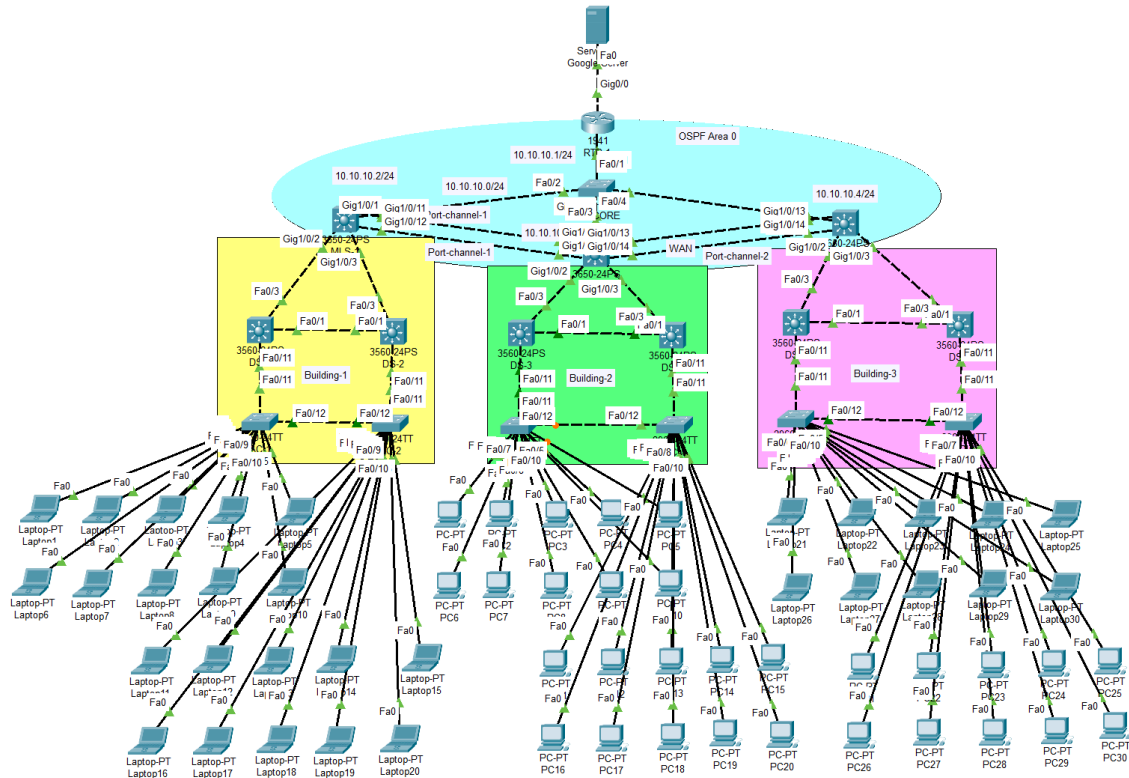


## CCNA Lab Topology - Type 1

### Topology



### Objective

No	Configure & Verify
1	STP & RSTP
2	Trunk & DTP
3	VTP Server & Client
4	VLAN
5	InterVLAN Routing
6	DHCP Server
7	EtherChannel
8	OSPF Area 0
9	End-to-end Connectivity Testing



## Configuration & Verification

No.	Description
1	<b>STP &amp; RSTP</b>
	<b>Configuration</b> MLS-1,2,3(config)#spanning-tree vlan 1 root primary AC-1,2,3,4,5,6(config)#interface range fa0/1-10 AC-1,2,3,4,5,6(config-if-range)#spanning-tree portfast AC-1,2,3,4,5,6(config-if-range)#spanning-tree bpduguard enable MLS-1,2,3(config)#spanning-tree mode rapid-pvst DS-1,2,3,4,5,6(config)#spanning-tree mode rapid-pvst AC-1,2,3,4,5,6(config)#spanning-tree mode rapid-pvst  <b>Verification</b> show running-config show spanning-tree show spanning-tree interface fa0/1 detail
2	<b>Trunk &amp; DTP</b>
	<b>Configuration</b> DS-1,2,3,4,5,6(config)#int fa0/1 DS-1,2,3,4,5,6(config-if)#switchport trunk encapsulation dot1q DS-1,2,3,4,5,6(config-if)#switchport mode trunk DS-1,2,3,4,5,6(config-if)#int f0/3 DS-1,2,3,4,5,6(config-if)#switchport trunk encapsulation dot1q DS-1,2,3,4,5,6(config-if)#switchport mode trunk DS-1,2,3,4,5,6(config-if)#int f0/11 DS-1,2,3,4,5,6(config-if)#switchport trunk encapsulation dot1q DS-1,2,3,4,5,6(config-if)#switchport mode trunk  AC-1,2,3(config)#int f0/12 AC-1,2,33(config-if)#switchport mode trunk  <b>Verification</b> show interface trunk show interface f0/1 switchport show interface switchport
3	<b>VTP Server &amp; Client</b>
	<b>Configuration</b>



	<pre> MLS-1,2,3(config)#vtp mode server MLS-1,2,3(config)#vtp domain CCNA MLS-1,2,3(config)#vtp password NIXTRAIN  DS-1,2,3,4,5,6(config)#vtp mode client DS-1,2,3,4,5,6(config)#vtp domain CCNA DS-1,2,3,4,5,6(config)#vtp password NIXTRAIN  AC-1,2,3,4,5,6(config)#vtp mode client AC-1,2,3,4,5,6(config)#vtp domain CCNA AC-1,2,3,4,5,6(config)#vtp password NIXTRAIN  <b>Verification</b>  show vtp status show vtp password show vtp counters </pre>
4	<p><b>VLAN</b></p> <p><b>Configuration</b></p> <pre> MLS-1,2,3(config)#vlan 101 MLS-1,2,3(config-vlan)#name Div_1 MLS-1,2,3(config-vlan)#vlan 102 MLS-1,2,3(config-vlan)#name Div_2 MLS-1,2,3(config-vlan)#vlan 103 MLS-1,2,3(config-vlan)#name Div_3 MLS-1,2,3(config-vlan)#vlan 104 MLS-1,2,3(config-vlan)#name Div_4 MLS-1,2,3(config-vlan)#vlan 105 MLS-1,2,3(config-vlan)#name Div_5 MLS-1,2,3(config-vlan)#vlan 106 MLS-1,2,3(config-vlan)#name Div_6 MLS-1,2,3(config-vlan)#vlan 107 MLS-1,2,3(config-vlan)#name Div_7 MLS-1,2,3(config-vlan)#vlan 108 MLS-1,2,3(config-vlan)#name Div_8 MLS-1,2,3(config-vlan)#vlan 109 MLS-1,2,3(config-vlan)#name Div_9 MLS-1,2,3(config-vlan)#vlan 110 MLS-1,2,3(config-vlan)#name Div_10 MLS-1,2,3(config-vlan)#vlan 111 MLS-1,2,3(config-vlan)#name Div_11 MLS-1,2,3(config-vlan)#vlan 112 MLS-1,2,3(config-vlan)#name Div_12 MLS-1,2,3(config-vlan)#vlan 113 MLS-1,2,3(config-vlan)#name Div_13 MLS-1,2,3(config-vlan)#vlan 114 </pre>



```
MLS-1,2,3(config-vlan)#name Div_14
MLS-1,2,3(config-vlan)#vlan 115
MLS-1,2,3(config-vlan)#name Div_15
MLS-1,2,3(config-vlan)#vlan 116
MLS-1,2,3(config-vlan)#name Div_16
MLS-1,2,3(config-vlan)#vlan 117
MLS-1,2,3(config-vlan)#name Div_17
MLS-1,2,3(config-vlan)#vlan 118
MLS-1,2,3(config-vlan)#name Div_18
MLS-1,2,3(config-vlan)#vlan 119
MLS-1,2,3(config-vlan)#name Div_19
MLS-1,2,3(config-vlan)#vlan 120
MLS-1,2,3(config-vlan)#name Div_20

AC-1,3,5(config)#int f0/1
AC-1,3,5(config-if)#switchport mode access
AC-1,3,5(config-if)#switchport access vlan 101
AC-1,3,5(config-if)#int f0/2
AC-1,3,5(config-if)#switchport mode access
AC-1,3,5(config-if)#switchport access vlan 102
AC-1,3,5(config-if)#int f0/3
AC-1,3,5(config-if)#switchport mode access
AC-1,3,5(config-if)#switchport access vlan 103
AC-1,3,5(config-if)#int f0/4
AC-1,3,5(config-if)#switchport mode access
AC-1,3,5(config-if)#switchport access vlan 104
AC-1,3,5(config-if)#int f0/5
AC-1,3,5(config-if)#switchport mode access
AC-1,3,5(config-if)#switchport access vlan 105
AC-1,3,5(config-if)#int f0/6
AC-1,3,5(config-if)#switchport mode access
AC-1,3,5(config-if)#switchport access vlan 106
AC-1,3,5(config-if)#int f0/7
AC-1,3,5(config-if)#switchport mode access
AC-1,3,5(config-if)#switchport access vlan 107
AC-1,3,5(config-if)#int f0/8
AC-1,3,5(config-if)#switchport mode access
AC-1,3,5(config-if)#switchport access vlan 108
AC-1,3,5(config-if)#int f0/9
AC-1,3,5(config-if)#switchport mode access
AC-1,3,5(config-if)#switchport access vlan 109
AC-1,3,5(config-if)#int f0/10
AC-1,3,5(config-if)#switchport mode access
AC-1,3,5(config-if)#switchport access vlan 110

AC-2,4,6(config)#int f0/1
AC-2,4,6(config-if)#switchport mode access
AC-2,4,6(config-if)#switchport access vlan 111
AC-2,4,6(config-if)#int f0/2
AC-2,4,6(config-if)#switchport mode access
AC-2,4,6(config-if)#switchport access vlan 112
```



	<pre> AC-2,4,6(config-if)#int f0/3 AC-2,4,6(config-if)#switchport mode access AC-2,4,6(config-if)#switchport access vlan 113 AC-2,4,6(config-if)#int f0/4 AC-2,4,6(config-if)#switchport mode access AC-2,4,6(config-if)#switchport access vlan 114 AC-2,4,6(config-if)#int f0/5 AC-2,4,6(config-if)#switchport mode access AC-2,4,6(config-if)#switchport access vlan 115 AC-2,4,6(config-if)#int f0/6 AC-2,4,6(config-if)#switchport mode access AC-2,4,6(config-if)#switchport access vlan 116 AC-2,4,6(config-if)#int f0/7 AC-2,4,6(config-if)#switchport mode access AC-2,4,6(config-if)#switchport access vlan 117 AC-2,4,6(config-if)#int f0/8 AC-2,4,6(config-if)#switchport mode access AC-2,4,6(config-if)#switchport access vlan 118 AC-2,4,6(config-if)#int f0/9 AC-2,4,6(config-if)#switchport mode access AC-2,4,6(config-if)#switchport access vlan 119 AC-2,4,6(config-if)#int f0/10 AC-2,4,6(config-if)#switchport mode access AC-2,4,6(config-if)#switchport access vlan 120 </pre> <p><b>Verification</b></p> <pre> show running-config show vlan brief </pre>
5	<b>InterVLAN Routing</b>
	<p><b>Configuration</b></p> <pre> MLS-1(config)#ip routing MLS-1(config)#int vlan101 MLS-1(config-if)#ip address 192.168.1.1 255.255.255.0 MLS-1(config-if)#int vlan102 MLS-1(config-if)#ip address 192.168.2.1 255.255.255.0 MLS-1(config-if)#int vlan103 MLS-1(config-if)#ip address 192.168.3.1 255.255.255.0 MLS-1(config-if)#int vlan104 MLS-1(config-if)#ip address 192.168.4.1 255.255.255.0 MLS-1(config-if)#int vlan105 MLS-1(config-if)#ip address 192.168.5.1 255.255.255.0 MLS-1(config-if)#int vlan106 MLS-1(config-if)#ip address 192.168.6.1 255.255.255.0 MLS-1(config-if)#int vlan107 MLS-1(config-if)#ip address 192.168.7.1 255.255.255.0 MLS-1(config-if)#int vlan108 MLS-1(config-if)#ip address 192.168.8.1 255.255.255.0 </pre>



```
MLS-1(config-if)#int vlan109
MLS-1(config-if)#ip address 192.168.9.1 255.255.255.0
MLS-1(config-if)#int vlan110
MLS-1(config-if)#ip address 192.168.10.1 255.255.255.0
MLS-1(config-if)#int vlan111
MLS-1(config-if)#ip address 192.168.11.1 255.255.255.0
MLS-1(config-if)#int vlan112
MLS-1(config-if)#ip address 192.168.12.1 255.255.255.0
MLS-1(config-if)#int vlan113
MLS-1(config-if)#ip address 192.168.13.1 255.255.255.0
MLS-1(config-if)#int vlan114
MLS-1(config-if)#ip address 192.168.14.1 255.255.255.0
MLS-1(config-if)#int vlan115
MLS-1(config-if)#ip address 192.168.15.1 255.255.255.0
MLS-1(config-if)#int vlan116
MLS-1(config-if)#ip address 192.168.16.1 255.255.255.0
MLS-1(config-if)#int vlan117
MLS-1(config-if)#ip address 192.168.17.1 255.255.255.0
MLS-1(config-if)#int vlan118
MLS-1(config-if)#ip address 192.168.18.1 255.255.255.0
MLS-1(config-if)#int vlan119
MLS-1(config-if)#ip address 192.168.19.1 255.255.255.0
MLS-1(config-if)#int vlan120
MLS-1(config-if)#ip address 192.168.20.1 255.255.255.0

MLS-2(config)#ip routing
MLS-2(config)#int vlan101
MLS-2(config-if)#ip address 172.16.1.1 255.255.255.0
MLS-2(config-if)#int vlan102
MLS-2(config-if)#ip address 172.16.2.1 255.255.255.0
MLS-2(config-if)#int vlan103
MLS-2(config-if)#ip address 172.16.3.1 255.255.255.0
MLS-2(config-if)#int vlan104
MLS-2(config-if)#ip address 172.16.4.1 255.255.255.0
MLS-2(config-if)#int vlan105
MLS-2(config-if)#ip address 172.16.5.1 255.255.255.0
MLS-2(config-if)#int vlan106
MLS-2(config-if)#ip address 172.16.6.1 255.255.255.0
MLS-2(config-if)#int vlan107
MLS-2(config-if)#ip address 172.16.7.1 255.255.255.0
MLS-2(config-if)#int vlan108
MLS-2(config-if)#ip address 172.16.8.1 255.255.255.0
MLS-2(config-if)#int vlan109
MLS-2(config-if)#ip address 172.16.9.1 255.255.255.0
MLS-2(config-if)#int vlan110
MLS-2(config-if)#ip address 172.16.10.1 255.255.255.0
MLS-2(config-if)#int vlan111
MLS-2(config-if)#ip address 172.16.11.1 255.255.255.0
MLS-2(config-if)#int vlan112
MLS-2(config-if)#ip address 172.16.12.1 255.255.255.0
MLS-2(config-if)#int vlan113
```



```
MLS-2(config-if)#ip address 172.16.13.1 255.255.255.0
MLS-2(config-if)#int vlan114
MLS-2(config-if)#ip address 172.16.14.1 255.255.255.0
MLS-2(config-if)#int vlan115
MLS-2(config-if)#ip address 172.16.15.1 255.255.255.0
MLS-2(config-if)#int vlan116
MLS-2(config-if)#ip address 172.16.16.1 255.255.255.0
MLS-2(config-if)#int vlan117
MLS-2(config-if)#ip address 172.16.17.1 255.255.255.0
MLS-2(config-if)#int vlan118
MLS-2(config-if)#ip address 172.16.18.1 255.255.255.0
MLS-2(config-if)#int vlan119
MLS-2(config-if)#ip address 172.16.19.1 255.255.255.0
MLS-2(config-if)#int vlan120
MLS-2(config-if)#ip address 172.16.20.1 255.255.255.0

MLS-3(config)#ip routing
MLS-3(config)#int vlan101
MLS-3(config-if)#ip address 10.0.1.1 255.255.255.0
MLS-3(config-if)#int vlan102
MLS-3(config-if)#ip address 10.0.2.1 255.255.255.0
MLS-3(config-if)#int vlan103
MLS-3(config-if)#ip address 10.0.3.1 255.255.255.0
MLS-3(config-if)#int vlan104
MLS-3(config-if)#ip address 10.0.4.1 255.255.255.0
MLS-3(config-if)#int vlan105
MLS-3(config-if)#ip address 10.0.5.1 255.255.255.0
MLS-3(config-if)#int vlan106
MLS-3(config-if)#ip address 10.0.6.1 255.255.255.0
MLS-3(config-if)#int vlan107
MLS-3(config-if)#ip address 10.0.7.1 255.255.255.0
MLS-3(config-if)#int vlan108
MLS-3(config-if)#ip address 10.0.8.1 255.255.255.0
MLS-3(config-if)#int vlan109
MLS-3(config-if)#ip address 10.0.9.1 255.255.255.0
MLS-3(config-if)#int vlan110
MLS-3(config-if)#ip address 10.0.10.1 255.255.255.0
MLS-3(config-if)#int vlan111
MLS-3(config-if)#ip address 10.0.11.1 255.255.255.0
MLS-3(config-if)#int vlan112
MLS-3(config-if)#ip address 10.0.12.1 255.255.255.0
MLS-3(config-if)#int vlan113
MLS-3(config-if)#ip address 10.0.13.1 255.255.255.0
MLS-3(config-if)#int vlan114
MLS-3(config-if)#ip address 10.0.14.1 255.255.255.0
MLS-3(config-if)#int vlan115
MLS-3(config-if)#ip address 10.0.15.1 255.255.255.0
MLS-3(config-if)#int vlan116
MLS-3(config-if)#ip address 10.0.16.1 255.255.255.0
MLS-3(config-if)#int vlan117
MLS-3(config-if)#ip address 10.0.17.1 255.255.255.0
```





	<pre> MLS-3(config-if)#int vlan118 MLS-3(config-if)#ip address 10.0.18.1 255.255.255.0 MLS-3(config-if)#int vlan119 MLS-3(config-if)#ip address 10.0.19.1 255.255.255.0 MLS-3(config-if)#int vlan120 MLS-3(config-if)#ip address 10.0.20.1 255.255.255.0 </pre> <p><b>Verification</b></p> <pre> show ip route show ip interface brief </pre>
	<p><b>DHCP Server</b></p> <p><b>Configuration</b></p> <pre> MLS-1(config)#ip dhcp pool VLAN101 MLS-1(dhcp-config)#network 192.168.1.0 255.255.255.0 MLS-1(dhcp-config)#default-router 192.168.1.1 MLS-1(dhcp-config)#dns-server 8.8.8.8 MLS-1(dhcp-config)#ip dhcp excluded-address 192.168.1.1 192.168.1.10 MLS-1(config)#ip dhcp pool VLAN102 MLS-1(dhcp-config)#network 192.168.2.0 255.255.255.0 MLS-1(dhcp-config)#default-router 192.168.2.1 MLS-1(dhcp-config)#dns-server 8.8.8.8 MLS-1(dhcp-config)#ip dhcp excluded-address 192.168.2.1 192.168.2.10 MLS-1(config)#ip dhcp pool VLAN103 MLS-1(dhcp-config)#network 192.168.3.0 255.255.255.0 MLS-1(dhcp-config)#default-router 192.168.3.1 MLS-1(dhcp-config)#dns-server 8.8.8.8 MLS-1(dhcp-config)#ip dhcp excluded-address 192.168.3.1 192.168.3.10 MLS-1(config)#ip dhcp pool VLAN104 MLS-1(dhcp-config)#network 192.168.4.0 255.255.255.0 MLS-1(dhcp-config)#default-router 192.168.4.1 MLS-1(dhcp-config)#dns-server 8.8.8.8 MLS-1(dhcp-config)#ip dhcp excluded-address 192.168.4.1 192.168.4.10 MLS-1(config)#ip dhcp pool VLAN105 MLS-1(dhcp-config)#network 192.168.5.0 255.255.255.0 MLS-1(dhcp-config)#default-router 192.168.5.1 MLS-1(dhcp-config)#dns-server 8.8.8.8 MLS-1(dhcp-config)#ip dhcp excluded-address 192.168.5.1 192.168.5.10 MLS-1(config)#ip dhcp pool VLAN106 MLS-1(dhcp-config)#network 192.168.6.0 255.255.255.0 MLS-1(dhcp-config)#default-router 192.168.6.1 MLS-1(dhcp-config)#dns-server 8.8.8.8 MLS-1(dhcp-config)#ip dhcp excluded-address 192.168.6.1 192.168.6.10 MLS-1(config)#ip dhcp pool VLAN107 MLS-1(dhcp-config)#network 192.168.7.0 255.255.255.0 MLS-1(dhcp-config)#default-router 192.168.7.1 </pre>





```
MLS-1(dhcp-config)#dns-server 8.8.8.8
MLS-1(dhcp-config)#ip dhcp excluded-address 192.168.7.1 192.168.7.10
MLS-1(config)#ip dhcp pool VLAN108
MLS-1(dhcp-config)#network 192.168.8.0 255.255.255.0
MLS-1(dhcp-config)#default-router 192.168.8.1
MLS-1(dhcp-config)#dns-server 8.8.8.8
MLS-1(dhcp-config)#ip dhcp excluded-address 192.168.8.1 192.168.8.10
MLS-1(config)#ip dhcp pool VLAN109
MLS-1(dhcp-config)#network 192.168.9.0 255.255.255.0
MLS-1(dhcp-config)#default-router 192.168.9.1
MLS-1(dhcp-config)#dns-server 8.8.8.8
MLS-1(dhcp-config)#ip dhcp excluded-address 192.168.9.1 192.168.9.10
MLS-1(config)#ip dhcp pool VLAN110
MLS-1(dhcp-config)#network 192.168.10.0 255.255.255.0
MLS-1(dhcp-config)#default-router 192.168.10.1
MLS-1(dhcp-config)#dns-server 8.8.8.8
MLS-1(dhcp-config)#ip dhcp excluded-address 192.168.10.1 192.168.10.10
MLS-1(config)#ip dhcp pool VLAN111
MLS-1(dhcp-config)#network 192.168.11.0 255.255.255.0
MLS-1(dhcp-config)#default-router 192.168.11.1
MLS-1(dhcp-config)#dns-server 8.8.8.8
MLS-1(dhcp-config)#ip dhcp excluded-address 192.168.11.1 192.168.11.10
MLS-1(config)#ip dhcp pool VLAN112
MLS-1(dhcp-config)#network 192.168.12.0 255.255.255.0
MLS-1(dhcp-config)#default-router 192.168.12.1
MLS-1(dhcp-config)#dns-server 8.8.8.8
MLS-1(dhcp-config)#ip dhcp excluded-address 192.168.12.1 192.168.12.10
MLS-1(config)#ip dhcp pool VLAN113
MLS-1(dhcp-config)#network 192.168.13.0 255.255.255.0
MLS-1(dhcp-config)#default-router 192.168.13.1
MLS-1(dhcp-config)#dns-server 8.8.8.8
MLS-1(dhcp-config)#ip dhcp excluded-address 192.168.13.1 192.168.14.10
MLS-1(config)#ip dhcp pool VLAN114
MLS-1(dhcp-config)#network 192.168.14.0 255.255.255.0
MLS-1(dhcp-config)#default-router 192.168.14.1
MLS-1(dhcp-config)#dns-server 8.8.8.8
MLS-1(dhcp-config)#ip dhcp excluded-address 192.168.14.1 192.168.14.10
MLS-1(config)#ip dhcp pool VLAN115
MLS-1(dhcp-config)#network 192.168.15.0 255.255.255.0
MLS-1(dhcp-config)#default-router 192.168.15.1
MLS-1(dhcp-config)#dns-server 8.8.8.8
MLS-1(dhcp-config)#ip dhcp excluded-address 192.168.15.1 192.168.15.10
MLS-1(config)#ip dhcp pool VLAN116
MLS-1(dhcp-config)#network 192.168.16.0 255.255.255.0
MLS-1(dhcp-config)#default-router 192.168.16.1
MLS-1(dhcp-config)#dns-server 8.8.8.8
MLS-1(dhcp-config)#ip dhcp excluded-address 192.168.16.1 192.168.16.10
MLS-1(config)#ip dhcp pool VLAN117
MLS-1(dhcp-config)#network 192.168.17.0 255.255.255.0
MLS-1(dhcp-config)#default-router 192.168.17.1
MLS-1(dhcp-config)#dns-server 8.8.8.8
```



```
MLS-1(dhcp-config)#ip dhcp excluded-address 192.168.17.1 192.168.17.10
MLS-1(config)#ip dhcp pool VLAN118
MLS-1(dhcp-config)#network 192.168.18.0 255.255.255.0
MLS-1(dhcp-config)#default-router 192.168.18.1
MLS-1(dhcp-config)#dns-server 8.8.8.8
MLS-1(dhcp-config)#ip dhcp excluded-address 192.168.18.1 192.168.18.10
MLS-1(config)#ip dhcp pool VLAN119
MLS-1(dhcp-config)#network 192.168.19.0 255.255.255.0
MLS-1(dhcp-config)#default-router 192.168.19.1
MLS-1(dhcp-config)#dns-server 8.8.8.8
MLS-1(dhcp-config)#ip dhcp excluded-address 192.168.19.1 192.168.19.10
MLS-1(config)#ip dhcp pool VLAN120
MLS-1(dhcp-config)#network 192.168.20.0 255.255.255.0
MLS-1(dhcp-config)#default-router 192.168.20.1
MLS-1(dhcp-config)#dns-server 8.8.8.8
MLS-1(dhcp-config)#ip dhcp excluded-address 192.168.20.1 192.168.20.10

MLS-2(config)#ip dhcp pool VLAN101
MLS-2(dhcp-config)#network 172.16.1.0 255.255.255.0
MLS-2(dhcp-config)#default-router 172.16.1.1
MLS-2(dhcp-config)#dns-server 8.8.8.8
MLS-2(dhcp-config)#ip dhcp excluded-address 172.16.1.1 172.16.1.10
MLS-2(config)#ip dhcp pool VLAN102
MLS-2(dhcp-config)#network 172.16.2.0 255.255.255.0
MLS-2(dhcp-config)#default-router 172.16.2.1
MLS-2(dhcp-config)#dns-server 8.8.8.8
MLS-2(dhcp-config)#ip dhcp excluded-address 172.16.2.1 172.16.2.10
MLS-2(config)#ip dhcp pool VLAN103
MLS-2(dhcp-config)#network 172.16.3.0 255.255.255.0
MLS-2(dhcp-config)#default-router 172.16.3.1
MLS-2(dhcp-config)#dns-server 8.8.8.8
MLS-2(dhcp-config)#ip dhcp excluded-address 172.16.3.1 172.16.3.10
MLS-2(config)#ip dhcp pool VLAN104
MLS-2(dhcp-config)#network 172.16.4.0 255.255.255.0
MLS-2(dhcp-config)#default-router 172.16.4.1
MLS-2(dhcp-config)#dns-server 8.8.8.8
MLS-2(dhcp-config)#ip dhcp excluded-address 172.16.4.1 172.16.4.10
MLS-2(config)#ip dhcp pool VLAN105
MLS-2(dhcp-config)#network 172.16.5.0 255.255.255.0
MLS-2(dhcp-config)#default-router 172.16.5.1
MLS-2(dhcp-config)#dns-server 8.8.8.8
MLS-2(dhcp-config)#ip dhcp excluded-address 172.16.5.1 172.16.5.10
MLS-2(config)#ip dhcp pool VLAN106
MLS-2(dhcp-config)#network 172.16.6.0 255.255.255.0
MLS-2(dhcp-config)#default-router 172.16.6.1
MLS-2(dhcp-config)#dns-server 8.8.8.8
MLS-2(dhcp-config)#ip dhcp excluded-address 172.16.6.1 172.16.6.10
MLS-2(config)#ip dhcp pool VLAN107
MLS-2(dhcp-config)#network 172.16.7.0 255.255.255.0
MLS-2(dhcp-config)#default-router 172.16.7.1
MLS-2(dhcp-config)#dns-server 8.8.8.8
```



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MLS-2(dhcp-config)#ip dhcp excluded-address 172.16.7.1 172.16.7.10
MLS-2(config)#ip dhcp pool VLAN108
MLS-2(dhcp-config)#network 172.16.8.0 255.255.255.0
MLS-2(dhcp-config)#default-router 172.16.8.1
MLS-2(dhcp-config)#dns-server 8.8.8.8
MLS-2(dhcp-config)#ip dhcp excluded-address 172.16.8.1 172.16.8.10
MLS-2(config)#ip dhcp pool VLAN109
MLS-2(dhcp-config)#network 172.16.9.0 255.255.255.0
MLS-2(dhcp-config)#default-router 172.16.9.1
MLS-2(dhcp-config)#dns-server 8.8.8.8
MLS-2(dhcp-config)#ip dhcp excluded-address 172.16.9.1 172.16.9.10
MLS-2(config)#ip dhcp pool VLAN110
MLS-2(dhcp-config)#network 172.16.10.0 255.255.255.0
MLS-2(dhcp-config)#default-router 172.16.10.1
MLS-2(dhcp-config)#dns-server 8.8.8.8
MLS-2(dhcp-config)#ip dhcp excluded-address 172.16.10.1 172.16.10.10
MLS-2(config)#ip dhcp pool VLAN111
MLS-2(dhcp-config)#network 172.16.11.0 255.255.255.0
MLS-2(dhcp-config)#default-router 172.16.11.1
MLS-2(dhcp-config)#dns-server 8.8.8.8
MLS-2(dhcp-config)#ip dhcp excluded-address 172.16.11.1 172.16.11.10
MLS-2(config)#ip dhcp pool VLAN112
MLS-2(dhcp-config)#network 172.16.12.0 255.255.255.0
MLS-2(dhcp-config)#default-router 172.16.12.1
MLS-2(dhcp-config)#dns-server 8.8.8.8
MLS-2(dhcp-config)#ip dhcp excluded-address 172.16.12.1 172.16.12.10
MLS-2(config)#ip dhcp pool VLAN113
MLS-2(dhcp-config)#network 172.16.13.0 255.255.255.0
MLS-2(dhcp-config)#default-router 172.16.13.1
MLS-2(dhcp-config)#dns-server 8.8.8.8
MLS-2(dhcp-config)#ip dhcp excluded-address 172.16.13.1 172.16.14.10
MLS-2(config)#ip dhcp pool VLAN114
MLS-2(dhcp-config)#network 172.16.14.0 255.255.255.0
MLS-2(dhcp-config)#default-router 172.16.14.1
MLS-2(dhcp-config)#dns-server 8.8.8.8
MLS-2(dhcp-config)#ip dhcp excluded-address 172.16.14.1 172.16.14.10
MLS-2(config)#ip dhcp pool VLAN115
MLS-2(dhcp-config)#network 172.16.15.0 255.255.255.0
MLS-2(dhcp-config)#default-router 172.16.15.1
MLS-2(dhcp-config)#dns-server 8.8.8.8
MLS-2(dhcp-config)#ip dhcp excluded-address 172.16.15.1 172.16.15.10
MLS-2(config)#ip dhcp pool VLAN116
MLS-2(dhcp-config)#network 172.16.16.0 255.255.255.0
MLS-2(dhcp-config)#default-router 172.16.16.1
MLS-2(dhcp-config)#dns-server 8.8.8.8
MLS-2(dhcp-config)#ip dhcp excluded-address 172.16.16.1 172.16.16.10
MLS-2(config)#ip dhcp pool VLAN117
MLS-2(dhcp-config)#network 172.16.17.0 255.255.255.0
MLS-2(dhcp-config)#default-router 172.16.17.1
MLS-2(dhcp-config)#dns-server 8.8.8.8
MLS-2(dhcp-config)#ip dhcp excluded-address 172.16.17.1 172.16.17.10
```



```
MLS-2(config)#ip dhcp pool VLAN118
MLS-2(dhcp-config)#network 172.16.18.0 255.255.255.0
MLS-2(dhcp-config)#default-router 172.16.18.1
MLS-2(dhcp-config)#dns-server 8.8.8.8
MLS-2(dhcp-config)#ip dhcp excluded-address 172.16.18.1 172.16.18.10
MLS-2(config)#ip dhcp pool VLAN119
MLS-2(dhcp-config)#network 172.16.19.0 255.255.255.0
MLS-2(dhcp-config)#default-router 172.16.19.1
MLS-2(dhcp-config)#dns-server 8.8.8.8
MLS-2(dhcp-config)#ip dhcp excluded-address 172.16.19.1 172.16.19.10
MLS-2(config)#ip dhcp pool VLAN120
MLS-2(dhcp-config)#network 172.16.20.0 255.255.255.0
MLS-2(dhcp-config)#default-router 172.16.20.1
MLS-2(dhcp-config)#dns-server 8.8.8.8
MLS-2(dhcp-config)#ip dhcp excluded-address 172.16.20.1 172.16.20.10

MLS-3(config)#ip dhcp pool VLAN101
MLS-3(dhcp-config)#network 10.0.1.0 255.255.255.0
MLS-3(dhcp-config)#default-router 10.0.1.1
MLS-3(dhcp-config)#dns-server 8.8.8.8
MLS-3(dhcp-config)#ip dhcp excluded-address 10.0.1.1 10.0.1.10
MLS-3(config)#ip dhcp pool VLAN102
MLS-3(dhcp-config)#network 10.0.2.0 255.255.255.0
MLS-3(dhcp-config)#default-router 10.0.2.1
MLS-3(dhcp-config)#dns-server 8.8.8.8
MLS-3(dhcp-config)#ip dhcp excluded-address 10.0.2.1 10.0.2.10
MLS-3(config)#ip dhcp pool VLAN103
MLS-3(dhcp-config)#network 10.0.3.0 255.255.255.0
MLS-3(dhcp-config)#default-router 10.0.3.1
MLS-3(dhcp-config)#dns-server 8.8.8.8
MLS-3(dhcp-config)#ip dhcp excluded-address 10.0.3.1 10.0.3.10
MLS-3(config)#ip dhcp pool VLAN104
MLS-3(dhcp-config)#network 10.0.4.0 255.255.255.0
MLS-3(dhcp-config)#default-router 10.0.4.1
MLS-3(dhcp-config)#dns-server 8.8.8.8
MLS-3(dhcp-config)#ip dhcp excluded-address 10.0.4.1 10.0.4.10
MLS-3(config)#ip dhcp pool VLAN105
MLS-3(dhcp-config)#network 10.0.5.0 255.255.255.0
MLS-3(dhcp-config)#default-router 10.0.5.1
MLS-3(dhcp-config)#dns-server 8.8.8.8
MLS-3(dhcp-config)#ip dhcp excluded-address 10.0.5.1 10.0.5.10
MLS-3(config)#ip dhcp pool VLAN106
MLS-3(dhcp-config)#network 10.0.6.0 255.255.255.0
MLS-3(dhcp-config)#default-router 10.0.6.1
MLS-3(dhcp-config)#dns-server 8.8.8.8
MLS-3(dhcp-config)#ip dhcp excluded-address 10.0.6.1 10.0.6.10
MLS-3(config)#ip dhcp pool VLAN107
MLS-3(dhcp-config)#network 10.0.7.0 255.255.255.0
MLS-3(dhcp-config)#default-router 10.0.7.1
MLS-3(dhcp-config)#dns-server 8.8.8.8
```



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MLS-3(dhcp-config)#ip dhcp excluded-address 10.0.7.1 10.0.7.10
MLS-3(config)#ip dhcp pool VLAN108
MLS-3(dhcp-config)#network 10.0.8.0 255.255.255.0
MLS-3(dhcp-config)#default-router 10.0.8.1
MLS-3(dhcp-config)#dns-server 8.8.8.8
MLS-3(dhcp-config)#ip dhcp excluded-address 10.0.8.1 10.0.8.10
MLS-3(config)#ip dhcp pool VLAN109
MLS-3(dhcp-config)#network 10.0.9.0 255.255.255.0
MLS-3(dhcp-config)#default-router 10.0.9.1
MLS-3(dhcp-config)#dns-server 8.8.8.8
MLS-3(dhcp-config)#ip dhcp excluded-address 10.0.9.1 10.0.9.10
MLS-3(config)#ip dhcp pool VLAN110
MLS-3(dhcp-config)#network 10.0.10.0 255.255.255.0
MLS-3(dhcp-config)#default-router 10.0.10.1
MLS-3(dhcp-config)#dns-server 8.8.8.8
MLS-3(dhcp-config)#ip dhcp excluded-address 10.0.10.1 10.0.10.10
MLS-3(config)#ip dhcp pool VLAN111
MLS-3(dhcp-config)#network 10.0.11.0 255.255.255.0
MLS-3(dhcp-config)#default-router 10.0.11.1
MLS-3(dhcp-config)#dns-server 8.8.8.8
MLS-3(dhcp-config)#ip dhcp excluded-address 10.0.11.1 10.0.11.10
MLS-3(config)#ip dhcp pool VLAN112
MLS-3(dhcp-config)#network 10.0.12.0 255.255.255.0
MLS-3(dhcp-config)#default-router 10.0.12.1
MLS-3(dhcp-config)#dns-server 8.8.8.8
MLS-3(dhcp-config)#ip dhcp excluded-address 10.0.12.1 10.0.12.10
MLS-3(config)#ip dhcp pool VLAN113
MLS-3(dhcp-config)#network 10.0.13.0 255.255.255.0
MLS-3(dhcp-config)#default-router 10.0.13.1
MLS-3(dhcp-config)#dns-server 8.8.8.8
MLS-3(dhcp-config)#ip dhcp excluded-address 10.0.13.1 10.0.14.10
MLS-3(config)#ip dhcp pool VLAN114
MLS-3(dhcp-config)#network 10.0.14.0 255.255.255.0
MLS-3(dhcp-config)#default-router 10.0.14.1
MLS-3(dhcp-config)#dns-server 8.8.8.8
MLS-3(dhcp-config)#ip dhcp excluded-address 10.0.14.1 10.0.14.10
MLS-3(config)#ip dhcp pool VLAN115
MLS-3(dhcp-config)#network 10.0.15.0 255.255.255.0
MLS-3(dhcp-config)#default-router 10.0.15.1
MLS-3(dhcp-config)#dns-server 8.8.8.8
MLS-3(dhcp-config)#ip dhcp excluded-address 10.0.15.1 10.0.15.10
MLS-3(config)#ip dhcp pool VLAN116
MLS-3(dhcp-config)#network 10.0.16.0 255.255.255.0
MLS-3(dhcp-config)#default-router 10.0.16.1
MLS-3(dhcp-config)#dns-server 8.8.8.8
MLS-3(dhcp-config)#ip dhcp excluded-address 10.0.16.1 10.0.16.10
MLS-3(config)#ip dhcp pool VLAN117
MLS-3(dhcp-config)#network 10.0.17.0 255.255.255.0
MLS-3(dhcp-config)#default-router 10.0.17.1
MLS-3(dhcp-config)#dns-server 8.8.8.8
MLS-3(dhcp-config)#ip dhcp excluded-address 10.0.17.1 10.0.17.10
```





	<pre> MLS-3(config)#ip dhcp pool VLAN118 MLS-3(dhcp-config)#network 10.0.18.0 255.255.255.0 MLS-3(dhcp-config)#default-router 10.0.18.1 MLS-3(dhcp-config)#dns-server 8.8.8.8 MLS-3(dhcp-config)#ip dhcp excluded-address 10.0.18.1 10.0.18.10 MLS-3(config)#ip dhcp pool VLAN119 MLS-3(dhcp-config)#network 10.0.19.0 255.255.255.0 MLS-3(dhcp-config)#default-router 10.0.19.1 MLS-3(dhcp-config)#dns-server 8.8.8.8 MLS-3(dhcp-config)#ip dhcp excluded-address 10.0.19.1 10.0.19.10 MLS-3(config)#ip dhcp pool VLAN120 MLS-3(dhcp-config)#network 10.0.20.0 255.255.255.0 MLS-3(dhcp-config)#default-router 10.0.20.1 MLS-3(dhcp-config)#dns-server 8.8.8.8 MLS-3(dhcp-config)#ip dhcp excluded-address 10.0.20.1 10.0.20.10 MLS-3(config)# </pre> <p><b>Verification</b></p> <pre> show ip int brief show ip dhcp binding show ip dhcp pool show ip dhcp conflict </pre>
7	<p><b>EtherChannel</b></p> <p><b>Configuration</b></p> <pre> MLS-1(config)#int range g1/0/11-12 MLS-1(config-if-range)#channel-group 1 mode active  MLS-2(config)#int range g1/0/11-12 MLS-2(config-if-range)#channel-group 1 mode active MLS-2(config-if-range)#int range g1/0/13-14 MLS-2(config-if-range)#channel-group 2 mode active  MLS-3(config)#int range g1/0/13-14 MLS-3(config-if-range)#channel-group 2 mode active  MLS-1(config)#int po1 MLS-1(config-if)#no switchport MLS-1(config-if)#ip address 20.20.20.1 255.255.255.0 MLS-1(config-if)#no shut  MLS-2(config-if)#int po1 MLS-2(config-if)#no switchport MLS-2(config-if)#ip address 20.20.20.2 255.255.255.0 MLS-2(config-if)#no shutdown MLS-2(config-if)# </pre>



	<pre> MLS-2(config-if)#int po2 MLS-2(config-if)#no switchport MLS-2(config-if)#ip address 30.30.30.1 255.255.255.0 MLS-2(config-if)#no shutdown  MLS-3(config-if-range)#int po2 MLS-3(config-if)#no switchport MLS-3(config-if)#ip address 30.30.30.2 255.255.255.0 MLS-3(config-if)#no shut  <b>Verification</b>  show etherchannel summary show etherchannel port-channel </pre>
8	<p><b>OSPF Area 0</b></p> <p><b>Configuration</b></p> <p><u>RTR-1</u>  router ospf 1  log-adjacency-changes  network 10.10.10.0 0.0.0.255 area 0  network 8.8.8.0 0.0.0.255 area 0  network 1.1.1.1 0.0.0.0 area 0</p> <p><u>MLS-1</u>  router ospf 1  log-adjacency-changes  network 10.10.10.0 0.0.0.255 area 0  network 2.2.2.2 0.0.0.0 area 0  network 192.168.0.0 0.0.255.255 area 0</p> <p><u>MLS-2</u>  router ospf 1  log-adjacency-changes  network 10.10.10.0 0.0.0.255 area 0  network 3.3.3.3 0.0.0.0 area 0  network 172.16.0.0 0.0.255 area 0</p> <p><u>MLS-3</u>  router ospf 1  log-adjacency-changes  network 10.10.10.0 0.0.0.255 area 0  network 4.4.4.4 0.0.0.0 area 0  network 10.0.0.0 0.0.255.255 area 0</p> <p><b>Verification</b></p> <pre> show ip protocols show ip ospf neighbor </pre>





	<pre>show ip route ospf show ip route</pre>
9	<p><b>End-to-end Connectivity Testing</b></p> <p>Ping and trace 8.8.8.8 from all devices.</p> <p><b>Laptop15</b></p> <p><b>C:\&gt;ipconfig /all</b></p> <p>FastEthernet0 Connection:(default port)</p> <p>Connection-specific DNS Suffix...:  Physical Address.....: 0001.9634.E18A  Link-local IPv6 Address.....: FE80::201:96FF:FE34:E18A  IPv6 Address.....: ::  IPv4 Address.....: 192.168.15.11  Subnet Mask.....: 255.255.255.0  Default Gateway.....: ::  192.168.15.1  DHCP Servers.....: 192.168.15.1  DHCPv6 IAID.....:  DHCPv6 Client DUID.....: 00-01-00-01-4C-AB-8D-E3-00-01-96-34-E1-8A  DNS Servers.....: ::  8.8.8.8</p> <p>Bluetooth Connection:</p> <p>Connection-specific DNS Suffix...:  Physical Address.....: 00E0.F9E3.C454  Link-local IPv6 Address.....: ::  IPv6 Address.....: ::  IPv4 Address.....: 0.0.0.0  Subnet Mask.....: 0.0.0.0  Default Gateway.....: ::  0.0.0.0  DHCP Servers.....: 0.0.0.0  DHCPv6 IAID.....:  DHCPv6 Client DUID.....: 00-01-00-01-4C-AB-8D-E3-00-01-96-34-E1-8A  DNS Servers.....: ::  8.8.8.8</p> <p><b>C:\&gt;ping 8.8.8.8</b></p> <p>Pinging 8.8.8.8 with 32 bytes of data:</p> <p>Reply from 8.8.8.8: bytes=32 time&lt;1ms TTL=126  Reply from 8.8.8.8: bytes=32 time=1ms TTL=126  Reply from 8.8.8.8: bytes=32 time=1ms TTL=126</p>



Reply from 8.8.8.8: bytes=32 time=1ms TTL=126

Ping statistics for 8.8.8.8:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 1ms, Average = 0ms