet1/0/13
  switchport mode access
!
interface GigabitEthernet1/0/14
!
interface GigabitEthernet1/0/15
!
interface GigabitEthernet1/0/16
!
interface GigabitEthernet1/0/17
!
interface GigabitEthernet1/0/18
!
interface GigabitEthernet1/0/19
!
interface GigabitEthernet1/0/20
!
interface GigabitEthernet1/0/21
!
interface GigabitEthernet1/0/22
!
interface GigabitEthernet1/0/23
!
interface GigabitEthernet1/0/24
!
interface GigabitEthernet1/0/25
!
interface GigabitEthernet1/0/26
!
interface GigabitEthernet1/0/27
```

```
!
interface GigabitEthernet1/0/28
!
interface Vlan1
  ip address 10.0.0.254 255.255.255.0
!
router ospf 1
  log-adjacency-changes
  network 10.0.0.0 0.0.0.255 area 0
  network 10.0.1.0 0.0.0.3 area 0
  bfd all-interfaces
!
ip classless
ip http server
ip http secure-server
!
!
!
!
```

```
line con 0
line vty 0 4
  password admin
  login
  transport input all
  transport output all
line vty 5 15
  password admin
  login
  transport input all
  transport output all
```

```
!
end
```

```
CS1#
```

```
=====
=====
```

```
CS2#sh run
Building configuration...
```

```
Current configuration : 3473 bytes
!
version 12.2
no service pad
```

```
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname CS2
!
boot-start-marker
boot-end-marker
!
enable password admin
!
!
!
no aaa new-model
switch 3 provision ws-c3750g-24ts-1u
system mtu routing 1500
ip routing
!
!
!
!
crypto pki trustpoint TP-self-signed-3023007360
enrollment selfsigned
subject-name cn=IOS-Self-Signed-Certificate-3023007360
revocation-check none
rsakeypair TP-self-signed-3023007360
!
!
crypto pki certificate chain TP-self-signed-3023007360
certificate self-signed 01
3082023C 308201A5 A0030201 02020101 300D0609 2A864886 F70D0101 04050030
31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D 43657274
69666963 6174652D 33303233 30303733 3630301E 170D3933 30333031 30303032
33385A17 0D323030 31303130 30303030 305A3031 312F302D 06035504 03132649
4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D33 30323330
30373336 3030819F 300D0609 2A864886 F70D0101 01050003 818D0030 81890281
8100DEF7 61DB1661 DD020B2D C4773B9D C8CD4B0B FA867E36 D58007BE CCD706EC
33E585DC 4DC89A9B B55232E5 B234AF4A C9EFA2F9 3E07F3B9 69E7A8AF F1979BB3
0C6C5DB8 F4155C9B AF8A2FAF 1F51B99B C931FAE9 F4A3FDA8 7537FFEC 36DA345C
0F0B21F2 E32F1B64 2A0F53D1 56976C92 06140878 139B18D9 2F53FB9A 9B2A7E12
880B0203 010001A3 64306230 0F060355 1D130101 FF040530 030101FF 300F0603
551D1104 08300682 04435332 2E301F06 03551D23 04183016 8014EB80 1580F5CB
36FB4581 38C5FF8A 7EE0ADD8 1639301D 0603551D 0E041604 14EB8015 80F5CB36
FB458138 C5FF8A7E E0ADD816 39300D06 092A8648 86F70D01 01040500 03818100
4B00DCC2 8B39B506 AF1F3502 DFD952BE 92E9790F 7E7F4CA6 CCC68265 3DA13E7E
8ADE7607 58580609 906D48A5 10A39F8B 4A45E675 80E00450 21BA58A2 ED147B99
0C995260 335BDE9B 1743B14F 59B65E43 E9615F2B 8E8B940D 3F565673 04B626DD
```

```
A2F0F2AE 2283BEE4 28594573 0EF98D6E 3C7B63FF 970AD37C 8927F89B AFF77F00
quit
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
vlan internal allocation policy ascending
!
!
!
!
interface GigabitEthernet3/0/1
no switchport
ip address 10.0.1.5 255.255.255.252
!
interface GigabitEthernet3/0/2
!
interface GigabitEthernet3/0/3
!
interface GigabitEthernet3/0/4
!
interface GigabitEthernet3/0/5
!
interface GigabitEthernet3/0/6
!
interface GigabitEthernet3/0/7
!
interface GigabitEthernet3/0/8
!
interface GigabitEthernet3/0/9
!
interface GigabitEthernet3/0/10
!
interface GigabitEthernet3/0/11
!
interface GigabitEthernet3/0/12
!
interface GigabitEthernet3/0/13
!
interface GigabitEthernet3/0/14
!
interface GigabitEthernet3/0/15
!
interface GigabitEthernet3/0/16
!
```

```
interface GigabitEthernet3/0/17
!
interface GigabitEthernet3/0/18
!
interface GigabitEthernet3/0/19
!
interface GigabitEthernet3/0/20
!
interface GigabitEthernet3/0/21
!
interface GigabitEthernet3/0/22
!
interface GigabitEthernet3/0/23
!
interface GigabitEthernet3/0/24
!
interface GigabitEthernet3/0/25
!
interface GigabitEthernet3/0/26
!
interface GigabitEthernet3/0/27
!
interface GigabitEthernet3/0/28
!
interface Vlan1
  ip address 22.0.0.254 255.255.255.0
!
router ospf 1
  log-adjacency-changes
  network 10.0.1.4 0.0.0.3 area 0
  network 22.0.0.0 0.0.0.255 area 0
  bfd all-interfaces
!
ip classless
ip http server
ip http secure-server
!
!
!
!
!
line con 0
line vty 0 4
  password admin
  login
  transport input all
  transport output all
```

```
line vty 5 15
password admin
login
transport input all
transport output all
!
end
```

CS2#

=====

```
CS3#sh run
Building configuration...
```

```
Current configuration : 5260 bytes
!
! Last configuration change at 03:04:44 UTC Thu Dec 7 2023
version 15.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname CS3
!
boot-start-marker
boot-end-marker
!
!
!
no aaa new-model
!
no network-clock-participate slot 2
!
dot11 syslog
ip source-route
!
ip cef
!
!
!
no ipv6 cef
!
multilink bundle-name authenticated
```

```
!
!
!
!
!
voice-card 0
!
!
!
!
!
!
!
!
crypto pki token default removal timeout 0
!
!
!
!
!
license udi pid CISCO3825 sn FTX1241A375
!
redundancy
!
!
!
class-map match-all fwd-pc1-marking-cm
  match access-group 111
class-map match-all fwd-pc2-marking-cm
  match access-group 122
class-map match-all fwd-pc3-marking-cm
  match access-group 132
class-map match-all rev-cship-mgmt-egress-cm
  match dscp af11
class-map match-all rev-pc1-marking-cm
  match access-group 112
class-map match-all rev-pc2-marking-cm
  match access-group 123
class-map match-all rev-pc3-marking-cm
  match access-group 133
class-map match-all fwd-cship-mgmt-egress-cm
  match dscp af11
class-map match-all ftp-bluk-rev-cship-marking-cm
  match access-group 103
class-map match-all ftp-bluk-fwd-cship-marking-cm
  match access-group 102
class-map match-all fwd-cship-marking-cm
  match access-group 100
class-map match-all rev-cship-marking-cm
```

```
match access-group 101
class-map match-all fwd-pc1-egress-cm
  match dscp af31
class-map match-all fwd-pc2-egress-cm
  match dscp af12
class-map match-all fwd-pc3-egress-cm
  match dscp af13
class-map match-all ftp-bulk-fwd-cship-mgmt-egress-cm
  match dscp af21
class-map match-all rev-pc1-egress-cm
  match dscp af31
class-map match-all rev-pc2-egress-cm
  match dscp af12
class-map match-all rev-pc3-egress-cm
  match dscp af13
class-map match-all ftp-bulk-rev-cship-mgmt-egress-cm
  match dscp af21
!
!
policy-map fwd-cship-mgmt-egress-pm
  class fwd-cship-mgmt-egress-cm
    bandwidth 16000
  class ftp-bulk-fwd-cship-mgmt-egress-cm
    bandwidth 10000
  class fwd-pc1-egress-cm
    bandwidth 5000
    police 5100000 conform-action transmit  exceed-action drop
  class fwd-pc2-egress-cm
    bandwidth 3000
    police 3100000 conform-action transmit  exceed-action drop
  class fwd-pc3-egress-cm
    bandwidth 2000
    police 2100000 conform-action transmit  exceed-action drop
policy-map rev-cship-mgmt-egress-pm
  class rev-cship-mgmt-egress-cm
    bandwidth 16000
  class ftp-bulk-rev-cship-mgmt-egress-cm
    bandwidth 10000
  class rev-pc1-egress-cm
    bandwidth 5000
    police 5100000 conform-action transmit  exceed-action drop
  class rev-pc2-egress-cm
    bandwidth 3000
    police 3100000 conform-action transmit  exceed-action drop
  class rev-pc3-egress-cm
    bandwidth 2000
    police 2100000 conform-action transmit  exceed-action drop
```



```
interface Serial1/0
no ip address
shutdown
no fair-queue
serial restart-delay 0
!
interface Serial1/1
no ip address
shutdown
serial restart-delay 0
!
interface Serial1/2
no ip address
shutdown
serial restart-delay 0
!
interface Serial1/3
no ip address
shutdown
serial restart-delay 0
!
interface FastEthernet2/0
no ip address
shutdown
duplex auto
speed auto
!
interface FastEthernet2/1
no ip address
shutdown
duplex auto
speed auto
!
router ospf 1
network 10.0.1.0 0.0.0.3 area 0
network 10.0.1.8 0.0.0.3 area 0
bfd all-interfaces
!
ip forward-protocol nd
no ip http server
no ip http secure-server
!
!
!
access-list 100 permit icmp host 10.0.0.1 any echo
access-list 100 permit tcp host 10.0.0.1 any eq 22
access-list 100 permit tcp host 10.0.0.1 any eq telnet
```

```
access-list 101 permit icmp any host 10.0.0.1 echo-reply
access-list 101 permit tcp any host 10.0.0.1 eq 22
access-list 101 permit tcp any host 10.0.0.1 eq telnet
access-list 102 permit tcp host 10.0.0.1 any eq ftp
access-list 102 permit tcp host 10.0.0.1 any eq ftp-data
access-list 103 permit tcp any host 10.0.0.1 eq ftp
access-list 103 permit tcp any host 10.0.0.1 eq ftp-data
access-list 111 permit ip host 10.0.0.11 any
access-list 112 permit ip any host 10.0.0.11
access-list 122 permit ip host 22.0.0.2 any
access-list 123 permit ip any host 22.0.0.2
access-list 132 permit ip host 22.0.0.3 any
access-list 133 permit ip any host 22.0.0.3
!
!
!
!
!
!
control-plane
!
!
!
!
!
mgcp profile default
!
!
!
!
!
!
line con 0
line aux 0
line vty 0 4
  login
  transport input all
!
scheduler allocate 20000 1000
end
```

CS3#

```
=====
=====
```

```
CS4#sh run
Building configuration...
```

```
Current configuration : 2064 bytes
!
! Last configuration change at 15:03:35 UTC Thu Dec 7 2023
version 15.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname CS4
!
boot-start-marker
boot-end-marker
!
!
!
no aaa new-model
!
no network-clock-participate slot 2
!
dot11 syslog
ip source-route
!
ip cef
!
!
!
!
no ipv6 cef
!
multilink bundle-name authenticated
!
!
!
!
!
voice-card 0
!
!
!
!
!
!
crypto pki token default removal timeout 0
!
```

```
!
!
!
license udi pid CISCO3825 sn FHK1330F3PS
!
redundancy
!
!
!
!
!
!
!
!
!
!
!
!
interface Loopback1
 ip address 100.0.0.1 255.255.255.255
!
interface GigabitEthernet0/0
 ip address 10.0.1.10 255.255.255.252
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/1
 ip address 10.0.1.13 255.255.255.252
 duplex auto
 speed auto
 media-type rj45
!
interface Serial1/0
 no ip address
 shutdown
 no fair-queue
 serial restart-delay 0
!
interface Serial1/1
 no ip address
 shutdown
 serial restart-delay 0
!
interface Serial1/2
 no ip address
 shutdown
 serial restart-delay 0
!
```

```
interface Serial1/3
no ip address
shutdown
serial restart-delay 0
!
interface FastEthernet2/0
ip address 10.0.1.17 255.255.255.252
duplex auto
speed auto
!
interface FastEthernet2/1
ip address 10.0.1.21 255.255.255.252
duplex auto
speed auto
!
router ospf 1
network 10.0.1.8 0.0.0.3 area 0
network 10.0.1.12 0.0.0.3 area 0
default-information originate
bfd all-interfaces
!
router bgp 65011
bgp log-neighbor-changes
timers bgp 1 3
neighbor 10.0.1.18 remote-as 65012
neighbor 10.0.1.22 remote-as 65012
!
address-family ipv4
network 10.0.0.0 mask 255.255.255.0
network 22.0.0.0 mask 255.255.255.0
network 100.0.0.1 mask 255.255.255.255
neighbor 10.0.1.18 activate
neighbor 10.0.1.22 activate
maximum-paths 2
exit-address-family
!
ip forward-protocol nd
no ip http server
no ip http secure-server
!
!
!
!
!
```

```
!
control-plane
!
!
!
!
!
mgcp profile default
!
!
!
!
!
!
line con 0
line aux 0
line vty 0 4
  login
  transport input all
!
scheduler allocate 20000 1000
end
```

CS4#

```
=====
=====
```

```
CS5#sh run
Building configuration...
```

```
Current configuration : 4519 bytes
!
! Last configuration change at 09:08:14 UTC Thu Dec 7 2023
version 15.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname CS5
!
boot-start-marker
boot-end-marker
!
!
!
no aaa new-model
```

```
!
no network-clock-participate slot 2
!
dot11 syslog
ip source-route
!
ip cef
!
!
!
!
!
no ipv6 cef
!
multilink bundle-name authenticated
!
!
!
!
!
!
voice-card 0
!
!
!
!
!
!
crypto pki token default removal timeout 0
!
!
!
!
!
license udi pid CISCO3825 sn FTX1241A39Z
!
redundancy
!
!
!
class-map match-all fwd-pc1-marking-cm
  match access-group 111
class-map match-all fwd-pc2-marking-cm
  match access-group 122
class-map match-all fwd-pc3-marking-cm
  match access-group 132
class-map match-all rev-cship-mgmt-egress-cm
  match dscp af11
class-map match-all rev-pc1-marking-cm
```

```
match access-group 112
class-map match-all rev-pc2-marking-cm
  match access-group 123
class-map match-all rev-pc3-marking-cm
  match access-group 133
class-map match-all fwd-cship-mgmt-egress-cm
  match dscp af11
class-map match-all fwd-cship-marking-cm
  match access-group 100
class-map match-all rev-cship-marking-cm
  match access-group 101
class-map match-all fwd-pc1-egress-cm
  match dscp af31
class-map match-all fwd-pc2-egress-cm
  match dscp af12
class-map match-all fwd-pc3-egress-cm
  match dscp af13
class-map match-all rev-pc1-egress-cm
  match dscp af31
class-map match-all rev-pc2-egress-cm
  match dscp af12
class-map match-all rev-pc3-egress-cm
  match dscp af13
!
!
policy-map fwd-cship-mgmt-egress-pm
  class fwd-cship-mgmt-egress-cm
    bandwidth 16000
  class fwd-pc1-egress-cm
    bandwidth 5000
    police 5100000 conform-action transmit  exceed-action drop
  class fwd-pc2-egress-cm
    bandwidth 3000
    police 3100000 conform-action transmit  exceed-action drop
  class fwd-pc3-egress-cm
    bandwidth 2000
    police 2100000 conform-action transmit  exceed-action drop
policy-map rev-cship-mgmt-egress-pm
  class rev-cship-mgmt-egress-cm
    bandwidth 16000
  class rev-pc1-egress-cm
    bandwidth 5000
    police 5100000 conform-action transmit  exceed-action drop
  class rev-pc2-egress-cm
    bandwidth 3000
    police 3100000 conform-action transmit  exceed-action drop
  class rev-pc3-egress-cm
```



```
shutdown
no fair-queue
clock rate 2000000
!
interface Serial0/2/1
no ip address
shutdown
clock rate 2000000
!
interface Serial0/3/0
no ip address
shutdown
clock rate 2000000
!
interface Serial0/3/1
no ip address
shutdown
clock rate 2000000
!
interface FastEthernet2/0
no ip address
shutdown
duplex auto
speed auto
!
interface FastEthernet2/1
no ip address
shutdown
duplex auto
speed auto
!
router ospf 1
network 10.0.1.4 0.0.0.3 area 0
network 10.0.1.12 0.0.0.3 area 0
bfd all-interfaces
!
ip forward-protocol nd
no ip http server
no ip http secure-server
!
!
!
access-list 100 permit icmp host 10.0.0.1 any echo
access-list 100 permit tcp host 10.0.0.1 any eq 22
access-list 100 permit tcp host 10.0.0.1 any eq telnet
access-list 101 permit icmp any host 10.0.0.1 echo-reply
access-list 101 permit tcp any host 10.0.0.1 eq 22
```

```
access-list 101 permit tcp any host 10.0.0.1 eq telnet
access-list 111 permit ip host 10.0.0.11 any
access-list 112 permit ip any host 10.0.0.11
access-list 122 permit ip host 22.0.0.2 any
access-list 123 permit ip any host 22.0.0.2
access-list 132 permit ip host 22.0.0.3 any
access-list 133 permit ip any host 22.0.0.3
!
!
!
!
!
control-plane
!
!
!
!
!
mgcp profile default
!
!
!
!
!
!
line con 0
line aux 0
line vty 0 4
  login
  transport input all
!
scheduler allocate 20000 1000
end
```

CS5#

```
=====
=====
SD1#sh run
Building configuration...
```

```
Current configuration : 3318 bytes
!
! Last configuration change at 19:01:24 UTC Thu Dec 7 2023
```

```
version 15.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname SD1
!
boot-start-marker
boot-end-marker
!
!
enable password admin
!
no aaa new-model
!
no network-clock-participate slot 1
no network-clock-participate slot 2
!
dot11 syslog
ip source-route
!
ip cef
!
!
!
!
no ipv6 cef
!
multilink bundle-name authenticated
!
!
!
!
!
voice-card 0
!
!
!
!
!
!
crypto pki token default removal timeout 0
!
!
!
```

```
license udi pid CISCO3825 sn FTX1110A0J0
!
redundancy
!
!
!
class-map match-all ship-cm
  match access-group 100
!
!
policy-map ship-pm
  class ship-cm
    bandwidth 16000
policy-map abc
  class ship-cm
!
!
!
!
!
!
!
!
!
!
!
!
interface Loopback1
  ip address 100.0.0.4 255.255.255.255
!
interface GigabitEthernet0/0
  ip address 10.0.1.18 255.255.255.252
  duplex auto
  speed auto
  media-type rj45
!
interface GigabitEthernet0/1
  ip address 10.0.1.26 255.255.255.252
  ip ospf dead-interval 3
  ip ospf hello-interval 1
  duplex auto
  speed auto
  media-type rj45
  service-policy output ship-pm
!
interface Serial0/2/0
  no ip address
  shutdown
  no fair-queue
  clock rate 2000000
```

```
!
interface Serial0/2/1
no ip address
shutdown
clock rate 2000000
!
interface Serial0/3/0
no ip address
shutdown
clock rate 2000000
!
interface Serial0/3/1
no ip address
shutdown
clock rate 2000000
!
interface FastEthernet1/0
ip address 10.0.1.33 255.255.255.252
ip ospf dead-interval 3
ip ospf hello-interval 1
duplex auto
speed auto
service-policy output ship-pm
!
interface FastEthernet2/0
no ip address
shutdown
duplex auto
speed auto
!
router ospf 11
redistribute connected subnets route-map RM_CONNECTED
network 10.0.1.24 0.0.0.3 area 0
network 10.0.1.32 0.0.0.3 area 0
network 100.0.0.4 0.0.0.0 area 0
!
router bgp 65012
bgp log-neighbor-changes
timers bgp 1 3
neighbor 10.0.1.17 remote-as 65011
neighbor 10.0.1.25 remote-as 65012
neighbor 10.0.1.34 remote-as 65012
neighbor 100.0.0.2 remote-as 65012
neighbor 100.0.0.2 update-source Loopback1
neighbor 100.0.0.3 remote-as 65012
neighbor 100.0.0.3 update-source Loopback1
neighbor 100.0.0.5 remote-as 65012
```

```
neighbor 100.0.0.5 update-source Loopback1
neighbor 100.0.0.10 remote-as 65012
neighbor 100.0.0.10 update-source Loopback1
!
address-family ipv4
    neighbor 10.0.1.17 activate
    neighbor 10.0.1.17 default-originate
    neighbor 10.0.1.25 activate
    neighbor 10.0.1.34 activate
    neighbor 100.0.0.2 activate
    neighbor 100.0.0.3 activate
    neighbor 100.0.0.5 activate
    neighbor 100.0.0.10 activate
    maximum-paths ibgp 2
exit-address-family
!
ip forward-protocol nd
no ip http server
no ip http secure-server
!
!
ip route 0.0.0.0 0.0.0.0 Null0
!
!
ip prefix-list CONNECTED_ROUTES seq 5 permit 10.0.1.16/30
access-list 100 permit icmp host 10.0.0.1 any echo
access-list 100 permit icmp host 10.0.0.1 any echo-reply
!
!
!
!
route-map RM_CONNECTED permit 10
    match ip address prefix-list CONNECTED_ROUTES
!
route-map RM_CONNECTED permit 20
!
!
control-plane
!
!
!
!
mgcp profile default
!
!
```

```
!
!
!
line con 0
line aux 0
line vty 0 4
    password admin
    login
    transport input all
    transport output all
line vty 5 15
    password admin
    login
    transport input all
    transport output all
!
scheduler allocate 20000 1000
end
```

SD1#

```
=====
=====
```

```
SD2#sh run
Building configuration...
```

```
Current configuration : 3181 bytes
!
version 15.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname SD2
!
boot-start-marker
boot-end-marker
!
!
enable password admin
!
no aaa new-model
!
no network-clock-participate slot 2
!
```

```
dot11 syslog
ip source-route
!
ip cef
!
!
!
!
no ipv6 cef
!
multilink bundle-name authenticated
!
!
!
!
!
!
voice-card 0
!
!
!
!
!
!
crypto pki token default removal timeout 0
!
!
!
!
!
license udi pid CISCO3825 sn FTX1241A2X4
!
redundancy
!
!
!
class-map match-all ship-cm
  match access-group 100
!
!
policy-map ship-pm
  class ship-cm
    bandwidth 16000
!
!
!
```

```
!
!
!
!
interface Loopback1
 ip address 100.0.0.5 255.255.255.255
!
interface GigabitEthernet0/0
 ip address 10.0.1.22 255.255.255.252
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/1
 no ip address
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
interface Serial1/0
 no ip address
 shutdown
 no fair-queue
 serial restart-delay 0
!
interface Serial1/1
 no ip address
 shutdown
 serial restart-delay 0
!
interface Serial1/2
 no ip address
 shutdown
 serial restart-delay 0
!
interface Serial1/3
 no ip address
 shutdown
 serial restart-delay 0
!
interface FastEthernet2/0
 ip address 10.0.1.54 255.255.255.252
 ip ospf dead-interval 3
 ip ospf hello-interval 1
 duplex auto
 speed auto
```

```
service-policy output ship-pm
!
interface FastEthernet2/1
  ip address 10.0.1.30 255.255.255.252
  ip ospf dead-interval 3
  ip ospf hello-interval 1
  duplex auto
  speed auto
  service-policy output ship-pm
!
router ospf 11
  redistribute connected subnets route-map RM_CONNECTED
  network 10.0.1.28 0.0.0.3 area 0
  network 10.0.1.52 0.0.0.3 area 0
  network 100.0.0.5 0.0.0.0 area 0
!
router ospf 1
!
router bgp 65012
  bgp log-neighbor-changes
  timers bgp 1 3
  neighbor 10.0.1.21 remote-as 65011
  neighbor 10.0.1.29 remote-as 65012
  neighbor 10.0.1.53 remote-as 65012
  neighbor 100.0.0.2 remote-as 65012
  neighbor 100.0.0.2 update-source Loopback1
  neighbor 100.0.0.3 remote-as 65012
  neighbor 100.0.0.3 update-source Loopback1
  neighbor 100.0.0.4 remote-as 65012
  neighbor 100.0.0.4 update-source Loopback1
  neighbor 100.0.0.10 remote-as 65012
  neighbor 100.0.0.10 update-source Loopback1
!
address-family ipv4
  neighbor 10.0.1.21 activate
  neighbor 10.0.1.21 default-originate
  neighbor 10.0.1.29 activate
  neighbor 10.0.1.53 activate
  neighbor 100.0.0.2 activate
  neighbor 100.0.0.3 activate
  neighbor 100.0.0.4 activate
  neighbor 100.0.0.10 activate
  maximum-paths ibgp 2
exit-address-family
!
ip forward-protocol nd
no ip http server
```

```
no ip http secure-server
!
!
ip route 0.0.0.0 0.0.0.0 Null0
!
!
ip prefix-list CONNECTED_ROUTES seq 5 permit 10.0.1.20/30
access-list 100 permit icmp host 10.0.0.1 any echo
access-list 100 permit icmp host 10.0.0.1 any echo-reply
!
!
!
!
route-map RM_CONNECTED permit 10
  match ip address prefix-list CONNECTED_ROUTES
!
!
!
control-plane
!
!
!
!
!
mgcp profile default
!
!
!
!
!
!
line con 0
line aux 0
line vty 0 4
  password admin
  login
  transport input all
  transport output all
line vty 5 15
  password admin
  login
  transport input all
  transport output all
!
scheduler allocate 20000 1000
end
```

SD2#

```
=====
=====

SD3#sh run
Building configuration...

Current configuration : 2678 bytes
!
! Last configuration change at 15:59:31 UTC Thu Dec 7 2023
version 15.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname SD3
!
boot-start-marker
boot-end-marker
!
!
enable password admin
!
no aaa new-model
!
no network-clock-participate slot 1
no network-clock-participate slot 2
!
dot11 syslog
ip source-route
!
ip cef
!
!
!
!
no ipv6 cef
!
multilink bundle-name authenticated
!
!
!
!
!
voice-card 0
!
```

```
!
!
!
!
!
crypto pki token default removal timeout 0
!
!
!
!
license udi pid CISCO3825 sn FTX1241A37V
!
redundancy
!
!
!
class-map match-all ship-cm
  match access-group 100
!
!
policy-map ship-pm
  class ship-cm
    bandwidth 16000
!
!
!
!
!
!
!
!
!
!
!
!
!
!
interface Loopback1
  ip address 100.0.0.11 255.255.255.255
!
interface GigabitEthernet0/0
  no ip address
  shutdown
  duplex auto
  speed auto
  media-type rj45
!
interface GigabitEthernet0/1
  no ip address
  shutdown
  duplex auto
```

```
speed auto
media-type rj45
!
interface Serial0/2/0
no ip address
shutdown
no fair-queue
clock rate 2000000
!
interface Serial0/2/1
no ip address
shutdown
clock rate 2000000
!
interface Serial0/3/0
no ip address
shutdown
clock rate 2000000
!
interface Serial0/3/1
no ip address
shutdown
clock rate 2000000
!
interface FastEthernet1/0
ip address 10.0.1.34 255.255.255.252
ip ospf dead-interval 3
ip ospf hello-interval 1
duplex auto
speed auto
!
interface FastEthernet2/0
ip address 10.0.1.37 255.255.255.252
ip ospf dead-interval 3
ip ospf hello-interval 1
duplex auto
speed auto
service-policy output ship-pm
!
router ospf 11
network 10.0.1.32 0.0.0.3 area 0
network 10.0.1.36 0.0.0.3 area 0
network 100.0.0.11 0.0.0.0 area 0
!
router ospf 1
!
router bgp 65012
```

```
no bgp fast-external-fallover
bgp log-neighbor-changes
timers bgp 1 3
neighbor 10.0.1.33 remote-as 65012
neighbor 10.0.1.38 remote-as 65012
neighbor 100.0.0.10 remote-as 65012
neighbor 100.0.0.10 update-source Loopback1
!
address-family ipv4
    neighbor 10.0.1.33 activate
    neighbor 10.0.1.33 route-reflector-client
    neighbor 10.0.1.38 activate
    neighbor 10.0.1.38 route-reflector-client
    neighbor 100.0.0.10 activate
    maximum-paths 2
exit-address-family
!
ip forward-protocol nd
no ip http server
no ip http secure-server
!
!
!
access-list 100 permit icmp host 10.0.0.1 any echo
access-list 100 permit icmp host 10.0.0.1 any echo-reply
!
!
!
!
!
control-plane
!
!
!
!
mgcp profile default
!
!
!
!
!
line con 0
line aux 0
line vty 0 4
    password admin
```

```
login
transport input all
transport output all
line vty 5 15
password admin
login
transport input all
transport output all
!
scheduler allocate 20000 1000
end
```

SD3#

```
=====
=====
```

```
SD4#sh run
Building configuration...
```

```
Current configuration : 4009 bytes
!
! Last configuration change at 16:06:24 UTC Thu Dec 7 2023
version 15.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname SD4
!
boot-start-marker
boot-end-marker
!
!
enable password admin
!
no aaa new-model
!
no network-clock-participate slot 2
!
dot11 syslog
ip source-route
!
!
```

```
ip cef
!
!
no ipv6 cef
!
multilink bundle-name authenticated
!
!
!
!
voice-card 0
!
!
!
!
!
!
crypto pki token default removal timeout 0
!
!
!
!
!
license udi pid CISCO3825 sn FTX1247A1G5
!
redundancy
!
!
!
class-map match-all ship-cm
  match access-group 100
!
!
policy-map ship-pm
  class ship-cm
    bandwidth 16000
!
!
!
!
!
!
!
!
interface Loopback1
  ip address 100.0.0.10 255.255.255.255
```

```
!
interface GigabitEthernet0/0
 ip address 10.0.1.41 255.255.255.252
 ip ospf dead-interval 3
 ip ospf hello-interval 1
 duplex auto
 speed auto
 media-type rj45
 service-policy output ship-pm
!
interface GigabitEthernet0/1
 ip address 10.0.1.25 255.255.255.252
 ip ospf dead-interval 3
 ip ospf hello-interval 1
 duplex auto
 speed auto
 media-type rj45
!
interface Serial0/2/0
 no ip address
 shutdown
 no fair-queue
 clock rate 2000000
!
interface Serial0/2/1
 no ip address
 shutdown
 clock rate 2000000
!
interface Serial0/3/0
 no ip address
 shutdown
 clock rate 2000000
!
interface Serial0/3/1
 no ip address
 shutdown
 clock rate 2000000
!
interface FastEthernet2/0
 ip address 10.0.1.45 255.255.255.252
 ip ospf dead-interval 3
 ip ospf hello-interval 1
 duplex auto
 speed auto
 service-policy output ship-pm
!
```

```
interface FastEthernet2/1
  ip address 10.0.1.29 255.255.255.252
  ip ospf dead-interval 3
  ip ospf hello-interval 1
  duplex auto
  speed auto
!
router ospf 11
  network 10.0.1.24 0.0.0.3 area 0
  network 10.0.1.28 0.0.0.3 area 0
  network 10.0.1.40 0.0.0.3 area 0
  network 10.0.1.44 0.0.0.3 area 0
  network 100.0.0.10 0.0.0.0 area 0
!
router ospf 1
!
router bgp 65012
  no bgp fast-external-fallover
  bgp log-neighbor-changes
  timers bgp 1 3
  neighbor 10.0.1.26 remote-as 65012
  neighbor 10.0.1.30 remote-as 65012
  neighbor 10.0.1.42 remote-as 65012
  neighbor 10.0.1.46 remote-as 65012
  neighbor 100.0.0.2 remote-as 65012
  neighbor 100.0.0.2 update-source Loopback1
  neighbor 100.0.0.3 remote-as 65012
  neighbor 100.0.0.3 update-source Loopback1
  neighbor 100.0.0.4 remote-as 65012
  neighbor 100.0.0.4 update-source Loopback1
  neighbor 100.0.0.5 remote-as 65012
  neighbor 100.0.0.5 update-source Loopback1
  neighbor 100.0.0.11 remote-as 65012
  neighbor 100.0.0.11 update-source Loopback1
  neighbor 100.0.0.12 remote-as 65012
  neighbor 100.0.0.12 update-source Loopback1
!
address-family ipv4
  network 100.100.100.100 mask 255.255.255.255
  neighbor 10.0.1.26 activate
  neighbor 10.0.1.26 route-reflector-client
  neighbor 10.0.1.26 route-map BLOCK_DEFAULT_BGP_RM in
  neighbor 10.0.1.30 activate
  neighbor 10.0.1.30 route-reflector-client
  neighbor 10.0.1.30 route-map BLOCK_DEFAULT_BGP_RM in
  neighbor 10.0.1.42 activate
  neighbor 10.0.1.42 route-reflector-client
```

```
neighbor 10.0.1.46 activate
neighbor 10.0.1.46 route-reflector-client
neighbor 100.0.0.2 activate
neighbor 100.0.0.3 activate
neighbor 100.0.0.4 activate
neighbor 100.0.0.5 activate
neighbor 100.0.0.11 activate
neighbor 100.0.0.12 activate
maximum-paths 2
maximum-paths ibgp 2
exit-address-family
!
ip forward-protocol nd
!
!
no ip http server
no ip http secure-server
!
!
ip prefix-list BLOCK_DEFAULT_BGP seq 5 permit 0.0.0.0/0
access-list 100 permit icmp host 10.0.0.1 any echo
access-list 100 permit icmp host 10.0.0.1 any echo-reply
!
!
!
!
route-map BLOCK_DEFAULT_BGP_RM deny 10
  match ip address prefix-list BLOCK_DEFAULT_BGP
!
route-map BLOCK_DEFAULT_BGP_RM permit 20
!
!
!
control-plane
!
!
!
!
mgcp profile default
!
!
!
!
!
line con 0
line aux 0
```

```
line vty 0 4
password admin
login
transport input all
transport output all
line vty 5 15
password admin
login
transport input all
transport output all
!
scheduler allocate 20000 1000
end
```

SD4#

```
=====
=====
```

```
SD5#sh run
Building configuration...
```

```
Current configuration : 2646 bytes
!
! Last configuration change at 17:20:21 UTC Thu Dec 7 2023
version 15.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname SD5
!
boot-start-marker
boot-end-marker
!
!
enable password admin
!
no aaa new-model
!
no network-clock-participate slot 1
no network-clock-participate slot 2
!
dot11 syslog
ip source-route
!
```

```
ip cef
!
!
!
!
no ipv6 cef
!
multilink bundle-name authenticated
!
!
!
!
!
voice-card 0
!
!
!
!
!
!
crypto pki token default removal timeout 0
!
!
!
!
!
license udi pid CISCO3825 sn FTX1241A2HT
!
redundancy
!
!
!
class-map match-all ship-cm
  match access-group 100
!
!
policy-map ship-pm
  class ship-cm
    bandwidth 16000
!
!
!
!
!
```

```
!
interface Loopback1
 ip address 100.0.0.12 255.255.255.255
!
interface GigabitEthernet0/0
 no ip address
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/1
 no ip address
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
interface Serial0/2/0
 no ip address
 shutdown
 no fair-queue
 clock rate 2000000
!
interface Serial0/2/1
 no ip address
 shutdown
 clock rate 2000000
!
interface Serial0/3/0
 no ip address
 shutdown
 clock rate 2000000
!
interface Serial0/3/1
 no ip address
 shutdown
 clock rate 2000000
!
interface FastEthernet1/0
 ip address 10.0.1.50 255.255.255.252
 ip ospf dead-interval 3
 ip ospf hello-interval 1
 duplex auto
 speed auto
 service-policy output ship-pm
!
```

```
interface FastEthernet2/0
  ip address 10.0.1.53 255.255.255.252
  ip ospf dead-interval 3
  ip ospf hello-interval 1
  duplex auto
  speed auto
!
router ospf 11
  network 10.0.1.48 0.0.0.3 area 0
  network 10.0.1.52 0.0.0.3 area 0
  network 100.0.0.12 0.0.0.0 area 0
!
router ospf 1
!
router bgp 65012
  no bgp fast-external-fallover
  bgp log-neighbor-changes
  timers bgp 1 3
  neighbor 10.0.1.49 remote-as 65012
  neighbor 10.0.1.54 remote-as 65012
  neighbor 100.0.0.10 remote-as 65012
  neighbor 100.0.0.10 update-source Loopback1
!
address-family ipv4
  neighbor 10.0.1.49 activate
  neighbor 10.0.1.49 route-reflector-client
  neighbor 10.0.1.54 activate
  neighbor 10.0.1.54 route-reflector-client
  neighbor 100.0.0.10 activate
  maximum-paths 2
exit-address-family
!
ip forward-protocol nd
no ip http server
no ip http secure-server
!
!
!
access-list 100 permit icmp host 10.0.0.1 any echo
access-list 100 permit icmp host 10.0.0.1 any echo-reply
!
!
!
!
!
control-plane
```

```
!
!
!
!
mgcp profile default
!
!
!
!
!
line con 0
line aux 0
line vty 0 4
  login
  transport input all
  transport output all
line vty 5 15
  login
  transport input all
  transport output all
!
scheduler allocate 20000 1000
end
```

SD5#

```
=====
=====
```

```
SD6#sh run
Building configuration...
```

```
Current configuration : 4440 bytes
!
! Last configuration change at 16:16:49 UTC Thu Dec 7 2023
version 15.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname SD6
!
boot-start-marker
boot-end-marker
!
```

```
!
enable password admin
!
no aaa new-model
!
no network-clock-participate slot 1
no network-clock-participate slot 2
!
dot11 syslog
ip source-route
!
ip cef
!
!
!
!
no ipv6 cef
!
multilink bundle-name authenticated
!
!
!
!
!
!
voice-card 0
!
!
!
!
!
!
!
crypto pki token default removal timeout 0
!
!
!
!
license udi pid CISCO3825 sn FTX1241A3Y6
!
redundancy
!
!
!
track 11 ip sla 1 reachability
  delay down 5
!
class-map match-all ship-cm
```

```
match access-group 100
!
!
policy-map ship-pm
  class ship-cm
    bandwidth 16000
!
!
!
!
!
!
!
interface Loopback1
  ip address 100.0.0.2 255.255.255.255
!
interface GigabitEthernet0/0
  ip address 10.0.1.42 255.255.255.252
  ip ospf dead-interval 3
  ip ospf hello-interval 1
  duplex auto
  speed auto
  media-type rj45
!
interface GigabitEthernet0/1
  ip address 10.0.1.57 255.255.255.252
  duplex auto
  speed auto
  media-type rj45
  service-policy output ship-pm
!
interface Serial0/2/0
  no ip address
  shutdown
  no fair-queue
  clock rate 2000000
!
interface Serial0/2/1
  no ip address
  shutdown
  clock rate 2000000
!
interface Serial0/3/0
  no ip address
  shutdown
```

```
clock rate 2000000
!
interface Serial0/3/1
no ip address
shutdown
clock rate 2000000
!
interface FastEthernet1/0
ip address 10.0.1.61 255.255.255.252
duplex auto
speed auto
service-policy output ship-pm
!
interface FastEthernet2/0
ip address 10.0.1.38 255.255.255.252
ip ospf dead-interval 3
ip ospf hello-interval 1
duplex auto
speed auto
!
router ospf 11
redistribute connected subnets route-map RM_CONNECTED
network 10.0.1.36 0.0.0.3 area 0
network 10.0.1.40 0.0.0.3 area 0
network 100.0.0.2 0.0.0.0 area 0
!
router ospf 1
!
router bgp 65012
bgp log-neighbor-changes
timers bgp 1 3
neighbor 10.0.1.37 remote-as 65012
neighbor 10.0.1.41 remote-as 65012
neighbor 10.0.1.58 remote-as 65013
neighbor 10.0.1.58 fall-over bfd
neighbor 10.0.1.62 remote-as 65013
neighbor 10.0.1.62 fall-over bfd
neighbor 100.0.0.3 remote-as 65012
neighbor 100.0.0.3 update-source Loopback1
neighbor 100.0.0.4 remote-as 65012
neighbor 100.0.0.4 update-source Loopback1
neighbor 100.0.0.5 remote-as 65012
neighbor 100.0.0.5 update-source Loopback1
neighbor 100.0.0.10 remote-as 65012
neighbor 100.0.0.10 update-source Loopback1
!
address-family ipv4
```

```
network 100.0.0.2 mask 255.255.255.255
neighbor 10.0.1.37 activate
neighbor 10.0.1.41 activate
neighbor 10.0.1.41 route-map CHANGE_NH in
neighbor 10.0.1.58 activate
neighbor 10.0.1.62 activate
neighbor 100.0.0.3 activate
neighbor 100.0.0.4 activate
neighbor 100.0.0.5 activate
neighbor 100.0.0.10 activate
maximum-paths 2
maximum-paths ibgp 2
exit-address-family
!
ip forward-protocol nd
no ip http server
no ip http secure-server
!
!
!
!
ip prefix-list CONNECTED_ROUTES seq 5 permit 10.0.1.56/30
ip prefix-list CONNECTED_ROUTES seq 10 permit 10.0.1.60/30
ip sla 1
  icmp-echo 100.0.0.1 source-ip 100.0.0.2
  frequency 5
ip sla schedule 1 life forever start-time now
access-list 100 permit icmp host 10.0.0.1 any echo
access-list 100 permit icmp host 10.0.0.1 any echo-reply
!
!
!
!
route-map RM_CONNECTED permit 10
  match ip address prefix-list CONNECTED_ROUTES
!
route-map CHANGE_NH permit 10
  match source-protocol bgp 65012
  set ip next-hop 10.0.1.21
!
!
!
control-plane
!
!
```

```
mgcp profile default
!
!
!
!
!
line con 0
line aux 0
line vty 0 4
    password admin
    login
    transport input all
    transport output all
line vty 5 15
    password admin
    login
    transport input all
    transport output all
!
scheduler allocate 20000 1000
event manager applet SHUT_INTERFACE
    event track 11 state down
        action 1.0 cli command "enable"
        action 1.5 cli command "config t"
        action 2.0 cli command "interface GigabitEthernet0/1"
        action 2.1 cli command "shutdown"
        action 2.2 cli command "interface FastEthernet1/0"
        action 2.5 cli command "shutdown"
        action 3.0 cli command "end"
event manager applet UNSHUT_INTERFACE
    event track 11 state up
        action 1.0 cli command "enable"
        action 1.5 cli command "config t"
        action 2.0 cli command "interface GigabitEthernet0/1"
        action 2.1 cli command "no shutdown"
        action 2.2 cli command "interface FastEthernet1/0"
        action 2.5 cli command "no shutdown"
        action 3.0 cli command "end"
!
end
```

SD6#

```
SD7#sh run
Building configuration...

Current configuration : 4310 bytes
!
! Last configuration change at 16:59:58 UTC Thu Dec 7 2023
version 15.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname SD7
!
boot-start-marker
boot-end-marker
!
!
enable password admin
!
no aaa new-model
!
no network-clock-participate slot 1
no network-clock-participate slot 2
!
dot11 syslog
ip source-route
!
ip cef
!
!
!
!
no ipv6 cef
!
multilink bundle-name authenticated
!
!
!
!
voice-card 0
!
!
```

```
!
!
!
crypto pki token default removal timeout 0
!
!
!
license udi pid CISCO3825 sn FTX1241A37J
!
redundancy
!
!
!
track 11 ip sla 1 reachability
  delay down 5
!
class-map match-all ship-cm
  match access-group 100
!
!
policy-map ship-pm
  class ship-cm
    bandwidth 16000
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
interface Loopback1
  ip address 100.0.0.3 255.255.255.255
!
interface GigabitEthernet0/0
  ip address 10.0.1.65 255.255.255.252
  duplex auto
  speed auto
  media-type rj45
  service-policy output ship-pm
!
interface GigabitEthernet0/1
  ip address 10.0.1.69 255.255.255.252
  duplex auto
  speed auto
```

```
media-type rj45
service-policy output ship-pm
!
interface Serial0/2/0
no ip address
shutdown
no fair-queue
clock rate 2000000
!
interface Serial0/2/1
no ip address
shutdown
clock rate 2000000
!
interface Serial0/3/0
no ip address
shutdown
clock rate 2000000
!
interface Serial0/3/1
no ip address
shutdown
clock rate 2000000
!
interface FastEthernet1/0
ip address 10.0.1.49 255.255.255.252
ip ospf dead-interval 3
ip ospf hello-interval 1
duplex auto
speed auto
!
interface FastEthernet2/0
ip address 10.0.1.46 255.255.255.252
ip ospf dead-interval 3
ip ospf hello-interval 1
duplex auto
speed auto
!
router ospf 11
redistribute connected subnets route-map RM_CONNECTED
network 10.0.1.44 0.0.0.3 area 0
network 10.0.1.48 0.0.0.3 area 0
network 100.0.0.3 0.0.0.0 area 0
!
router ospf 1
!
router bgp 65012
```

```
bgp log-neighbor-changes
timers bgp 1 3
neighbor 10.0.1.45 remote-as 65012
neighbor 10.0.1.50 remote-as 65012
neighbor 10.0.1.66 remote-as 65013
neighbor 10.0.1.66 fall-over bfd
neighbor 10.0.1.70 remote-as 65013
neighbor 10.0.1.70 fall-over bfd
neighbor 100.0.0.2 remote-as 65012
neighbor 100.0.0.2 update-source Loopback1
neighbor 100.0.0.4 remote-as 65012
neighbor 100.0.0.4 update-source Loopback1
neighbor 100.0.0.5 remote-as 65012
neighbor 100.0.0.5 update-source Loopback1
neighbor 100.0.0.10 remote-as 65012
neighbor 100.0.0.10 update-source Loopback1
!
address-family ipv4
network 100.0.0.3 mask 255.255.255.255
neighbor 10.0.1.45 activate
neighbor 10.0.1.50 activate
neighbor 10.0.1.66 activate
neighbor 10.0.1.70 activate
neighbor 100.0.0.2 activate
neighbor 100.0.0.4 activate
neighbor 100.0.0.5 activate
neighbor 100.0.0.10 activate
maximum-paths 2
maximum-paths ibgp 2
exit-address-family
!
ip forward-protocol nd
no ip http server
no ip http secure-server
!
!
!
ip prefix-list CONNECTED_ROUTES seq 5 permit 10.0.1.64/30
ip prefix-list CONNECTED_ROUTES seq 10 permit 10.0.1.68/30
ip sla 1
icmp-echo 100.0.0.1 source-ip 100.0.0.3
frequency 5
ip sla schedule 1 life forever start-time now
access-list 100 permit icmp host 10.0.0.1 any echo
access-list 100 permit icmp host 10.0.0.1 any echo-reply
!
```

```
!
!
!
route-map RM_CONNECTED permit 10
  match ip address prefix-list CONNECTED_ROUTES
!
!
!
control-plane
!
!
!
!
!
mgcp profile default
!
!
!
!
!
!
line con 0
line aux 0
line vty 0 4
  password admin
  login
  transport input all
  transport output all
line vty 5 15
  password admin
  login
  transport input all
  transport output all
!
scheduler allocate 20000 1000
event manager applet SHUT_INTERFACE
  event track 11 state down
    action 1.0 cli command "enable"
    action 1.5 cli command "config t"
    action 2.0 cli command "interface GigabitEthernet0/0"
    action 2.1 cli command "shutdown"
    action 2.2 cli command "interface GigabitEthernet0/1"
    action 2.5 cli command "shutdown"
    action 3.0 cli command "end"
event manager applet UNSHUT_INTERFACE
  event track 11 state up
    action 1.0 cli command "enable"
    action 1.5 cli command "config t"
```

```
action 2.0 cli command "interface GigabitEthernet0/0"
action 2.1 cli command "no shutdown"
action 2.2 cli command "interface GigabitEthernet0/1"
action 2.5 cli command "no shutdown"
action 3.0 cli command "end"
!
end
```

SD7#

```
=====
=====
```

```
DSR-SE#sh run
Building configuration...
```

```
Current configuration : 3775 bytes
!
! Last configuration change at 01:15:05 UTC Fri Dec 8 2023
version 15.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname DSR-SE
!
boot-start-marker
boot-end-marker
!
!
enable password admin
!
no aaa new-model
!
no network-clock-participate slot 1
!
dot11 syslog
ip source-route
!
ip cef
!
!
!
no ipv6 cef
!
```

```
multilink bundle-name authenticated
!
!
!
!
!
voice-card 0
!
!
!
!
!
!
!
crypto pki token default removal timeout 0
!
!
!
!
license udi pid CISCO3825 sn FTX1225A44H
!
redundancy
!
!
!
track 1 interface GigabitEthernet0/1 ip routing
!
track 11 ip sla 1 reachability
  delay down 12
!
track 12 ip sla 2 reachability
  delay down 12
!
class-map match-all ship-cm
  match access-group 100
class-map match-all SHAPEDC_CLASS
  match access-group name SHAPEDC
!
!
policy-map SHAPEDC
  class SHAPEDC_CLASS
    bandwidth 100000
!
!
!
```

```
!
!
!
!
interface GigabitEthernet0/0
  ip address 11.0.0.4 255.255.255.0
  glbp 1 ip 11.0.0.254
  glbp 1 timers 1 3
  glbp 1 priority 150
  glbp 1 weighting 110
  glbp 1 authentication md5 key-string k2ps
  glbp 1 weighting track 1 decrement 110
  duplex auto
  speed auto
  media-type rj45
  service-policy output SHAPEDC
!
interface GigabitEthernet0/1
  ip address 10.0.1.70 255.255.255.252
  shutdown
  duplex auto
  speed auto
  media-type rj45
!
interface FastEthernet1/0
  no ip address
  shutdown
  duplex auto
  speed auto
!
interface FastEthernet1/1
  no ip address
  shutdown
  duplex auto
  speed auto
!
interface Serial2/0
  no ip address
  shutdown
  no fair-queue
  serial restart-delay 0
!
interface Serial2/1
  no ip address
  shutdown
  serial restart-delay 0
!
```

```
interface Serial2/2
no ip address
shutdown
serial restart-delay 0
!
interface Serial2/3
no ip address
shutdown
serial restart-delay 0
!
router ospf 1
!
router bgp 65013
bgp log-neighbor-changes
network 11.0.0.0 mask 255.255.255.0
timers bgp 1 3
neighbor 10.0.1.69 remote-as 65012
neighbor 10.0.1.69 fall-over bfd
!
ip forward-protocol nd
no ip http server
no ip http secure-server
!
!
!
ip access-list extended SHAPEDC
permit ip any any
!
ip sla 1
icmp-echo 11.0.0.9 source-interface GigabitEthernet0/0
frequency 5
ip sla schedule 1 life forever start-time now
ip sla 2
icmp-echo 11.0.0.10 source-interface GigabitEthernet0/0
frequency 5
ip sla schedule 2 life forever start-time now
access-list 100 permit icmp host 10.0.0.1 any echo
access-list 100 permit icmp host 10.0.0.1 any echo-reply
!
!
!
!
!
control-plane
!
```

```
!
!
mgcp profile default
!
!
!
!
!
line con 0
line aux 0
line vty 0 4
password admin
login
transport input all
transport output all
line vty 5 15
password admin
login
transport input all
transport output all
!
scheduler allocate 20000 1000
event manager applet SHUT_ISP_INTERFACE
  event track 11 state down
    action 1.0 cli command "enable"
    action 1.5 cli command "config t"
    action 2.0 cli command "interface GigabitEthernet0/1"
    action 2.5 cli command "shutdown"
    action 3.0 cli command "end"
event manager applet SHUT_ISP_INTERFACE1
  event track 12 state down
    action 1.0 cli command "enable"
    action 1.5 cli command "config t"
    action 2.0 cli command "interface GigabitEthernet0/1"
    action 2.5 cli command "shutdown"
    action 3.0 cli command "end"
event manager applet UNSHUT_ISP_INTERFACE
  event track 11 state up
    action 1.0 cli command "enable"
    action 1.5 cli command "config t"
    action 2.0 cli command "interface GigabitEthernet0/1"
    action 2.5 cli command "no shutdown"
    action 3.0 cli command "end"
event manager applet UNSHUT_ISP_INTERFACE1
  event track 12 state up
    action 1.0 cli command "enable"
```

```
action 1.5 cli command "config t"
action 2.0 cli command "interface GigabitEthernet0/1"
action 2.5 cli command "no shutdown"
action 3.0 cli command "end"
!
end
```

DSR-SE#

```
=====
=====
```

```
DSR-SW#sh run
Building configuration...
```

```
Current configuration : 3736 bytes
!
! Last configuration change at 01:28:13 UTC Fri Dec 8 2023
version 15.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname DSR-SW
!
boot-start-marker
boot-end-marker
!
!
enable password admin
!
no aaa new-model
!
no network-clock-participate slot 2
!
dot11 syslog
ip source-route
!
ip cef
!
!
!
no ipv6 cef
!
multilink bundle-name authenticated
```

```
!
!
!
!
!
voice-card 0
!
!
!
!
!
!
!
!
crypto pki token default removal timeout 0
!
!
!
!
!
license udi pid CISCO3825 sn FTX1139A1XB
!
redundancy
!
!
!
track 1 interface GigabitEthernet0/0 ip routing
!
track 11 ip sla 1 reachability
  delay down 12
!
track 12 ip sla 2 reachability
  delay down 12
!
class-map match-all ship-cm
  match access-group 100
class-map match-all SHAPEDC_CLASS
  match access-group name SHAPEDC
!
!
policy-map SHAPEDC
  class SHAPEDC_CLASS
    bandwidth 100000
!
!
!
!
```

```
!
!
!
interface GigabitEthernet0/0
 ip address 10.0.1.66 255.255.255.252
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/1
 ip address 11.0.0.3 255.255.255.0
 glbp 1 ip 11.0.0.254
 glbp 1 timers 1 3
 glbp 1 weighting 110
 glbp 1 authentication md5 key-string k2ps
 glbp 1 weighting track 1 decrement 110
 duplex auto
 speed auto
 media-type rj45
 service-policy output SHAPEDC
!
interface Serial0/2/0
 no ip address
 shutdown
 no fair-queue
 clock rate 2000000
!
interface Serial0/2/1
 no ip address
 shutdown
 clock rate 2000000
!
interface Serial0/3/0
 no ip address
 shutdown
 clock rate 2000000
!
interface Serial0/3/1
 no ip address
 shutdown
 clock rate 2000000
!
interface FastEthernet2/0
 no ip address
 shutdown
 duplex auto
 speed auto
```

```
!
interface FastEthernet2/1
no ip address
shutdown
duplex auto
speed auto
!
router ospf 1
!
router bgp 65013
bgp log-neighbor-changes
network 11.0.0.0 mask 255.255.255.0
timers bgp 1 3
neighbor 10.0.1.65 remote-as 65012
neighbor 10.0.1.65 fall-over bfd
!
ip forward-protocol nd
no ip http server
no ip http secure-server
!
!
!
ip access-list extended SHAPEDC
permit ip any any
!
ip sla 1
icmp-echo 11.0.0.9 source-interface GigabitEthernet0/1
frequency 5
ip sla schedule 1 life forever start-time now
ip sla 2
icmp-echo 11.0.0.10 source-interface GigabitEthernet0/1
frequency 5
ip sla schedule 2 life forever start-time now
access-list 100 permit icmp host 10.0.0.1 any echo
access-list 100 permit icmp host 10.0.0.1 any echo-reply
!
!
!
!
!
control-plane
!
!
!
!
mgcp profile default
```

```
!
!
!
!
!
line con 0
line aux 0
line vty 0 4
    password admin
    login
    transport input all
    transport output all
line vty 5 15
    password admin
    login
    transport input all
    transport output all
!
scheduler allocate 20000 1000
event manager applet SHUT_ISP_INTERFACE
    event track 11 state down
        action 1.0 cli command "enable"
        action 1.5 cli command "config t"
        action 2.0 cli command "interface GigabitEthernet0/0"
        action 2.5 cli command "shutdown"
        action 3.0 cli command "end"
event manager applet SHUT_ISP_INTERFACE1
    event track 12 state down
        action 1.0 cli command "enable"
        action 1.5 cli command "config t"
        action 2.0 cli command "interface GigabitEthernet0/0"
        action 2.5 cli command "shutdown"
        action 3.0 cli command "end"
event manager applet UNSHUT_ISP_INTERFACE
    event track 11 state up
        action 1.0 cli command "enable"
        action 1.5 cli command "config t"
        action 2.0 cli command "interface GigabitEthernet0/0"
        action 2.5 cli command "no shutdown"
        action 3.0 cli command "end"
event manager applet UNSHUT_ISP_INTERFACE1
    event track 12 state up
        action 1.0 cli command "enable"
        action 1.5 cli command "config t"
        action 2.0 cli command "interface GigabitEthernet0/0"
        action 2.5 cli command "no shutdown"
```

```
action 3.0 cli command "end"
!
end

DSR-SW#



=====
=====

DSR-NW#sh run
Building configuration...

Current configuration : 4012 bytes
!
! Last configuration change at 01:01:02 UTC Fri Dec 8 2023
version 15.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname DSR-NW
!
boot-start-marker
boot-end-marker
!
!
enable password admin
!
no aaa new-model
!
no network-clock-participate slot 2
!
dot11 syslog
ip source-route
!
ip cef
!
!
!
!
no ipv6 cef
!
multilink bundle-name authenticated
!
!
```

```
!
!
voice-card 0
!
!
!
!
!
!
!
!
crypto pki token default removal timeout 0
!
!
!
!
license udi pid CISCO3825 sn FHK1240F3PP
!
redundancy
!
!
!
track 1 interface GigabitEthernet0/1 ip routing
!
track 11 ip sla 1 reachability
  delay down 12
!
track 12 ip sla 2 reachability
  delay down 12
!
class-map match-all ship-cm
  match access-group 100
class-map match-all SHAPEDC_CLASS
  match access-group name SHAPEDC
!
!
policy-map SHAPEDC
  class SHAPEDC_CLASS
    bandwidth 100000
!
!
!
!
!
!
```

```
interface GigabitEthernet0/0
  ip address 11.0.0.1 255.255.255.0
  glbp 1 ip 11.0.0.254
  glbp 1 timers 1 3
  glbp 1 weighting 110
  glbp 1 authentication md5 key-string k2ps
  glbp 1 weighting track 1 decrement 110
  duplex auto
  speed auto
  media-type rj45
  service-policy output SHAPEDC
!
interface GigabitEthernet0/1
  ip address 10.0.1.58 255.255.255.252
  duplex auto
  speed auto
  media-type rj45
!
interface Serial0/0/0
  no ip address
  shutdown
  no fair-queue
  clock rate 2000000
!
interface Serial0/0/1
  no ip address
  shutdown
  clock rate 2000000
!
interface Serial0/1/0
  no ip address
  shutdown
  clock rate 2000000
!
interface Serial0/1/1
  no ip address
  shutdown
  clock rate 2000000
!
interface Serial0/2/0
  no ip address
  shutdown
  clock rate 2000000
!
interface Serial0/2/1
  no ip address
  shutdown
```

```
clock rate 2000000
!
interface Serial0/3/0
no ip address
shutdown
clock rate 2000000
!
interface Serial0/3/1
no ip address
shutdown
clock rate 2000000
!
interface FastEthernet2/0
no ip address
shutdown
duplex auto
speed auto
!
interface FastEthernet2/1
no ip address
shutdown
duplex auto
speed auto
!
router ospf 1
!
router bgp 65013
bgp log-neighbor-changes
network 11.0.0.0 mask 255.255.255.0
timers bgp 1 3
neighbor 10.0.1.57 remote-as 65012
neighbor 10.0.1.57 fall-over bfd
!
ip forward-protocol nd
no ip http server
no ip http secure-server
!
!
!
ip access-list extended SHAPEDC
permit ip any any
!
ip sla 1
icmp-echo 11.0.0.9 source-interface GigabitEthernet0/0
frequency 5
ip sla schedule 1 life forever start-time now
ip sla 2
```

```
    icmp-echo 11.0.0.10 source-interface GigabitEthernet0/0
        frequency 5
    ip sla schedule 2 life forever start-time now
    access-list 100 permit icmp host 10.0.0.1 any echo
    access-list 100 permit icmp host 10.0.0.1 any echo-reply
!
!
!
!
!
control-plane
!
!
!
!
!
mgcp profile default
!
!
!
!
!
!
line con 0
line aux 0
line vty 0 4
    password admin
    login
    transport input all
    transport output all
line vty 5 15
    password admin
    login
    transport input all
    transport output all
!
scheduler allocate 20000 1000
event manager applet SHUT_ISP_INTERFACE
    event track 11 state down
        action 1.0 cli command "enable"
        action 1.5 cli command "config t"
        action 2.0 cli command "interface GigabitEthernet0/1"
        action 2.5 cli command "shutdown"
        action 3.0 cli command "end"
event manager applet SHUT_ISP_INTERFACE1
    event track 12 state down
        action 1.0 cli command "enable"
```

```
action 1.5 cli command "config t"
action 2.0 cli command "interface GigabitEthernet0/1"
action 2.5 cli command "shutdown"
action 3.0 cli command "end"
event manager applet UNSHUT_ISP_INTERFACE
  event track 11 state up
    action 1.0 cli command "enable"
    action 1.5 cli command "config t"
    action 2.0 cli command "interface GigabitEthernet0/1"
    action 2.5 cli command "no shutdown"
    action 3.0 cli command "end"
event manager applet UNSHUT_ISP_INTERFACE1
  event track 12 state up
    action 1.0 cli command "enable"
    action 1.5 cli command "config t"
    action 2.0 cli command "interface GigabitEthernet0/1"
    action 2.5 cli command "no shutdown"
    action 3.0 cli command "end"
!
end
```

DSR-NW#

```
=====
=====
```

DSR-NE#sh run
Building configuration...

```
Current configuration : 4251 bytes
!
! Last configuration change at 02:20:08 UTC Fri Dec 8 2023
version 15.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname DSR-NE
!
boot-start-marker
boot-end-marker
!
!
enable password admin
!
```

```
no aaa new-model
!
no network-clock-participate slot 1
no network-clock-participate slot 2
!
dot11 syslog
ip source-route
!
ip cef
!
!
!
!
ip host cs5 2002 172.16.0.1
ip host cs4 2003 172.16.0.1
ip host cs3 2004 172.16.0.1
ip host cs2 2005 172.16.0.1
ip host cs1 2006 172.16.0.1
ip host mgmt 2007 172.16.0.1
ip host sd1 2010 172.16.0.1
ip host sd2 2011 172.16.0.1
ip host sd3 2012 172.16.0.1
ip host sd4 2013 172.16.0.1
ip host sd5 2014 172.16.0.1
ip host sd6 2015 172.16.0.1
ip host sd7 2016 172.16.0.1
ip host DsrSw 2008 172.16.0.1
ip host DsrNe 2009 172.16.0.1
ip host DsrNw 2007 172.16.0.1
ip host DsrSe 2017 172.16.0.1
no ipv6 cef
!
multilink bundle-name authenticated
!
!
!
!
!
voice-card 0
!
!
!
!
!
!
crypto pki token default removal timeout 0
```

```
!
!
!
license udi pid CISCO3825 sn FCZ1251723U
!
redundancy
!
!
!
track 1 interface FastEthernet1/0 ip routing
!
track 11 ip sla 1 reachability
  delay down 12
!
track 12 ip sla 2 reachability
  delay down 12
!
class-map match-all ship-cm
  match access-group 100
class-map match-all SHAPEDC_CLASS
  match access-group name SHAPEDC
!
!
policy-map SHAPEDC
  class SHAPEDC_CLASS
    bandwidth 100000
!
!
!
!
!
!
!
!
!
!
!
!
interface GigabitEthernet0/0
  no ip address
  shutdown
  duplex auto
  speed auto
  media-type rj45
!
interface GigabitEthernet0/1
  ip address 11.0.0.2 255.255.255.0
  glbp 1 ip 11.0.0.254
  glbp 1 timers 1 3
```

```
glbp 1 weighting 110
glbp 1 authentication md5 key-string k2ps
glbp 1 weighting track 1 decrement 110
duplex auto
speed auto
media-type rj45
service-policy output SHAPEDC
!
interface Serial0/2/0
no ip address
shutdown
no fair-queue
clock rate 2000000
!
interface Serial0/2/1
no ip address
shutdown
clock rate 2000000
!
interface Serial0/3/0
no ip address
shutdown
clock rate 2000000
!
interface Serial0/3/1
no ip address
shutdown
clock rate 2000000
!
interface FastEthernet1/0
ip address 10.0.1.62 255.255.255.252
duplex auto
speed auto
!
interface FastEthernet2/0
no ip address
shutdown
duplex auto
speed auto
!
router ospf 1
!
router bgp 65013
bgp log-neighbor-changes
network 11.0.0.0 mask 255.255.255.0
timers bgp 1 3
neighbor 10.0.1.61 remote-as 65012
```

```
neighbor 10.0.1.61 fall-over bfd
!
ip forward-protocol nd
no ip http server
no ip http secure-server
!
!
!
ip access-list extended SHAPEDC
 permit ip any any
!
ip sla 1
 icmp-echo 11.0.0.9 source-interface GigabitEthernet0/1
 timeout 6000
 frequency 6
ip sla schedule 1 life forever start-time now
ip sla 2
 icmp-echo 11.0.0.10 source-interface GigabitEthernet0/1
 timeout 6000
 frequency 6
ip sla schedule 2 life forever start-time now
access-list 100 permit icmp host 10.0.0.1 any echo
access-list 100 permit icmp host 10.0.0.1 any echo-reply
!
!
!
!
!
control-plane
!
!
!
!
mgcp profile default
!
!
!
!
!
!
line con 0
line aux 0
line vty 0 4
 password admin
 login
 transport input all
```

```

transport output all
line vty 5 15
password admin
login
transport input all
transport output all
!
scheduler allocate 20000 1000
event manager applet SHUT_ISP_INTERFACE
  event track 11 state down
    action 1.0 cli command "enable"
    action 1.5 cli command "config t"
    action 2.0 cli command "interface fa1/0"
    action 2.5 cli command "shutdown"
    action 3.0 cli command "end"
event manager applet SHUT_ISP_INTERFACE1
  event track 12 state down
    action 1.0 cli command "enable"
    action 1.5 cli command "config t"
    action 2.0 cli command "interface fa1/0"
    action 2.5 cli command "shutdown"
    action 3.0 cli command "end"
event manager applet UNSHUT_ISP_INTERFACE
  event track 11 state up
    action 1.0 cli command "enable"
    action 1.5 cli command "config t"
    action 2.0 cli command "interface FastEthernet1/0"
    action 2.5 cli command "no shutdown"
    action 3.0 cli command "end"
event manager applet UNSHUT_ISP_INTERFACE1
  event track 12 state up
    action 1.0 cli command "enable"
    action 1.5 cli command "config t"
    action 2.0 cli command "interface FastEthernet1/0"
    action 2.5 cli command "no shutdown"
    action 3.0 cli command "end"
!
end

```

DSR-NE#

```

SW-NW1#sh run
! Command: show running-config
! device: SW-NW1 (DCS-7050QX-32S, EOS-4.19.5M)

```

```
!
! boot system flash:/EOS-4.19.5M.swi
!
hardware port-group 1 select Et1-4
!
alias srnz show interface counter rate | nz
!
switchport default mode routed
!
load-interval default 5
!
transceiver qsfp default-mode 4x10G
!
logging console debugging
!
hostname SW-NW1
!
radius-server timeout 1
radius-server retransmit 0
radius-server host 12.12.12.99 key 7 09584B081457
!
spanning-tree mode rstp
no spanning-tree vlan 4094
spanning-tree hello-time 1000
spanning-tree max-age 6
spanning-tree forward-time 4
!
aaa authentication login default group radius local
!
no aaa root
!
username admin privilege 15 role network-admin secret sha512
$6$8MxzF.LVCoCzVDU7$J8vAp9PdWmJmLBkLg1qokfBOhssdo3I3dSU0zHx1wVUqnqkQvyeZWJ
VPDBjZYyViwu5xV3SYYg.vCbrZ4S9wd1
!
vlan 4094
    trunk group MLAG-Peer
!
interface Port-Channel40
    switchport mode trunk
    switchport
    mlag 2
!
interface Port-Channel45
    switchport mode trunk
    switchport
    mlag 1
```

```
!
interface Port-Channel1000
    switchport mode trunk
    switchport trunk group MLAG-Peer
    switchport
!
interface Ethernet1
    description DSR-NW
    speed forced 1000full
    switchport mode trunk
    switchport
    shape rate 100000
!
interface Ethernet2
    description veritcal
    speed forced 10000full
    switchport mode trunk
    switchport
    lacp rate fast
!
interface Ethernet3
    speed forced 1000full
    switchport
!
interface Ethernet4
    speed forced 10000full
    switchport
    channel-group 1000 mode active
!
interface Ethernet5/1
    no switchport
!
interface Ethernet5/2
    no switchport
!
interface Ethernet5/3
    no switchport
!
interface Ethernet5/4
    no switchport
!
interface Ethernet6/1
    no switchport
!
interface Ethernet6/2
    no switchport
!
```

```
interface Ethernet6/3
    no switchport
!
interface Ethernet6/4
    no switchport
!
interface Ethernet7/1
    no switchport
!
interface Ethernet7/2
    no switchport
!
interface Ethernet7/3
    no switchport
!
interface Ethernet7/4
    no switchport
!
interface Ethernet8/1
    no switchport
!
interface Ethernet8/2
    no switchport
!
interface Ethernet8/3
    no switchport
!
interface Ethernet8/4
    no switchport
!
interface Ethernet9/1
    no switchport
!
interface Ethernet9/2
    no switchport
!
interface Ethernet9/3
    no switchport
!
interface Ethernet9/4
    no switchport
!
interface Ethernet10/1
    speed forced 10000full
    switchport
    channel-group 40 mode active
    lacp rate fast
```

```
!
interface Ethernet10/2
    no switchport
    channel-group 40 mode active
    lacp rate fast
!
interface Ethernet10/3
    no switchport
    channel-group 40 mode active
    lacp rate fast
!
interface Ethernet10/4
    no switchport
    channel-group 40 mode active
    lacp rate fast
!
interface Ethernet11/1
    no switchport
    lacp rate fast
!
interface Ethernet11/2
    no switchport
    lacp rate fast
!
interface Ethernet11/3
    no switchport
    lacp rate fast
!
interface Ethernet11/4
    no switchport
    lacp rate fast
!
interface Ethernet12/1
    no switchport
!
interface Ethernet12/2
    no switchport
!
interface Ethernet12/3
    no switchport
!
interface Ethernet12/4
    no switchport
!
interface Ethernet13/1
    no switchport
!
```

```
interface Ethernet13/2
    no switchport
!
interface Ethernet13/3
    no switchport
!
interface Ethernet13/4
    no switchport
!
interface Ethernet14/1
    no switchport
!
interface Ethernet14/2
    no switchport
!
interface Ethernet14/3
    no switchport
!
interface Ethernet14/4
    no switchport
!
interface Ethernet15/1
    no switchport
!
interface Ethernet15/2
    no switchport
!
interface Ethernet15/3
    no switchport
!
interface Ethernet15/4
    no switchport
!
interface Ethernet16/1
    no switchport
!
interface Ethernet16/2
    no switchport
!
interface Ethernet16/3
    no switchport
!
interface Ethernet16/4
    no switchport
!
interface Ethernet17/1
    no switchport
```

```
!
interface Ethernet17/2
    no switchport
!
interface Ethernet17/3
    no switchport
!
interface Ethernet17/4
    no switchport
!
interface Ethernet18/1
    switchport
    channel-group 45 mode active
    lacp rate fast
!
interface Ethernet18/2
    no switchport
!
interface Ethernet18/3
    no switchport
!
interface Ethernet18/4
    no switchport
!
interface Ethernet19/1
    no switchport
    lacp rate fast
!
interface Ethernet19/2
    no switchport
    lacp rate fast
!
interface Ethernet19/3
    no switchport
    lacp rate fast
!
interface Ethernet19/4
    no switchport
    lacp rate fast
!
interface Ethernet20/1
    no switchport
!
interface Ethernet20/2
    no switchport
!
interface Ethernet20/3
```

```
    no switchport
!
interface Ethernet20/4
    no switchport
!
interface Ethernet21/1
    no switchport
!
interface Ethernet21/2
    no switchport
!
interface Ethernet21/3
    no switchport
!
interface Ethernet21/4
    no switchport
!
interface Ethernet22/1
    no switchport
!
interface Ethernet22/2
    no switchport
!
interface Ethernet22/3
    no switchport
!
interface Ethernet22/4
    no switchport
!
interface Ethernet23/1
    no switchport
!
interface Ethernet23/2
    no switchport
!
interface Ethernet23/3
    no switchport
!
interface Ethernet23/4
    no switchport
!
interface Ethernet24/1
    no switchport
!
interface Ethernet24/2
    no switchport
!
```

```
interface Ethernet24/3
    no switchport
!
interface Ethernet24/4
    no switchport
!
interface Ethernet25/1
    no switchport
!
interface Ethernet25/2
    no switchport
!
interface Ethernet25/3
    no switchport
!
interface Ethernet25/4
    no switchport
!
interface Ethernet26/1
    no switchport
!
interface Ethernet26/2
    no switchport
!
interface Ethernet26/3
    no switchport
!
interface Ethernet26/4
    no switchport
!
interface Ethernet27/1
    no switchport
!
interface Ethernet27/2
    no switchport
!
interface Ethernet27/3
    no switchport
!
interface Ethernet27/4
    no switchport
!
interface Ethernet28/1
    no switchport
!
interface Ethernet28/2
    no switchport
```

```
!
interface Ethernet28/3
    no switchport
!
interface Ethernet28/4
    no switchport
!
interface Ethernet29
    no switchport
!
interface Ethernet30
    no switchport
!
interface Ethernet31
    no switchport
!
interface Ethernet32
    no switchport
!
interface Ethernet33
    no switchport
!
interface Ethernet34
    no switchport
!
interface Ethernet35
    no switchport
!
interface Ethernet36
    no switchport
!
interface Management1
    ip address 12.12.12.100/24
!
interface Vlan1
    ip address 11.0.0.125/24
!
interface Vlan4094
    no autostate
    ip address 1.1.1.1/30
!
no ip routing
!
mlag configuration
    domain-id test1
    heartbeat-interval 1000
    local-interface Vlan4094
```

```
    peer-address 1.1.1.2
    peer-link Port-Channel1000
!
end
SW-NW1#
```

```
=====
=====
SW1-NE1#sh run
! Command: show running-config
! device: SW1-NE1 (DCS-7050QX-32S, EOS-4.19.5M)
!
! boot system flash:/EOS-4.19.5M.swi
!
hardware port-group 1 select Et1-4
!
alias srnz show interface counter rate | nz
!
switchport default mode routed
!
load-interval default 5
!
transceiver qsfp default-mode 4x10G
!
logging console debugging
!
hostname SW1-NE1
!
radius-server timeout 1
radius-server retransmit 0
radius-server host 12.12.12.99 key 7 071B244D435B
!
spanning-tree mode rstp
no spanning-tree vlan 4094
spanning-tree hello-time 1000
spanning-tree max-age 6
spanning-tree forward-time 4
!
aaa authentication login default group radius local
!
no aaa root
!
username admin privilege 15 role network-admin secret sha512
$6$7IZZXJQQSmkZjPIj$BxaVndGI1YRTFoScw9BoogI9CvQTq917Q4PodgHHnIVrsbaOIfh/rX
AXKZ0dtFONudZE.qzsFn0J.qYCuMODd.
!
```

```
vlan 4094
    trunk group MLAG-Peer
!
interface Port-Channel40
    switchport mode trunk
    switchport
    mlag 2
!
interface Port-Channel45
    switchport mode trunk
    switchport
    mlag 1
!
interface Port-Channel1000
    switchport mode trunk
    switchport trunk group MLAG-Peer
    switchport
!
interface Ethernet1
    speed forced 10000full
    switchport mode trunk
    switchport
    lacp rate fast
!
interface Ethernet2
    description DSR-NE
    speed forced 1000full
    switchport mode trunk
    switchport
    shape rate 100000
!
interface Ethernet3
    speed forced 10000full
    switchport
    channel-group 1000 mode active
!
interface Ethernet4
    speed forced 10000full
    switchport
!
interface Ethernet5/1
    no switchport
!
interface Ethernet5/2
    no switchport
!
interface Ethernet5/3
```

```
    no switchport
!
interface Ethernet5/4
    no switchport
!
interface Ethernet6/1
    no switchport
!
interface Ethernet6/2
    no switchport
!
interface Ethernet6/3
    no switchport
!
interface Ethernet6/4
    no switchport
!
interface Ethernet7/1
    no switchport
!
interface Ethernet7/2
    no switchport
!
interface Ethernet7/3
    no switchport
!
interface Ethernet7/4
    no switchport
!
interface Ethernet8/1
    no switchport
!
interface Ethernet8/2
    no switchport
!
interface Ethernet8/3
    no switchport
!
interface Ethernet8/4
    no switchport
!
interface Ethernet9/1
    no switchport
!
interface Ethernet9/2
    no switchport
!
```

```
interface Ethernet9/3
    no switchport
!
interface Ethernet9/4
    no switchport
!
interface Ethernet10/1
    no switchport
!
interface Ethernet10/2
    no switchport
!
interface Ethernet10/3
    no switchport
!
interface Ethernet10/4
    no switchport
!
interface Ethernet11/1
    no switchport
!
interface Ethernet11/2
    no switchport
!
interface Ethernet11/3
    no switchport
!
interface Ethernet11/4
    no switchport
!
interface Ethernet12/1
    no switchport
!
interface Ethernet12/2
    no switchport
!
interface Ethernet12/3
    no switchport
!
interface Ethernet12/4
    no switchport
!
interface Ethernet13/1
    no switchport
!
interface Ethernet13/2
    no switchport
```

```
!
interface Ethernet13/3
    no switchport
!
interface Ethernet13/4
    no switchport
!
interface Ethernet14/1
    no switchport
!
interface Ethernet14/2
    no switchport
!
interface Ethernet14/3
    no switchport
!
interface Ethernet14/4
    no switchport
!
interface Ethernet15/1
    no switchport
!
interface Ethernet15/2
    no switchport
!
interface Ethernet15/3
    no switchport
!
interface Ethernet15/4
    no switchport
!
interface Ethernet16/1
    no switchport
    lacp rate fast
!
interface Ethernet16/2
    no switchport
    lacp rate fast
!
interface Ethernet16/3
    no switchport
    lacp rate fast
!
interface Ethernet16/4
    no switchport
    lacp rate fast
!
```

```
interface Ethernet17/1
    speed forced 10000full
    switchport
        channel-group 45 mode active
        lacp rate fast
!
interface Ethernet17/2
    switchport
        channel-group 45 mode active
        lacp rate fast
!
interface Ethernet17/3
    switchport
        channel-group 45 mode active
        lacp rate fast
!
interface Ethernet17/4
    switchport
        channel-group 45 mode active
        lacp rate fast
!
interface Ethernet18/1
    speed forced 10000full
    switchport
        channel-group 40 mode active
        lacp rate fast
!
interface Ethernet18/2
    switchport
        channel-group 40 mode active
        lacp rate fast
!
interface Ethernet18/3
    switchport
        channel-group 40 mode active
        lacp rate fast
!
interface Ethernet18/4
    switchport
        channel-group 40 mode active
        lacp rate fast
!
interface Ethernet19/1
    no switchport
    lacp rate fast
!
interface Ethernet19/2
```

```
    no switchport
    lacp rate fast
!
interface Ethernet19/3
    no switchport
    lacp rate fast
!
interface Ethernet19/4
    no switchport
    lacp rate fast
!
interface Ethernet20/1
    no switchport
!
interface Ethernet20/2
    no switchport
!
interface Ethernet20/3
    no switchport
!
interface Ethernet20/4
    no switchport
!
interface Ethernet21/1
    no switchport
!
interface Ethernet21/2
    no switchport
!
interface Ethernet21/3
    no switchport
!
interface Ethernet21/4
    no switchport
!
interface Ethernet22/1
    no switchport
!
interface Ethernet22/2
    no switchport
!
interface Ethernet22/3
    no switchport
!
interface Ethernet22/4
    no switchport
!
```

```
interface Ethernet23/1
    no switchport
!
interface Ethernet23/2
    no switchport
!
interface Ethernet23/3
    no switchport
!
interface Ethernet23/4
    no switchport
!
interface Ethernet24/1
    no switchport
!
interface Ethernet24/2
    no switchport
!
interface Ethernet24/3
    no switchport
!
interface Ethernet24/4
    no switchport
!
interface Ethernet25/1
    no switchport
!
interface Ethernet25/2
    no switchport
!
interface Ethernet25/3
    no switchport
!
interface Ethernet25/4
    no switchport
!
interface Ethernet26/1
    no switchport
!
interface Ethernet26/2
    no switchport
!
interface Ethernet26/3
    no switchport
!
interface Ethernet26/4
    no switchport
```

```
!
interface Ethernet27/1
    no switchport
!
interface Ethernet27/2
    no switchport
!
interface Ethernet27/3
    no switchport
!
interface Ethernet27/4
    no switchport
!
interface Ethernet28/1
    no switchport
!
interface Ethernet28/2
    no switchport
!
interface Ethernet28/3
    no switchport
!
interface Ethernet28/4
    no switchport
!
interface Ethernet29
    no switchport
!
interface Ethernet30
    no switchport
!
interface Ethernet31
    no switchport
!
interface Ethernet32
    no switchport
!
interface Ethernet33
    no switchport
!
interface Ethernet34
    no switchport
!
interface Ethernet35
    no switchport
!
interface Ethernet36
```

```
    no switchport
!
interface Management1
    ip address 12.12.12.101/24
!
interface Vlan4094
    no autostate
    ip address 1.1.1.2/30
!
no ip routing
!
mlag configuration
    domain-id test1
    heartbeat-interval 1000
    local-interface Vlan4094
    peer-address 1.1.1.1
    peer-link Port-Channel1000
!
end
SW1-NE1#
```

```
=====
=====

SW-SW1#sh run
! Command: show running-config
! device: SW-SW1 (DCS-7050QX-32S, EOS-4.19.5M)
!
! boot system flash:/EOS-4.19.5M.swi
!
hardware port-group 1 select Et1-4
!
alias srnz show interface counter rate | nz
!
switchport default mode routed
!
load-interval default 5
!
transceiver qsfp default-mode 4x10G
!
logging console debugging
!
hostname SW-SW1
!
radius-server timeout 1
radius-server retransmit 0
radius-server host 12.12.12.99 key 7 09584B081457
```

```
!
spanning-tree mode rstp
no spanning-tree vlan 4094
spanning-tree hello-time 1000
spanning-tree max-age 6
spanning-tree forward-time 4
!
aaa authentication login default group radius local
!
no aaa root
!
username admin privilege 15 role network-admin secret sha512
$6$v.eau6JD/1ubanac$yfM97WH58eAqZFqtVG1QyVaLRxw1ZMS9gZR4bxv/1Z0rHmzXJDxA91
j2Hww.5KjeLDsdxbptNZjsd9C4pRQpc0
!
vlan 4094
    trunk group MLAG-Peer
!
interface Port-Channel140
    switchport mode trunk
    switchport
    mlag 1
!
interface Port-Channel145
    switchport mode trunk
    switchport
    mlag 3
!
interface Port-Channel1000
    switchport mode trunk
    switchport trunk group MLAG-Peer
    switchport
!
interface Ethernet1
    description DSR-SW
    speed forced 1000full
    switchport mode trunk
    switchport
    shape rate 100000
!
interface Ethernet2
    speed forced 10000full
    switchport
    channel-group 45 mode active
    lacp rate fast
!
interface Ethernet3
```

```
    speed forced 10000full
    switchport mode trunk
    switchport
    lacp rate fast
!
interface Ethernet4
    speed forced 1000full
    switchport
    channel-group 1000 mode active
!
interface Ethernet5/1
    no switchport
!
interface Ethernet5/2
    no switchport
!
interface Ethernet5/3
    no switchport
!
interface Ethernet5/4
    no switchport
!
interface Ethernet6/1
    no switchport
!
interface Ethernet6/2
    no switchport
!
interface Ethernet6/3
    no switchport
!
interface Ethernet6/4
    no switchport
!
interface Ethernet7/1
    no switchport
!
interface Ethernet7/2
    no switchport
!
interface Ethernet7/3
    no switchport
!
interface Ethernet7/4
    no switchport
!
interface Ethernet8/1
```

```
    no switchport
!
interface Ethernet8/2
    no switchport
!
interface Ethernet8/3
    no switchport
!
interface Ethernet8/4
    no switchport
!
interface Ethernet9/1
    switchport
    lacp rate fast
!
interface Ethernet9/2
    no switchport
!
interface Ethernet9/3
    no switchport
!
interface Ethernet9/4
    no switchport
!
interface Ethernet10/1
    no switchport
!
interface Ethernet10/2
    no switchport
!
interface Ethernet10/3
    no switchport
!
interface Ethernet10/4
    no switchport
!
interface Ethernet11/1
    no switchport
!
interface Ethernet11/2
    no switchport
!
interface Ethernet11/3
    no switchport
!
interface Ethernet11/4
    no switchport
```

```
!
interface Ethernet12/1
    no switchport
!
interface Ethernet12/2
    no switchport
!
interface Ethernet12/3
    no switchport
!
interface Ethernet12/4
    no switchport
!
interface Ethernet13/1
    no switchport
!
interface Ethernet13/2
    no switchport
!
interface Ethernet13/3
    no switchport
!
interface Ethernet13/4
    no switchport
!
interface Ethernet14/1
    no switchport
!
interface Ethernet14/2
    no switchport
!
interface Ethernet14/3
    no switchport
!
interface Ethernet14/4
    no switchport
!
interface Ethernet15/1
    no switchport
!
interface Ethernet15/2
    no switchport
!
interface Ethernet15/3
    no switchport
!
interface Ethernet15/4
```

```
    no switchport
!
interface Ethernet16/1
    no switchport
!
interface Ethernet16/2
    no switchport
!
interface Ethernet16/3
    no switchport
!
interface Ethernet16/4
    no switchport
!
interface Ethernet17/1
    no switchport
!
interface Ethernet17/2
    no switchport
!
interface Ethernet17/3
    no switchport
!
interface Ethernet17/4
    no switchport
!
interface Ethernet18/1
    no switchport
!
interface Ethernet18/2
    no switchport
!
interface Ethernet18/3
    no switchport
!
interface Ethernet18/4
    no switchport
!
interface Ethernet19/1
    no switchport
!
interface Ethernet19/2
    no switchport
!
interface Ethernet19/3
    no switchport
!
```

```
interface Ethernet19/4
    no switchport
!
interface Ethernet20/1
    no switchport
!
interface Ethernet20/2
    no switchport
!
interface Ethernet20/3
    no switchport
!
interface Ethernet20/4
    no switchport
!
interface Ethernet21/1
    no switchport
!
interface Ethernet21/2
    no switchport
!
interface Ethernet21/3
    no switchport
!
interface Ethernet21/4
    no switchport
!
interface Ethernet22/1
    switchport
    channel-group 40 mode active
    lacp rate fast
!
interface Ethernet22/2
    shutdown
    no switchport
!
interface Ethernet22/3
    shutdown
    no switchport
!
interface Ethernet22/4
    shutdown
    no switchport
!
interface Ethernet23/1
    switchport
    lacp rate fast
```

```
!
interface Ethernet23/2
    switchport
    lACP rate fast
!
interface Ethernet23/3
    switchport
    lACP rate fast
!
interface Ethernet23/4
    switchport
    lACP rate fast
!
interface Ethernet24/1
    no switchport
!
interface Ethernet24/2
    no switchport
!
interface Ethernet24/3
    no switchport
!
interface Ethernet24/4
    no switchport
!
interface Ethernet25/1
    no switchport
!
interface Ethernet25/2
    no switchport
!
interface Ethernet25/3
    no switchport
!
interface Ethernet25/4
    no switchport
!
interface Ethernet26/1
    no switchport
!
interface Ethernet26/2
    no switchport
!
interface Ethernet26/3
    no switchport
!
interface Ethernet26/4
```

```
    no switchport
!
interface Ethernet27/1
    no switchport
!
interface Ethernet27/2
    no switchport
!
interface Ethernet27/3
    no switchport
!
interface Ethernet27/4
    no switchport
!
interface Ethernet28/1
    no switchport
!
interface Ethernet28/2
    no switchport
!
interface Ethernet28/3
    no switchport
!
interface Ethernet28/4
    no switchport
!
interface Ethernet29
    no switchport
!
interface Ethernet30
    no switchport
!
interface Ethernet31
    no switchport
!
interface Ethernet32
    no switchport
!
interface Ethernet33
    no switchport
!
interface Ethernet34
    no switchport
!
interface Ethernet35
    no switchport
!
```

```

interface Ethernet36
    no switchport
!
interface Management1
    ip address 12.12.12.102/24
!
interface Vlan1
    ip address 11.0.0.126/24
!
interface Vlan4094
    no autostate
    ip address 1.1.1.1/24
!
ip routing
!
mlag configuration
    domain-id SouthArista
    heartbeat-interval 1000
    local-interface Vlan4094
    peer-address 1.1.1.2
    peer-address heartbeat 12.12.12.103
    peer-link Port-Channel1000
    dual-primary detection delay 1 action errdisable all-interfaces
!
end
SW-SW1#
=====
```

```

=====
=====
=====
SW-SE1#sh run
! Command: show running-config
! device: SW-SE1 (DCS-7050QX-32S, EOS-4.19.5M)
!
! boot system flash:/EOS-4.19.5M.swi
!
hardware port-group 1 select Et1-4
!
alias srnz show interface counter rate | nz
!
switchport default mode routed
!
load-interval default 5
!
transceiver qsfp default-mode 4x10G
!
logging console debugging
```

```
!
hostname SW-SE1
!
radius-server timeout 1
radius-server retransmit 0
radius-server host 12.12.12.99 key 7 09584B081457
!
spanning-tree mode rstp
no spanning-tree vlan 4094
spanning-tree hello-time 1000
spanning-tree max-age 6
spanning-tree forward-time 4
!
aaa authentication login default group radius local
!
no aaa root
!
username admin privilege 15 role network-admin secret sha512
$6$vP0iamuQP3fdW.de$YNmsV8fz8nDoDEwbiehYK7rZ9LzCYVHiXWt8Y8TcUsgI61ls5qhHis
lafP2A.Gl66tY4YJTMXJnFo4ps4cD2L1
!
vlan 4094
    trunk group MLAG-Peer
!
interface Port-Channel40
    switchport mode trunk
    switchport
    mlag 1
!
interface Port-Channel45
    switchport mode trunk
    switchport
    mlag 3
!
interface Port-Channel1000
    switchport mode trunk
    switchport trunk group MLAG-Peer
    switchport
!
interface Ethernet1
    description DSR-SE1
    speed forced 1000full
    switchport mode trunk
    switchport
    shape rate 100000
!
interface Ethernet2
```

```
    speed forced 10000full
    switchport
    channel-group 40 mode active
    lacp rate fast
!
interface Ethernet3
    speed forced 1000full
    switchport
    channel-group 1000 mode active
!
interface Ethernet4
    speed forced 10000full
    switchport mode trunk
    switchport
    lacp rate fast
!
interface Ethernet5/1
    no switchport
!
interface Ethernet5/2
    no switchport
!
interface Ethernet5/3
    no switchport
!
interface Ethernet5/4
    no switchport
!
interface Ethernet6/1
    no switchport
!
interface Ethernet6/2
    no switchport
!
interface Ethernet6/3
    no switchport
!
interface Ethernet6/4
    no switchport
!
interface Ethernet7/1
    no switchport
!
interface Ethernet7/2
    no switchport
!
interface Ethernet7/3
```

```
    no switchport
!
interface Ethernet7/4
    no switchport
!
interface Ethernet8/1
    no switchport
!
interface Ethernet8/2
    no switchport
!
interface Ethernet8/3
    no switchport
!
interface Ethernet8/4
    no switchport
!
interface Ethernet9/1
    switchport
    lacp rate fast
!
interface Ethernet9/2
    switchport
    lacp rate fast
!
interface Ethernet9/3
    switchport
    lacp rate fast
!
interface Ethernet9/4
    switchport
    lacp rate fast
!
interface Ethernet10/1
    no switchport
!
interface Ethernet10/2
    no switchport
!
interface Ethernet10/3
    no switchport
!
interface Ethernet10/4
    no switchport
!
interface Ethernet11/1
    no switchport
```

```
!
interface Ethernet11/2
    no switchport
!
interface Ethernet11/3
    no switchport
!
interface Ethernet11/4
    no switchport
!
interface Ethernet12/1
    no switchport
!
interface Ethernet12/2
    no switchport
!
interface Ethernet12/3
    no switchport
!
interface Ethernet12/4
    no switchport
!
interface Ethernet13/1
    no switchport
!
interface Ethernet13/2
    no switchport
!
interface Ethernet13/3
    no switchport
!
interface Ethernet13/4
    no switchport
!
interface Ethernet14/1
    no switchport
!
interface Ethernet14/2
    no switchport
!
interface Ethernet14/3
    no switchport
!
interface Ethernet14/4
    no switchport
!
interface Ethernet15/1
```

```
    no switchport
!
interface Ethernet15/2
    no switchport
!
interface Ethernet15/3
    no switchport
!
interface Ethernet15/4
    no switchport
!
interface Ethernet16/1
    no switchport
!
interface Ethernet16/2
    no switchport
!
interface Ethernet16/3
    no switchport
!
interface Ethernet16/4
    no switchport
!
interface Ethernet17/1
    no switchport
!
interface Ethernet17/2
    no switchport
!
interface Ethernet17/3
    no switchport
!
interface Ethernet17/4
    no switchport
!
interface Ethernet18/1
    switchport
    channel-group 45 mode active
    lacp rate fast
!
interface Ethernet18/2
    shutdown
    no switchport
!
interface Ethernet18/3
    shutdown
    no switchport
```

```
!
interface Ethernet18/4
    shutdown
    no switchport
!
interface Ethernet19/1
    switchport
    lacp rate fast
!
interface Ethernet19/2
    switchport
    lacp rate fast
!
interface Ethernet19/3
    switchport
    lacp rate fast
!
interface Ethernet19/4
    switchport
    lacp rate fast
!
interface Ethernet20/1
    no switchport
!
interface Ethernet20/2
    no switchport
!
interface Ethernet20/3
    no switchport
!
interface Ethernet20/4
    no switchport
!
interface Ethernet21/1
    no switchport
!
interface Ethernet21/2
    no switchport
!
interface Ethernet21/3
    no switchport
!
interface Ethernet21/4
    no switchport
!
interface Ethernet22/1
    no switchport
```

```
!
interface Ethernet22/2
    no switchport
!
interface Ethernet22/3
    no switchport
!
interface Ethernet22/4
    no switchport
!
interface Ethernet23/1
    no switchport
!
interface Ethernet23/2
    no switchport
!
interface Ethernet23/3
    no switchport
!
interface Ethernet23/4
    no switchport
!
interface Ethernet24/1
    no switchport
!
interface Ethernet24/2
    no switchport
!
interface Ethernet24/3
    no switchport
!
interface Ethernet24/4
    no switchport
!
interface Ethernet25/1
    no switchport
!
interface Ethernet25/2
    no switchport
!
interface Ethernet25/3
    no switchport
!
interface Ethernet25/4
    no switchport
!
interface Ethernet26/1
```

```
    no switchport
!
interface Ethernet26/2
    no switchport
!
interface Ethernet26/3
    no switchport
!
interface Ethernet26/4
    no switchport
!
interface Ethernet27/1
    no switchport
!
interface Ethernet27/2
    no switchport
!
interface Ethernet27/3
    no switchport
!
interface Ethernet27/4
    no switchport
!
interface Ethernet28/1
    no switchport
!
interface Ethernet28/2
    no switchport
!
interface Ethernet28/3
    no switchport
!
interface Ethernet28/4
    no switchport
!
interface Ethernet29
    no switchport
!
interface Ethernet30
    no switchport
!
interface Ethernet31
    no switchport
!
interface Ethernet32
    no switchport
!
```

```
interface Ethernet33
    no switchport
!
interface Ethernet34
    no switchport
!
interface Ethernet35
    no switchport
!
interface Ethernet36
    no switchport
!
interface Management1
    ip address 12.12.12.103/24
!
interface Vlan4094
    no autostate
    ip address 1.1.1.2/24
!
ip routing
!
mlag configuration
    domain-id SouthArista
    heartbeat-interval 1000
    local-interface Vlan4094
    peer-address 1.1.1.1
    peer-address heartbeat 12.12.12.102
    peer-link Port-Channel1000
    dual-primary detection delay 1 action errdisable all-interfaces
!
end
SW-SE1#
```

```
=====
=====

SW-SE2# sh run

!Command: show running-config
!Time: Wed Dec  6 20:03:47 2017

version 7.0(3)I4(6)
hostname SW-SE2
vdc SW-SE2 id 1
  limit-resource vlan minimum 16 maximum 4094
  limit-resource vrf minimum 2 maximum 4096
```

```
limit-resource port-channel minimum 0 maximum 104
limit-resource u4route-mem minimum 128 maximum 128
limit-resource u6route-mem minimum 96 maximum 96
limit-resource m4route-mem minimum 58 maximum 58
limit-resource m6route-mem minimum 8 maximum 8

cfs eth distribute
feature interface-vlan
feature lacp
feature vpc
feature lldp

no password strength-check
username admin password 5
$5$LzfWl/HT$kF1GDHzU49/Rdh.D13/f6UPpzC7DMT7.EXkq6./MiP9  role
network-admin
ip domain-lookup
radius-server host 12.12.12.99 key 7 "waer2" authentication accounting
timeout 1
aaa group server radius dellRadius
    server 12.12.12.99
    source-interface mgmt0
service unsupported-transceiver
ip access-list copp-system-acl-eigrp
    10 permit eigrp any 224.0.0.10/32
ipv6 access-list copp-system-acl-eigrp6
    10 permit eigrp any ff02::a/128
ip access-list copp-system-acl-icmp
    10 permit icmp any any
ip access-list copp-system-acl-igmp
    10 permit igmp any any
ip access-list copp-system-acl-ntp
    10 permit udp any any eq ntp
    20 permit udp any eq ntp any
ip access-list copp-system-acl-pimreg
    10 permit pim any any
ip access-list copp-system-acl-ping
    10 permit icmp any any echo
    20 permit icmp any any echo-reply
ip access-list copp-system-acl-routingproto1
    10 permit tcp any gt 1024 any eq bgp
    20 permit tcp any eq bgp any gt 1024
    30 permit udp any 224.0.0.0/24 eq rip
    40 permit tcp any gt 1024 any eq 639
    50 permit tcp any eq 639 any gt 1024
    70 permit ospf any any
    80 permit ospf any 224.0.0.5/32
```

```
90 permit ospf any 224.0.0.6/32
ip access-list copp-system-acl-routingproto2
10 permit udp any 224.0.0.0/24 eq 1985
20 permit 112 any 224.0.0.0/24
ip access-list copp-system-acl-snmp
10 permit udp any any eq snmp
20 permit udp any any eq snmptrap
ip access-list copp-system-acl-ssh
10 permit tcp any any eq 22
20 permit tcp any eq 22 any
ip access-list copp-system-acl-stftp
10 permit udp any any eq tftp
20 permit udp any any eq 1758
30 permit udp any eq tftp any
40 permit udp any eq 1758 any
50 permit tcp any any eq 115
60 permit tcp any eq 115 any
ip access-list copp-system-acl-tacacsradius
10 permit tcp any any eq tacacs
20 permit tcp any eq tacacs any
30 permit udp any any eq 1812
40 permit udp any any eq 1813
50 permit udp any any eq 1645
60 permit udp any any eq 1646
70 permit udp any eq 1812 any
80 permit udp any eq 1813 any
90 permit udp any eq 1645 any
100 permit udp any eq 1646 any
ip access-list copp-system-acl-telnet
10 permit tcp any any eq telnet
20 permit tcp any any eq 107
30 permit tcp any eq telnet any
40 permit tcp any eq 107 any
ipv6 access-list copp-system-acl-v6routingProto2
10 permit udp any ff02::66/128 eq 2029
20 permit udp any ff02::fb/128 eq 5353
30 permit 112 any ff02::12/128
ipv6 access-list copp-system-acl-v6routingproto1
10 permit 89 any ff02::5/128
20 permit 89 any ff02::6/128
30 permit udp any ff02::9/128 eq 521
ip access-list copp-system-dhcp-relay
10 permit udp any eq bootps any eq bootps
class-map type control-plane match-any copp-icmp
match access-group name copp-system-acl-icmp
class-map type control-plane match-any copp-ntp
match access-group name copp-system-acl-ntp
```

```
class-map type control-plane match-any copp-s-arp
class-map type control-plane match-any copp-s-bfd
class-map type control-plane match-any copp-s-bpdu
class-map type control-plane match-any copp-s-dai
class-map type control-plane match-any copp-s-default
class-map type control-plane match-any copp-s-dhcpreq
class-map type control-plane match-any copp-s-dhcresp
    match access-group name copp-system-dhcp-relay
class-map type control-plane match-any copp-s-dpss
class-map type control-plane match-any copp-s-eigrp
    match access-group name copp-system-acl-eigrp
    match access-group name copp-system-acl-eigrp6
class-map type control-plane match-any copp-s-glean
class-map type control-plane match-any copp-s-igmp
    match access-group name copp-system-acl-igmp
class-map type control-plane match-any copp-s-ipmcmiss
class-map type control-plane match-any copp-s-l2switched
class-map type control-plane match-any copp-s-l3destmiss
class-map type control-plane match-any copp-s-l3mtufail
class-map type control-plane match-any copp-s-l3slowpath
class-map type control-plane match-any copp-s-mpls
class-map type control-plane match-any copp-s-pimautorp
class-map type control-plane match-any copp-s-pimreg
    match access-group name copp-system-acl-pimreg
class-map type control-plane match-any copp-s-ping
    match access-group name copp-system-acl-ping
class-map type control-plane match-any copp-s-ptp
class-map type control-plane match-any copp-s-routingProto1
    match access-group name copp-system-acl-routingproto1
    match access-group name copp-system-acl-v6routingproto1
class-map type control-plane match-any copp-s-routingProto2
    match access-group name copp-system-acl-routingproto2
class-map type control-plane match-any copp-s-selfIp
class-map type control-plane match-any copp-s-ttl11
class-map type control-plane match-any copp-s-v6routingProto2
    match access-group name copp-system-acl-v6routingProto2
class-map type control-plane match-any copp-s-vxlan
class-map type control-plane match-any copp-snmp
    match access-group name copp-system-acl-snmp
class-map type control-plane match-any copp-ssh
    match access-group name copp-system-acl-ssh
class-map type control-plane match-any copp-stftp
    match access-group name copp-system-acl-stftp
class-map type control-plane match-any copp-tacacsradius
    match access-group name copp-system-acl-tacacsradius
class-map type control-plane match-any copp-telnet
    match access-group name copp-system-acl-telnet
```

```
policy-map type control-plane copp-system-policy
  class copp-s-default
    police pps 400
  class copp-s-l2switched
    police pps 200
  class copp-s-ping
    police pps 100
  class copp-s-13destmiss
    police pps 100
  class copp-s-glean
    police pps 500
  class copp-s-selfIp
    police pps 500
  class copp-s-13mtufail
    police pps 100
  class copp-s-ttl1
    police pps 100
  class copp-s-ipmcmiss
    police pps 400
  class copp-s-13slowpath
    police pps 100
  class copp-s-dhcpreq
    police pps 300
  class copp-s-dhcprep
    police pps 300
  class copp-s-dai
    police pps 300
  class copp-s-igmp
    police pps 400
  class copp-s-routingProto2
    police pps 1300
  class copp-s-v6routingProto2
    police pps 1300
  class copp-s-eigrp
    police pps 200
  class copp-s-pimreg
    police pps 200
  class copp-s-pimaautorp
    police pps 200
  class copp-s-routingProto1
    police pps 1000
  class copp-s-arp
    police pps 200
  class copp-s-ptp
    police pps 1000
  class copp-s-vxlan
    police pps 1000
```

```
class copp-s-bfd
    police pps 350
class copp-s-bpdu
    police pps 12000
class copp-s-dpss
    police pps 1000
class copp-s-mpls
    police pps 100
class copp-icmp
    police pps 200
class copp-telnet
    police pps 500
class copp-ssh
    police pps 500
class copp-snmp
    police pps 500
class copp-ntp
    police pps 100
class copp-tacacsradius
    police pps 400
class copp-stftp
    police pps 400
control-plane
    service-policy input copp-system-policy
snmp-server user admin network-admin auth md5
0xf45b0e386d21018d0bbb0b41bc94a9bd priv 0xf45b0e386d21018d0bbb0b41bc94a9bd
localizedkey
rmon event 1 log trap public description FATAL(1) owner PMON@FATAL
rmon event 2 log trap public description CRITICAL(2) owner PMON@CRITICAL
rmon event 3 log trap public description ERROR(3) owner PMON@ERROR
rmon event 4 log trap public description WARNING(4) owner PMON@WARNING
rmon event 5 log trap public description INFORMATION(5) owner PMON@INFO
aaa authentication login default group dellRadius

vlan 1
spanning-tree vlan 1 priority 28672
spanning-tree vlan 1 hello-time 1
spanning-tree vlan 1 forward-time 4
spanning-tree vlan 1 max-age 6
vrf context management
no system urpf disable
no port-channel load-balance resilient
hardware profile portmode 64x10G

vpc domain 20
peer-switch
peer-keepalive destination 17.17.17.6 source 17.17.17.5 vrf default
```

```
auto-recovery

interface Vlan1
    no shutdown
    ip address 11.0.0.122/24

interface port-channel40
    switchport mode trunk
    speed 10000
    vpc 4

interface port-channel45
    switchport mode trunk
    speed 10000
    vpc 5

interface port-channel100
    spanning-tree port type network

interface port-channel111
    no switchport
    speed 10000
    ip address 17.17.17.5/30

interface port-channel1000
    description *vPC Peer Link*
    switchport mode trunk
    spanning-tree port type network
    speed 10000
    vpc peer-link

interface Ethernet1/1

interface Ethernet1/2

interface Ethernet1/3

interface Ethernet1/4

interface Ethernet1/5

interface Ethernet1/6

interface Ethernet1/7

interface Ethernet1/8
```

```
interface Ethernet1/9

interface Ethernet1/10

interface Ethernet1/11

interface Ethernet1/12

interface Ethernet1/13
    description **vPC Peer-Link**
    switchport mode trunk
    channel-group 1000 mode active

interface Ethernet1/14
    shutdown
    lacp rate fast
    switchport mode trunk

interface Ethernet1/15
    shutdown

interface Ethernet1/16

interface Ethernet1/17
    lacp rate fast
    switchport mode trunk

interface Ethernet1/18

interface Ethernet1/19

interface Ethernet1/20

interface Ethernet1/21
    lacp rate fast
    switchport mode trunk

interface Ethernet1/22
    lacp rate fast
    switchport mode trunk

interface Ethernet1/23
    lacp rate fast
    switchport mode trunk

interface Ethernet1/24
```

```
lacp rate fast
switchport mode trunk

interface Ethernet1/25

interface Ethernet1/26

interface Ethernet1/27
speed 1000

interface Ethernet1/28

interface Ethernet1/29

interface Ethernet1/30

interface Ethernet1/31

interface Ethernet1/32

interface Ethernet1/33

interface Ethernet1/34

interface Ethernet1/35

interface Ethernet1/36

interface Ethernet1/37

interface Ethernet1/38

interface Ethernet1/39
switchport mode trunk
speed 1000

interface Ethernet1/40
switchport mode trunk
speed 1000

interface Ethernet1/41
switchport mode trunk
speed 1000

interface Ethernet1/42

interface Ethernet1/43
```

```
interface Ethernet1/44

interface Ethernet1/45
    no switchport
    channel-group 111 mode active

interface Ethernet1/46

interface Ethernet1/47

interface Ethernet1/48

interface Ethernet1/49/1
    lacp rate fast
    switchport mode trunk
    channel-group 40 mode active

interface Ethernet1/49/2
    lacp rate fast
    switchport mode trunk

interface Ethernet1/49/3
    lacp rate fast
    switchport mode trunk

interface Ethernet1/49/4
    lacp rate fast
    switchport mode trunk

interface Ethernet1/50/1
    lacp rate fast
    switchport mode trunk
    channel-group 45 mode active

interface Ethernet1/50/2

interface Ethernet1/50/3

interface Ethernet1/50/4

interface Ethernet1/51/1
    lacp rate fast
    switchport mode trunk

interface Ethernet1/51/2
    lacp rate fast
```

```
switchport mode trunk

interface Ethernet1/51/3
    lacp rate fast
    switchport mode trunk

interface Ethernet1/51/4
    lacp rate fast
    switchport mode trunk

interface Ethernet1/52/1

interface Ethernet1/52/2

interface Ethernet1/52/3

interface Ethernet1/52/4

interface mgmt0
    vrf member management
    ip address 12.12.12.110/24
line console
line vty
boot nxos bootflash:/nxos.7.0.3.I4.6_compact_N3064.bin
```

SW-SE2#

```
=====
=====
```

SW-SW2# sh run

```
!Command: show running-config
!Time: Fri Dec  8 01:11:09 2023

version 7.0(3)I4(6)
hostname SW-SW2
vdc SW-SW2 id 1
    limit-resource vlan minimum 16 maximum 4094
    limit-resource vrf minimum 2 maximum 4096
    limit-resource port-channel minimum 0 maximum 104
    limit-resource u4route-mem minimum 128 maximum 128
    limit-resource u6route-mem minimum 96 maximum 96
    limit-resource m4route-mem minimum 58 maximum 58
    limit-resource m6route-mem minimum 8 maximum 8
```

```
cfs eth distribute
feature lacp
feature vpc
feature lldp

no password strength-check
username admin password 5
$5$nTPGc2Iy$qDMhssr..lAO9/eYfNfMSE/Xd6LkDrPtCs2gtgPZ1B3 role
network-admin
ip domain-lookup
radius-server host 12.12.12.99 key 7 "waer2" authentication accounting
timeout 1
aaa group server radius dellRadius
    server 12.12.12.99
    source-interface mgmt0
service unsupported-transceiver
ip access-list copp-system-acl-eigrp
    10 permit eigrp any 224.0.0.10/32
ipv6 access-list copp-system-acl-eigrp6
    10 permit eigrp any ff02::a/128
ip access-list copp-system-acl-icmp
    10 permit icmp any any
ip access-list copp-system-acl-igmp
    10 permit igmp any any
ip access-list copp-system-acl-ntp
    10 permit udp any any eq ntp
    20 permit udp any eq ntp any
ip access-list copp-system-acl-pimreg
    10 permit pim any any
ip access-list copp-system-acl-ping
    10 permit icmp any any echo
    20 permit icmp any any echo-reply
ip access-list copp-system-acl-routingproto1
    10 permit tcp any gt 1024 any eq bgp
    20 permit tcp any eq bgp any gt 1024
    30 permit udp any 224.0.0.0/24 eq rip
    40 permit tcp any gt 1024 any eq 639
    50 permit tcp any eq 639 any gt 1024
    70 permit ospf any any
    80 permit ospf any 224.0.0.5/32
    90 permit ospf any 224.0.0.6/32
ip access-list copp-system-acl-routingproto2
    10 permit udp any 224.0.0.0/24 eq 1985
    20 permit 112 any 224.0.0.0/24
ip access-list copp-system-acl-snmp
    10 permit udp any any eq snmp
    20 permit udp any any eq snmptrap
```

```
ip access-list copp-system-acl-ssh
 10 permit tcp any any eq 22
 20 permit tcp any eq 22 any
ip access-list copp-system-acl-stftp
 10 permit udp any any eq tftp
 20 permit udp any any eq 1758
 30 permit udp any eq tftp any
 40 permit udp any eq 1758 any
 50 permit tcp any any eq 115
 60 permit tcp any eq 115 any
ip access-list copp-system-acl-tacacsradius
 10 permit tcp any any eq tacacs
 20 permit tcp any eq tacacs any
 30 permit udp any any eq 1812
 40 permit udp any any eq 1813
 50 permit udp any any eq 1645
 60 permit udp any any eq 1646
 70 permit udp any eq 1812 any
 80 permit udp any eq 1813 any
 90 permit udp any eq 1645 any
 100 permit udp any eq 1646 any
ip access-list copp-system-acl-telnet
 10 permit tcp any any eq telnet
 20 permit tcp any any eq 107
 30 permit tcp any eq telnet any
 40 permit tcp any eq 107 any
ipv6 access-list copp-system-acl-v6routingProto2
 10 permit udp any ff02::66/128 eq 2029
 20 permit udp any ff02::fb/128 eq 5353
 30 permit 112 any ff02::12/128
ipv6 access-list copp-system-acl-v6routingproto1
 10 permit 89 any ff02::5/128
 20 permit 89 any ff02::6/128
 30 permit udp any ff02::9/128 eq 521
ip access-list copp-system-dhcp-relay
 10 permit udp any eq bootps any eq bootps
class-map type control-plane match-any copp-icmp
  match access-group name copp-system-acl-icmp
class-map type control-plane match-any copp-ntp
  match access-group name copp-system-acl-ntp
class-map type control-plane match-any copp-s-arp
class-map type control-plane match-any copp-s-bfd
class-map type control-plane match-any copp-s-bpdu
class-map type control-plane match-any copp-s-dai
class-map type control-plane match-any copp-s-default
class-map type control-plane match-any copp-s-dhcpreq
class-map type control-plane match-any copp-s-dhcresp
```

```
match access-group name copp-system-dhcp-relay
class-map type control-plane match-any copp-s-dpss
class-map type control-plane match-any copp-s-eigrp
    match access-group name copp-system-acl-eigrp
        match access-group name copp-system-acl-eigrp6
class-map type control-plane match-any copp-s-glean
class-map type control-plane match-any copp-s-igmp
    match access-group name copp-system-acl-igmp
class-map type control-plane match-any copp-s-ipmcmiss
class-map type control-plane match-any copp-s-l2switched
class-map type control-plane match-any copp-s-l3destmiss
class-map type control-plane match-any copp-s-l3mtufail
class-map type control-plane match-any copp-s-l3slowpath
class-map type control-plane match-any copp-s-mpls
class-map type control-plane match-any copp-s-pimautorp
class-map type control-plane match-any copp-s-pimreg
    match access-group name copp-system-acl-pimreg
class-map type control-plane match-any copp-s-ping
    match access-group name copp-system-acl-ping
class-map type control-plane match-any copp-s-ptp
class-map type control-plane match-any copp-s-routingProto1
    match access-group name copp-system-acl-routingproto1
    match access-group name copp-system-acl-v6routingproto1
class-map type control-plane match-any copp-s-routingProto2
    match access-group name copp-system-acl-routingproto2
class-map type control-plane match-any copp-s-selfIp
class-map type control-plane match-any copp-s-ttl1
class-map type control-plane match-any copp-s-v6routingProto2
    match access-group name copp-system-acl-v6routingProto2
class-map type control-plane match-any copp-s-vxlan
class-map type control-plane match-any copp-snmp
    match access-group name copp-system-acl-snmp
class-map type control-plane match-any copp-ssh
    match access-group name copp-system-acl-ssh
class-map type control-plane match-any copp-stftp
    match access-group name copp-system-acl-stftp
class-map type control-plane match-any copp-tacacsradius
    match access-group name copp-system-acl-tacacsradius
class-map type control-plane match-any copp-telnet
    match access-group name copp-system-acl-telnet
policy-map type control-plane copp-system-policy
    class copp-s-default
        police pps 400
    class copp-s-l2switched
        police pps 200
    class copp-s-ping
        police pps 100
```

```
class copp-s-l3destmiss
    police pps 100
class copp-s-glean
    police pps 500
class copp-s-selfIp
    police pps 500
class copp-s-l3mtufail
    police pps 100
class copp-s-ttl1
    police pps 100
class copp-s-ipmcmiss
    police pps 400
class copp-s-l3slowpath
    police pps 100
class copp-s-dhcpreq
    police pps 300
class copp-s-dhcprep
    police pps 300
class copp-s-dai
    police pps 300
class copp-s-igmp
    police pps 400
class copp-s-routingProto2
    police pps 1300
class copp-s-v6routingProto2
    police pps 1300
class copp-s-eigrp
    police pps 200
class copp-s-pimreg
    police pps 200
class copp-s-pimautorp
    police pps 200
class copp-s-routingProto1
    police pps 1000
class copp-s-arp
    police pps 200
class copp-s-ptp
    police pps 1000
class copp-s-vxlan
    police pps 1000
class copp-s-bfd
    police pps 350
class copp-s-bpdu
    police pps 12000
class copp-s-dpss
    police pps 1000
class copp-s-mpls
```

```
police pps 100
class copp-icmp
    police pps 200
class copp-telnet
    police pps 500
class copp-ssh
    police pps 500
class copp-snmp
    police pps 500
class copp-ntp
    police pps 100
class copp-tacacsradius
    police pps 400
class copp-stftp
    police pps 400
control-plane
    service-policy input copp-system-policy
snmp-server user admin network-admin auth md5
0x56734772e9a3c48f99a592bebd13ed92 priv 0x56734772e9a3c48f99a592bebd13ed92
localizedkey
rmon event 1 log trap public description FATAL(1) owner PMON@FATAL
rmon event 2 log trap public description CRITICAL(2) owner PMON@CRITICAL
rmon event 3 log trap public description ERROR(3) owner PMON@ERROR
rmon event 4 log trap public description WARNING(4) owner PMON@WARNING
rmon event 5 log trap public description INFORMATION(5) owner PMON@INFO
aaa authentication login default group dellRadius

vlan 1
spanning-tree vlan 1 hello-time 1
spanning-tree vlan 1 forward-time 4
spanning-tree vlan 1 max-age 6
vrf context management
no system urpf disable
no port-channel load-balance resilient
hardware profile portmode 64x10G

vpc domain 20
    peer-switch
        role priority 10
        peer-keepalive destination 17.17.17.5 source 17.17.17.6 vrf default
        auto-recovery

interface port-channel40
    switchport mode trunk
    speed 10000
    vpc 4
```

```
interface port-channel45
    switchport mode trunk
    speed 10000
    vpc 5

interface port-channel111
    no switchport
    speed 10000
    ip address 17.17.17.6/30

interface port-channel1000
    description *vPC Peer Link*
    switchport mode trunk
    spanning-tree port type network
    speed 10000
    vpc peer-link

interface Ethernet1/1

interface Ethernet1/2

interface Ethernet1/3

interface Ethernet1/4

interface Ethernet1/5

interface Ethernet1/6

interface Ethernet1/7

interface Ethernet1/8

interface Ethernet1/9

interface Ethernet1/10

interface Ethernet1/11

interface Ethernet1/12
    lacp rate fast
    switchport mode trunk

interface Ethernet1/13
    description **vPC Peer-Link**
    switchport mode trunk
```

```
channel-group 1000 mode active

interface Ethernet1/14
    lacp rate fast
    switchport mode trunk

interface Ethernet1/15

interface Ethernet1/16

interface Ethernet1/17

interface Ethernet1/18

interface Ethernet1/19

interface Ethernet1/20

interface Ethernet1/21

interface Ethernet1/22

interface Ethernet1/23

interface Ethernet1/24

interface Ethernet1/25

interface Ethernet1/26

interface Ethernet1/27

interface Ethernet1/28

interface Ethernet1/29

interface Ethernet1/30

interface Ethernet1/31

interface Ethernet1/32

interface Ethernet1/33
    lacp rate fast
    switchport mode trunk
    channel-group 45 mode active
```

```
interface Ethernet1/34
    lacp rate fast
    switchport mode trunk

interface Ethernet1/35

interface Ethernet1/36

interface Ethernet1/37

interface Ethernet1/38

interface Ethernet1/39
    switchport mode trunk
    speed 1000

interface Ethernet1/40
    switchport mode trunk
    speed 1000

interface Ethernet1/41
    switchport mode trunk
    speed 1000

interface Ethernet1/42

interface Ethernet1/43

interface Ethernet1/44

interface Ethernet1/45
    no switchport
    channel-group 111 mode active

interface Ethernet1/46

interface Ethernet1/47

interface Ethernet1/48

interface Ethernet1/49/1
    lacp rate fast
    switchport mode trunk
    channel-group 40 mode active

interface Ethernet1/49/2
```

```
interface Ethernet1/49/3

interface Ethernet1/49/4

interface Ethernet1/50/1
    lacp rate fast
    switchport mode trunk

interface Ethernet1/50/2
    lacp rate fast
    switchport mode trunk

interface Ethernet1/50/3
    lacp rate fast
    switchport mode trunk

interface Ethernet1/50/4
    lacp rate fast
    switchport mode trunk

interface Ethernet1/51/1

interface Ethernet1/51/2

interface Ethernet1/51/3

interface Ethernet1/51/4

interface Ethernet1/52/1

interface Ethernet1/52/2

interface Ethernet1/52/3

interface Ethernet1/52/4

interface mgmt0
    vrf member management
    ip address 12.12.12.111/24
line console
line vty
boot nxos bootflash:/nxos.7.0.3.I4.6_compact_N3064.bin
```

SW-SW2#

```
=====
=====

SW-NE2# sh run

!Command: show running-config
!Time: Fri Dec  8 01:14:45 2023

version 7.0(3)I4(6)
hostname SW-NE2
vdc SW-NE2 id 1
  limit-resource vlan minimum 16 maximum 4094
  limit-resource vrf minimum 2 maximum 4096
  limit-resource port-channel minimum 0 maximum 104
  limit-resource u4route-mem minimum 128 maximum 128
  limit-resource u6route-mem minimum 96 maximum 96
  limit-resource m4route-mem minimum 58 maximum 58
  limit-resource m6route-mem minimum 8 maximum 8

cfs eth distribute
feature lacp
feature vpc
feature lldp

no password strength-check
username admin password 5
$5$eM8yhPer$cn1MTrHl8kDKdVLSqXOjc8gKnYW0.z.HfTtXoRUopvB  role
network-admin
ip domain-lookup
radius-server host 12.12.12.99 key 7 "waer2" authentication accounting
timeout 1
aaa group server radius dellRadius
  server 12.12.12.99
  source-interface mgmt0
service unsupported-transceiver
ip access-list copp-system-acl-eigrp
  10 permit eigrp any 224.0.0.10/32
ipv6 access-list copp-system-acl-eigrp6
  10 permit eigrp any ff02::a/128
ip access-list copp-system-acl-icmp
  10 permit icmp any any
ip access-list copp-system-acl-igmp
  10 permit igmp any any
ip access-list copp-system-acl-ntp
  10 permit udp any any eq ntp
  20 permit udp any eq ntp any
ip access-list copp-system-acl-pimreg
```

```
10 permit pim any any
ip access-list copp-system-acl-ping
10 permit icmp any any echo
20 permit icmp any any echo-reply
ip access-list copp-system-acl-routingproto1
10 permit tcp any gt 1024 any eq bgp
20 permit tcp any eq bgp any gt 1024
30 permit udp any 224.0.0.0/24 eq rip
40 permit tcp any gt 1024 any eq 639
50 permit tcp any eq 639 any gt 1024
70 permit ospf any any
80 permit ospf any 224.0.0.5/32
90 permit ospf any 224.0.0.6/32
ip access-list copp-system-acl-routingproto2
10 permit udp any 224.0.0.0/24 eq 1985
20 permit 112 any 224.0.0.0/24
ip access-list copp-system-acl-snmp
10 permit udp any any eq snmp
20 permit udp any any eq snmptrap
ip access-list copp-system-acl-ssh
10 permit tcp any any eq 22
20 permit tcp any eq 22 any
ip access-list copp-system-acl-stftp
10 permit udp any any eq tftp
20 permit udp any any eq 1758
30 permit udp any eq tftp any
40 permit udp any eq 1758 any
50 permit tcp any any eq 115
60 permit tcp any eq 115 any
ip access-list copp-system-acl-tacacsradius
10 permit tcp any any eq tacacs
20 permit tcp any eq tacacs any
30 permit udp any any eq 1812
40 permit udp any any eq 1813
50 permit udp any any eq 1645
60 permit udp any any eq 1646
70 permit udp any eq 1812 any
80 permit udp any eq 1813 any
90 permit udp any eq 1645 any
100 permit udp any eq 1646 any
ip access-list copp-system-acl-telnet
10 permit tcp any any eq telnet
20 permit tcp any any eq 107
30 permit tcp any eq telnet any
40 permit tcp any eq 107 any
ipv6 access-list copp-system-acl-v6routingProto2
10 permit udp any ff02::66/128 eq 2029
```

```
20 permit udp any ff02::fb/128 eq 5353
30 permit 112 any ff02::12/128
ipv6 access-list copp-system-acl-v6routingproto1
10 permit 89 any ff02::5/128
20 permit 89 any ff02::6/128
30 permit udp any ff02::9/128 eq 521
ip access-list copp-system-dhcp-relay
10 permit udp any eq bootps any eq bootps
class-map type qos match-all c
class-map type qos match-all co
class-map type qos match-all cop
class-map type qos match-all copp
class-map type qos match-all copp-
class-map type qos match-all copp-s
class-map type qos match-all copp-s-
class-map type qos match-all copp-ntp
class-map type qos match-all copp-s-1
class-map type qos match-all copp-s-p
class-map type qos match-all copp-ssh
class-map type qos match-all copp-icmp
class-map type qos match-all copp-snmp
class-map type qos match-all copp-s-arp
class-map type qos match-all copp-s-bfd
class-map type qos match-all copp-s-dai
class-map type qos match-all copp-s-ptp
class-map type qos match-all copp-stftp
class-map type qos match-all copp-s-bpdu
class-map type qos match-all copp-s-dpss
class-map type qos match-all copp-s-igmp
class-map type qos match-all copp-s-mpls
class-map type qos match-all copp-s-ping
class-map type qos match-all copp-s-ttl1
class-map type qos match-all copp-telnet
class-map type qos match-all copp-s-eigrp
class-map type qos match-all copp-s-glean
class-map type qos match-all copp-s-vxlan
class-map type qos match-all copp-s-pimreg
class-map type qos match-all copp-s-selfIp
class-map type qos match-all copp-s-default
class-map type qos match-all copp-s-dhcpreq
class-map type qos match-all copp-s-dhcpresp
class-map type qos match-all copp-s-ipmcmiss
class-map type qos match-all copp-tacacsradi
class-map type qos match-all copp-s-l3destmis
class-map type qos match-all copp-s-l3mtufail
class-map type qos match-all copp-s-pimautorp
class-map type qos match-all copp-s-l2switched
```

```
class-map type qos match-all copp-s-13destmiss
class-map type qos match-all copp-s-13slowpath
class-map type qos match-all copp-tacacsradius
class-map type qos match-all copp-s-routingProto1
class-map type qos match-all copp-s-routingProto2
class-map type qos match-all copp-s-v6routingProto2
class-map type control-plane match-any copp
class-map type control-plane match-any copp-icmp
    match access-group name copp-system-acl-icmp
class-map type control-plane match-any copp-ntp
    match access-group name copp-system-acl-ntp
class-map type control-plane match-any copp-s
class-map type control-plane match-any copp-s-arp
class-map type control-plane match-any copp-s-bfd
class-map type control-plane match-any copp-s-bpdu
class-map type control-plane match-any copp-s-dai
class-map type control-plane match-any copp-s-default
class-map type control-plane match-any copp-s-dhcpreq
class-map type control-plane match-any copp-s-dhcprep
    match access-group name copp-system-dhcp-relay
class-map type control-plane match-any copp-s-dpss
class-map type control-plane match-any copp-s-eigrp
    match access-group name copp-system-acl-eigrp
    match access-group name copp-system-acl-eigrp6
class-map type control-plane match-any copp-s-glean
class-map type control-plane match-any copp-s-igmp
    match access-group name copp-system-acl-igmp
class-map type control-plane match-any copp-s-ipmcmiss
class-map type control-plane match-any copp-s-l2switched
class-map type control-plane match-any copp-s-13destmiss
class-map type control-plane match-any copp-s-13mtufail
class-map type control-plane match-any copp-s-13slowpath
class-map type control-plane match-any copp-s-mpls
class-map type control-plane match-any copp-s-pimau
class-map type control-plane match-any copp-s-pimaautorp
class-map type control-plane match-any copp-s-pimr
    match access-group name copp-system-acl-ping
    match access-group name copp-system-acl-pimreg
class-map type control-plane match-any copp-s-pimreg
    match access-group name copp-system-acl-ping
    match access-group name copp-system-acl-pimreg
class-map type control-plane match-any copp-s-ping
    match access-group name copp-system-acl-ping
class-map type control-plane match-any copp-s-ptp
class-map type control-plane match-any copp-s-ro
    match access-group name copp-system-acl-v6routingProto2
class-map type control-plane match-any copp-s-routingProto1
```

```
match access-group name copp-system-acl-routingproto1
  match access-group name copp-system-acl-v6routingproto1
class-map type control-plane match-any copp-s-routingProto2
  match access-group name copp-system-acl-routingproto2
class-map type control-plane match-any copp-s-selfIp
class-map type control-plane match-any copp-s-ttl1
class-map type control-plane match-any copp-s-v6routingProto2
  match access-group name copp-system-acl-v6routingProto2
class-map type control-plane match-any copp-s-vxlan
class-map type control-plane match-any copp-snmp
  match access-group name copp-system-acl-snmp
class-map type control-plane match-any copp-ssh
  match access-group name copp-system-acl-ssh
class-map type control-plane match-any copp-stftp
  match access-group name copp-system-acl-stftp
class-map type control-plane match-any copp-tacacsradius
  match access-group name copp-system-acl-tacacsradius
class-map type control-plane match-any copp-telnet
  match access-group name copp-system-acl-telnet
policy-map type control-plane copp-system-policy
  class copp-s-default
    police pps 400
  class copp-s-l2switched
    police pps 200
  class copp-s-ping
    police pps 100
  class copp-s-l3destmiss
    police pps 100
  class copp-s-glean
    police pps 500
  class copp-s-selfIp
    police pps 500
  class copp-s-l3mtufail
    police pps 100
  class copp-s-ttl1
    police pps 100
  class copp-s-ipmcmmiss
    police pps 400
  class copp-s-l3slowpath
    police pps 100
  class copp-s-dhcpreq
    police pps 300
  class copp-s-dhcpresp
    police pps 300
  class copp-s-dai
    police pps 300
  class copp-s-igmp
```

```
police pps 400
class copp-s-routingProto2
police pps 1300
class copp-s-v6routingProto2
police pps 1300
class copp-s-eigrp
police pps 200
class copp-s-pimreg
police pps 200
class copp-s-pimautorp
police pps 200
class copp-s-routingProtocol1
police pps 1000
class copp-s-arp
police pps 200
class copp-s-ptp
police pps 1000
class copp-s-vxlan
police pps 1000
class copp-s-bfd
police pps 350
class copp-s-bpdu
police pps 12000
class copp-s-dpss
police pps 1000
class copp-s-mpls
police pps 100
class copp-icmp
police pps 200
class copp-telnet
police pps 500
class copp-ssh
police pps 500
class copp-snmp
police pps 500
class copp-ntp
police pps 100
class copp-tacacsradius
police pps 400
class copp-stftp
police pps 400
control-plane
service-policy input copp-system-policy
snmp-server user admin network-admin auth md5
0xd0493552f909b9b34b70da38db08de42 priv 0xd0493552f909b9b34b70da38db08de42
localizedkey
rmon event 1 log trap public description FATAL(1) owner PMON@FATAL
```

```
rmon event 2 log trap public description CRITICAL(2) owner PMON@CRITICAL
rmon event 3 log trap public description ERROR(3) owner PMON@ERROR
rmon event 4 log trap public description WARNING(4) owner PMON@WARNING
rmon event 5 log trap public description INFORMATION(5) owner PMON@INFO
aaa authentication login default group dellRadius

vlan 1
spanning-tree vlan 1 hello-time 1
spanning-tree vlan 1 forward-time 4
spanning-tree vlan 1 max-age 6
vrf context management
no system urpf disable
no port-channel load-balance resilient
hardware profile portmode 64x10G

vpc domain 10
peer-switch
role priority 10
peer-keepalive destination 17.17.17.2 source 17.17.17.1 vrf default
auto-recovery

interface port-channel1
description **vPC Peer Link*
switchport mode trunk
spanning-tree port type network
speed 10000

interface port-channel10
description **vPC Peer Link*
switchport mode trunk
spanning-tree port type network
speed 10000
vpc peer-link

interface port-channel40
switchport mode trunk
speed 10000
vpc 2

interface port-channel45
switchport mode trunk
speed 10000
vpc 1

interface port-channel111
no switchport
```

```
speed 10000
ip address 17.17.17.1/30

interface Ethernet1/1

interface Ethernet1/2

interface Ethernet1/3

interface Ethernet1/4

interface Ethernet1/5
description **vPC Peer Link**
switchport mode trunk
channel-group 10 mode active

interface Ethernet1/6

interface Ethernet1/7

interface Ethernet1/8

interface Ethernet1/9

interface Ethernet1/10

interface Ethernet1/11

interface Ethernet1/12

interface Ethernet1/13

interface Ethernet1/14

interface Ethernet1/15

interface Ethernet1/16

interface Ethernet1/17
lacp rate fast
switchport mode trunk

interface Ethernet1/18

interface Ethernet1/19

interface Ethernet1/20
```

```
interface Ethernet1/21
    lacp rate fast
    switchport mode trunk

interface Ethernet1/22
    lacp rate fast
    switchport mode trunk

interface Ethernet1/23
    lacp rate fast
    switchport mode trunk

interface Ethernet1/24
    lacp rate fast
    switchport mode trunk

interface Ethernet1/25

interface Ethernet1/26

interface Ethernet1/27

interface Ethernet1/28

interface Ethernet1/29

interface Ethernet1/30

interface Ethernet1/31

interface Ethernet1/32

interface Ethernet1/33

interface Ethernet1/34

interface Ethernet1/35

interface Ethernet1/36

interface Ethernet1/37

interface Ethernet1/38
    switchport mode trunk
    speed 1000
```

```
interface Ethernet1/39
    switchport mode trunk
    speed 1000

interface Ethernet1/40
    switchport mode trunk
    speed 1000

interface Ethernet1/41
    switchport mode trunk
    speed 1000

interface Ethernet1/42

interface Ethernet1/43

interface Ethernet1/44

interface Ethernet1/45
    no switchport
    channel-group 111 mode active

interface Ethernet1/46

interface Ethernet1/47

interface Ethernet1/48

interface Ethernet1/49/1
    lacp rate fast
    switchport mode trunk
    channel-group 45 mode active

interface Ethernet1/49/2
    switchport mode trunk

interface Ethernet1/49/3
    switchport mode trunk

interface Ethernet1/49/4
    switchport mode trunk

interface Ethernet1/50/1
    lacp rate fast
    switchport mode trunk

interface Ethernet1/50/2
```

```
lacp rate fast
switchport mode trunk

interface Ethernet1/50/3
lacp rate fast
switchport mode trunk

interface Ethernet1/50/4
lacp rate fast
switchport mode trunk

interface Ethernet1/51/1
lacp rate fast
switchport mode trunk
channel-group 40 mode active

interface Ethernet1/51/2

interface Ethernet1/51/3

interface Ethernet1/51/4

interface Ethernet1/52/1

interface Ethernet1/52/2

interface Ethernet1/52/3

interface Ethernet1/52/4

interface mgmt0
vrf member management
ip address 12.12.12.112/24
line console
line vty
boot nxos bootflash:/nxos.7.0.3.I4.6_compact_N3064.bin
```

SW-NE2#

=====

SW-NW2# sh run

!Command: show running-config

!Time: Sat Jul 1 06:53:51 2017

```
version 7.0(3)I4(6)
hostname SW-NW2
vdc SW-NW2 id 1
    limit-resource vlan minimum 16 maximum 4094
    limit-resource vrf minimum 2 maximum 4096
    limit-resource port-channel minimum 0 maximum 104
    limit-resource u4route-mem minimum 128 maximum 128
    limit-resource u6route-mem minimum 96 maximum 96
    limit-resource m4route-mem minimum 58 maximum 58
    limit-resource m6route-mem minimum 8 maximum 8

cfs eth distribute
feature interface-vlan
feature lacp
feature vpc
feature lldp

no password strength-check
username admin password 5
$5$d2TY0ES8$8kKMZCrYx6/2RaEWfrQRH4CE5W9k0ujQbOuYVGqqxb7    role
network-admin
ip domain-lookup
radius-server host 12.12.12.99 key 7 "waer2" authentication accounting
timeout 1
aaa group server radius dellRadius
    server 12.12.12.99
    source-interface mgmt0
service unsupported-transceiver
ip access-list copp-system-acl-eigrp
    10 permit eigrp any 224.0.0.10/32
ipv6 access-list copp-system-acl-eigrp6
    10 permit eigrp any ff02::a/128
ip access-list copp-system-acl-icmp
    10 permit icmp any any
ip access-list copp-system-acl-igmp
    10 permit igmp any any
ip access-list copp-system-acl-ntp
    10 permit udp any any eq ntp
    20 permit udp any eq ntp any
ip access-list copp-system-acl-pimreg
    10 permit pim any any
ip access-list copp-system-acl-ping
    10 permit icmp any any echo
    20 permit icmp any any echo-reply
ip access-list copp-system-acl-routingproto1
```

```
10 permit tcp any gt 1024 any eq bgp
20 permit tcp any eq bgp any gt 1024
30 permit udp any 224.0.0.0/24 eq rip
40 permit tcp any gt 1024 any eq 639
50 permit tcp any eq 639 any gt 1024
70 permit ospf any any
80 permit ospf any 224.0.0.5/32
90 permit ospf any 224.0.0.6/32
ip access-list copp-system-acl-routingproto2
10 permit udp any 224.0.0.0/24 eq 1985
20 permit 112 any 224.0.0.0/24
ip access-list copp-system-acl-snmp
10 permit udp any any eq snmp
20 permit udp any any eq snmptrap
ip access-list copp-system-acl-ssh
10 permit tcp any any eq 22
20 permit tcp any eq 22 any
ip access-list copp-system-acl-stftp
10 permit udp any any eq tftp
20 permit udp any any eq 1758
30 permit udp any eq tftp any
40 permit udp any eq 1758 any
50 permit tcp any any eq 115
60 permit tcp any eq 115 any
ip access-list copp-system-acl-tacacsradius
10 permit tcp any any eq tacacs
20 permit tcp any eq tacacs any
30 permit udp any any eq 1812
40 permit udp any any eq 1813
50 permit udp any any eq 1645
60 permit udp any any eq 1646
70 permit udp any eq 1812 any
80 permit udp any eq 1813 any
90 permit udp any eq 1645 any
100 permit udp any eq 1646 any
ip access-list copp-system-acl-telnet
10 permit tcp any any eq telnet
20 permit tcp any any eq 107
30 permit tcp any eq telnet any
40 permit tcp any eq 107 any
ipv6 access-list copp-system-acl-v6routingProto2
10 permit udp any ff02::66/128 eq 2029
20 permit udp any ff02::fb/128 eq 5353
30 permit 112 any ff02::12/128
ipv6 access-list copp-system-acl-v6routingproto1
10 permit 89 any ff02::5/128
20 permit 89 any ff02::6/128
```

```
30 permit udp any ff02::9/128 eq 521
ip access-list copp-system-dhcp-relay
    10 permit udp any eq bootps any eq bootps
class-map type control-plane match-any copp-icmp
    match access-group name copp-system-acl-icmp
class-map type control-plane match-any copp-ntp
    match access-group name copp-system-acl-ntp
class-map type control-plane match-any copp-s-arp
class-map type control-plane match-any copp-s-bfd
class-map type control-plane match-any copp-s-bpdu
class-map type control-plane match-any copp-s-dai
class-map type control-plane match-any copp-s-default
class-map type control-plane match-any copp-s-dhcpreq
class-map type control-plane match-any copp-s-dhcprep
    match access-group name copp-system-dhcp-relay
class-map type control-plane match-any copp-s-dpss
class-map type control-plane match-any copp-s-eigrp
    match access-group name copp-system-acl-eigrp
    match access-group name copp-system-acl-eigrp6
class-map type control-plane match-any copp-s-glean
class-map type control-plane match-any copp-s-igmp
    match access-group name copp-system-acl-igmp
class-map type control-plane match-any copp-s-ipmcmiss
class-map type control-plane match-any copp-s-l2switched
class-map type control-plane match-any copp-s-l3destmiss
class-map type control-plane match-any copp-s-l3mtufail
class-map type control-plane match-any copp-s-l3slowpath
class-map type control-plane match-any copp-s-mpls
class-map type control-plane match-any copp-s-pimautorp
class-map type control-plane match-any copp-s-pimreg
    match access-group name copp-system-acl-pimreg
class-map type control-plane match-any copp-s-ping
    match access-group name copp-system-acl-ping
class-map type control-plane match-any copp-s-ptp
class-map type control-plane match-any copp-s-routingProto1
    match access-group name copp-system-acl-routingproto1
    match access-group name copp-system-acl-v6routingproto1
class-map type control-plane match-any copp-s-routingProto2
    match access-group name copp-system-acl-routingproto2
class-map type control-plane match-any copp-s-selfIp
class-map type control-plane match-any copp-s-ttl11
class-map type control-plane match-any copp-s-v6routingProto2
    match access-group name copp-system-acl-v6routingProto2
class-map type control-plane match-any copp-s-vxlan
class-map type control-plane match-any copp-snmp
    match access-group name copp-system-acl-snmp
class-map type control-plane match-any copp-ssh
```

```
match access-group name copp-system-acl-ssh
class-map type control-plane match-any copp-stftp
    match access-group name copp-system-acl-stftp
class-map type control-plane match-any copp-tacacsradius
    match access-group name copp-system-acl-tacacsradius
class-map type control-plane match-any copp-telnet
    match access-group name copp-system-acl-telnet
policy-map type control-plane copp-system-policy
    class copp-s-default
        police pps 400
    class copp-s-l2switched
        police pps 200
    class copp-s-ping
        police pps 100
    class copp-s-l3destmiss
        police pps 100
    class copp-s-glean
        police pps 500
    class copp-s-selfIp
        police pps 500
    class copp-s-l3mtufail
        police pps 100
    class copp-s-ttl1
        police pps 100
    class copp-s-ipmcmiss
        police pps 400
    class copp-s-l3slowpath
        police pps 100
    class copp-s-dhcpreq
        police pps 300
    class copp-s-dhcprep
        police pps 300
    class copp-s-dai
        police pps 300
    class copp-s-igmp
        police pps 400
    class copp-s-routingProto2
        police pps 1300
    class copp-s-v6routingProto2
        police pps 1300
    class copp-s-eigrp
        police pps 200
    class copp-s-pimreg
        police pps 200
    class copp-s-pimautorp
        police pps 200
    class copp-s-routingProtol
```

```
police pps 1000
class copp-s-arp
    police pps 200
class copp-s-ptp
    police pps 1000
class copp-s-vxlan
    police pps 1000
class copp-s-bfd
    police pps 350
class copp-s-bpdu
    police pps 12000
class copp-s-dpss
    police pps 1000
class copp-s-mpls
    police pps 100
class copp-icmp
    police pps 200
class copp-telnet
    police pps 500
class copp-ssh
    police pps 500
class copp-snmp
    police pps 500
class copp-ntp
    police pps 100
class copp-tacacsradius
    police pps 400
class copp-stftp
    police pps 400
control-plane
    service-policy input copp-system-policy
snmp-server user admin network-admin auth md5
0x308848879fc8fd2fd36920bc90e9de7a priv 0x308848879fc8fd2fd36920bc90e9de7a
localizedkey
rmon event 1 log trap public description FATAL(1) owner PMON@FATAL
rmon event 2 log trap public description CRITICAL(2) owner PMON@CRITICAL
rmon event 3 log trap public description ERROR(3) owner PMON@ERROR
rmon event 4 log trap public description WARNING(4) owner PMON@WARNING
rmon event 5 log trap public description INFORMATION(5) owner PMON@INFO
aaa authentication login default group dellRadius

vlan 1
spanning-tree vlan 1 priority 24576
spanning-tree vlan 1 hello-time 1
spanning-tree vlan 1 forward-time 4
spanning-tree vlan 1 max-age 6
vrf context management
```

```
no system urpf disable
no port-channel load-balance resilient
hardware profile portmode 64x10G

vpc domain 10
  peer-switch
  role priority 20
  peer-keepalive destination 17.17.17.1 source 17.17.17.2 vrf default
  auto-recovery

interface Vlan1
  no shutdown
  ip address 11.0.0.122/24

interface port-channel10
  description **vPC Peer Link*
  switchport mode trunk
  spanning-tree port type network
  speed 10000
  vpc peer-link

interface port-channel40
  switchport mode trunk
  speed 10000
  vpc 2

interface port-channel45
  switchport mode trunk
  speed 10000
  vpc 1

interface port-channel111
  no switchport
  speed 10000
  ip address 17.17.17.2/30

interface Ethernet1/1
  lacp rate fast
  switchport mode trunk

interface Ethernet1/2

interface Ethernet1/3

interface Ethernet1/4
```

```
interface Ethernet1/5
description **vPC Peer Link**
switchport mode trunk
channel-group 10 mode active

interface Ethernet1/6

interface Ethernet1/7

interface Ethernet1/8

interface Ethernet1/9

interface Ethernet1/10

interface Ethernet1/11

interface Ethernet1/12

interface Ethernet1/13

interface Ethernet1/14

interface Ethernet1/15

interface Ethernet1/16

interface Ethernet1/17

interface Ethernet1/18

interface Ethernet1/19

interface Ethernet1/20

interface Ethernet1/21

interface Ethernet1/22

interface Ethernet1/23

interface Ethernet1/24

interface Ethernet1/25

interface Ethernet1/26
```

```
interface Ethernet1/27
    speed 1000

interface Ethernet1/28

interface Ethernet1/29

interface Ethernet1/30

interface Ethernet1/31

interface Ethernet1/32

interface Ethernet1/33
    lacp rate fast
    switchport mode trunk
    channel-group 40 mode active

interface Ethernet1/34
    lacp rate fast
    switchport mode trunk

interface Ethernet1/35
    lacp rate fast
    switchport mode trunk

interface Ethernet1/36
    lacp rate fast
    switchport mode trunk

interface Ethernet1/37
    lacp rate fast
    switchport mode trunk

interface Ethernet1/38

interface Ethernet1/39
    switchport mode trunk
    speed 1000

interface Ethernet1/40
    switchport mode trunk
    speed 1000

interface Ethernet1/41
    switchport mode trunk
    speed 1000
```

```
interface Ethernet1/42

interface Ethernet1/43

interface Ethernet1/44

interface Ethernet1/45
    no switchport
    channel-group 111 mode active

interface Ethernet1/46

interface Ethernet1/47

interface Ethernet1/48

interface Ethernet1/49/1
    lacp rate fast
    switchport mode trunk
    channel-group 45 mode active

interface Ethernet1/49/2
    lacp rate fast
    switchport mode trunk
    channel-group 45 mode active

interface Ethernet1/49/3
    lacp rate fast
    switchport mode trunk
    channel-group 45 mode active

interface Ethernet1/49/4
    lacp rate fast
    switchport mode trunk
    channel-group 45 mode active

interface Ethernet1/50/1
    lacp rate fast
    switchport mode trunk

interface Ethernet1/50/2
    lacp rate fast
    switchport mode trunk

interface Ethernet1/50/3
    lacp rate fast
```

```
switchport mode trunk

interface Ethernet1/50/4
    lacp rate fast
    switchport mode trunk

interface Ethernet1/51/1

interface Ethernet1/51/2

interface Ethernet1/51/3

interface Ethernet1/51/4

interface Ethernet1/52/1

interface Ethernet1/52/2

interface Ethernet1/52/3

interface Ethernet1/52/4

interface mgmt0
    vrf member management
    ip address 12.12.12.113/24
line console
line vty
boot nxos bootflash:/nxos.7.0.3.I4.6_compact_N3064.bin
```

SW-NW2#

```
=====
=====

SLB-telnet@SLB2_KP2S#show running-config
!Building configuration...
!Current configuration : 1508 bytes
!
ver 10.2.01bTI2
!
server symmetric-port ethernet 4
!
!
server predictor round-robin
```

```
server port 80
  session-sync
  tcp

server port 21
  session-sync
  tcp
server source-nat
server source-ip 11.0.0.200 255.255.255.0 11.0.0.10
server source-ip 11.0.0.201 255.255.255.0 11.0.0.9
no server reset-message
server router-ports ethernet 1
!
context default
!
server real web2-vm2 11.0.0.12
  weight 50 0
  port http
  port http keepalive
  port http url "HEAD /"
  port ftp
!
server real web3-vm3 11.0.0.21
  weight 50 0
  port http
  port http keepalive
  port http url "HEAD /"
  port ftp
!
server real web4-vm4 11.0.0.22
  weight 50 0
  port http
  port http keepalive
  port http url "HEAD /"
  port ftp
!
server real web1-vm1 11.0.0.11
  weight 50 0
  port http
  port http keepalive
  port http url "HEAD /"
  port ftp
!
!
server virtual HTTPVIP 11.0.0.10
  sym-priority 101
  sym-active
```

```
port http
bind http web1-vm1 http web2-vm2 http web3-vm3 http web4-vm4 http
!
server virtual FTPVIP 11.0.0.9
sym-priority 101
sym-active
port ftp
bind ftp web1-vm1 ftp web2-vm2 ftp web3-vm3 ftp web4-vm4 ftp
!
vlan 1 name DEFAULT-VLAN by port
!
vlan 3 by port
untagged eth1 3
!
vlan 4 by port
untagged eth1 4
!
vlan 2 by port
untagged eth1 2
!
aaa authentication web-server default local
no enable aaa console
hostname SLB2_KP2S
ip address 13.13.13.2 255.255.255.252
ip default-gateway 11.0.0.254
telnet server
username admin password .....
snmp-server
!
interface ethernet 3
no spanning-tree
!
end
```

SLB-telnet@SLB2_KP2S#

=====

=====