Balai Pengembangan Talenta Indonesia
Kementerian Pendidikan Dasar dan Menengah

KEMENDIKDASMEN RAMAH #PENDIDIKAN BERMUTU UNTUK SEMUA

TEST PROJECT

LOMBA KOMPETENSI SISWA DIKMEN 2025

LKS DIKMEN TINGKAT NASIONAL

SMK/SMA/MAK/MA

Cabang Ajang

Teknologi Informasi Sistem Administrasi Jaringan

(IT Network System Administration)

ACTUAL TEST PROJECT
MODUL D – NETWORK SYSTEMS

IT NETWORK SYSTEMS ADMINISTRATION

LOMBA KOMPETENSI SISWA DIKMEN
TINGKAT NASIONAL 2025

Contents

Introduction

In today's IT landscape, proficiency in network technology is increasingly vital for individuals aspiring to excel in any IT engineering discipline. This test project presents numerous challenges drawn from real-world scenarios, focusing predominantly on IT Networking and Integration. Successfully completing this project with a high score demonstrates your readiness to manage network infrastructures for multi-branch enterprises.

Description of project and tasks

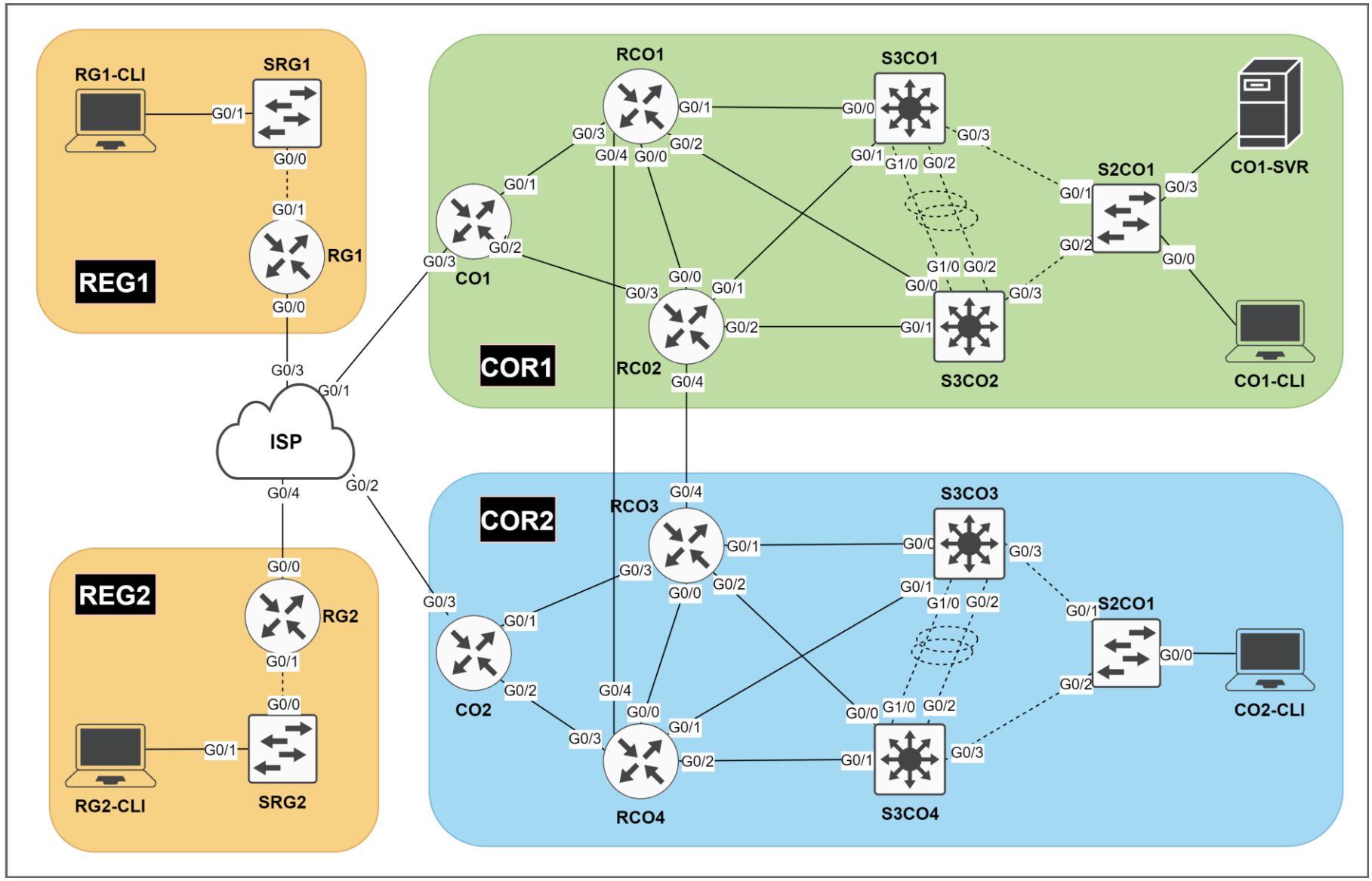
This test project is designed using a variety of network technologies that should be familiar to those who have studied for Cisco CCNA - Implementing and Administering Cisco Solutions certification track. In addition to the knowledge gained from this certification track, you are expected to have ENARSI (Implementing Cisco Enterprise Advanced Routing and Services) certification knowledge to complete this Test Project.

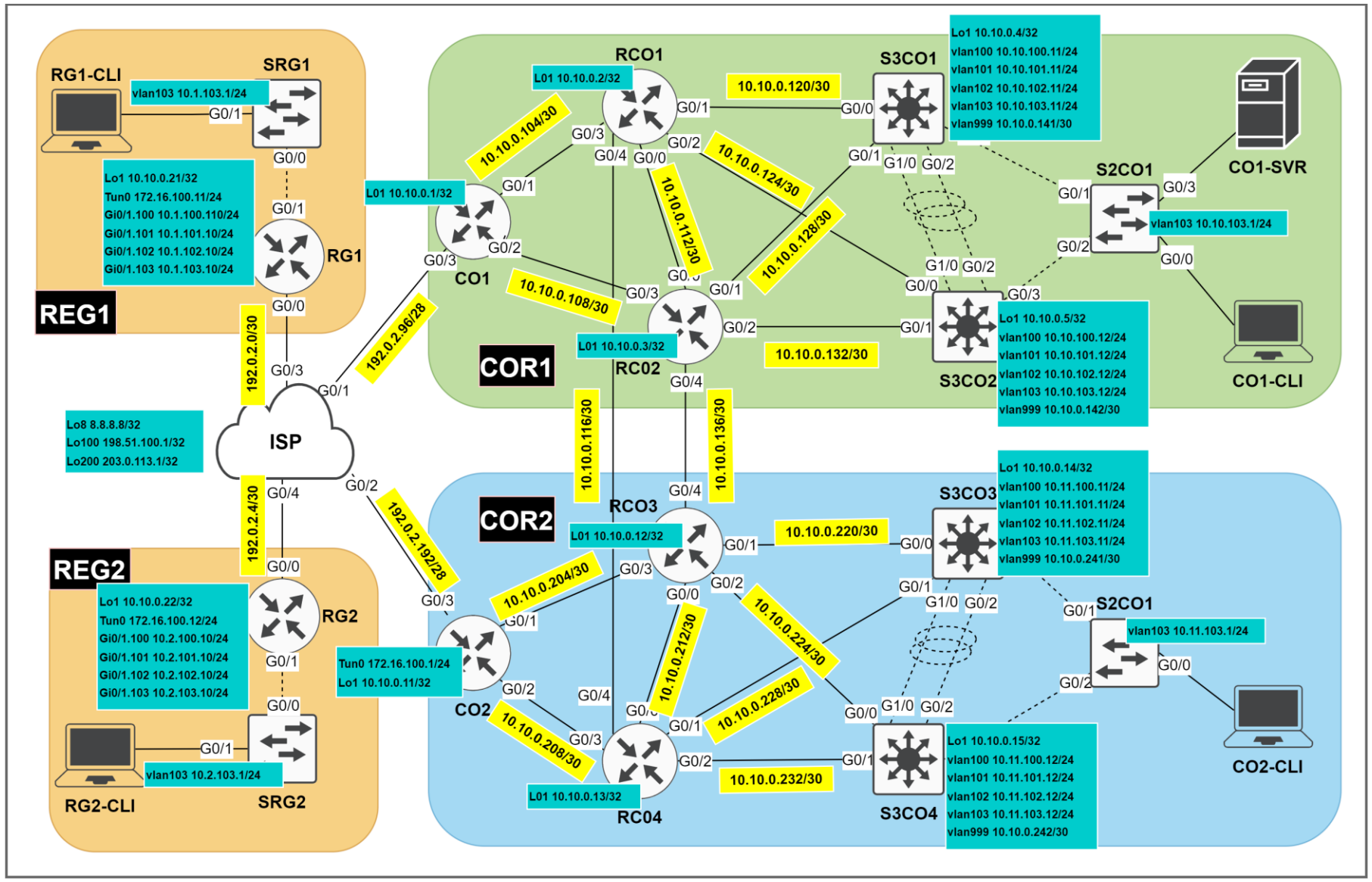
Configuration tasks are broken down into seven areas given below expanded in section Instructions to the Competiors.

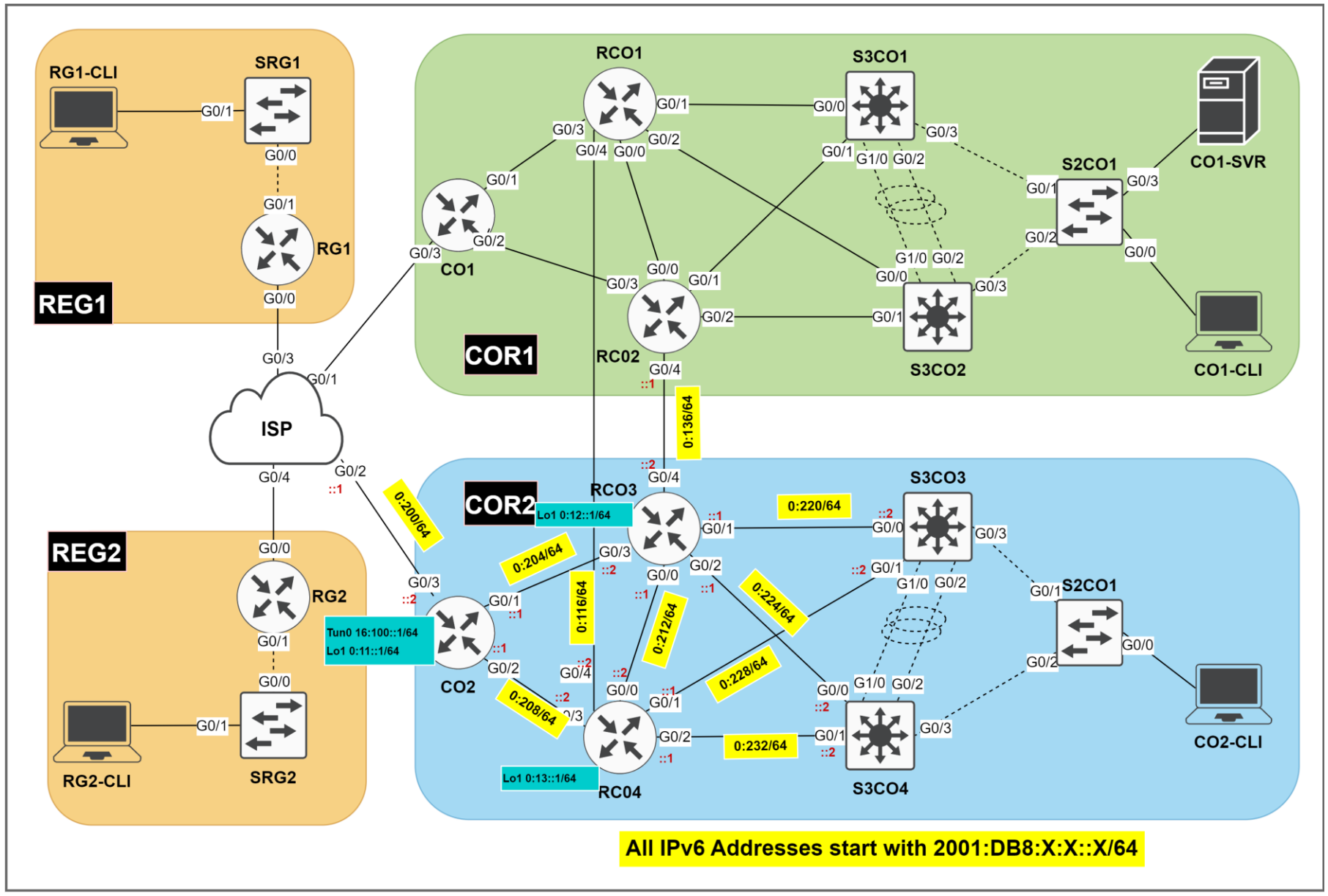
- Basic configuration
- L2 services
- OSPF
- EIGRP
- BGP
- IP Services
- VPN and Security

Physical Topology

Below is the physical topology of the Test Project.

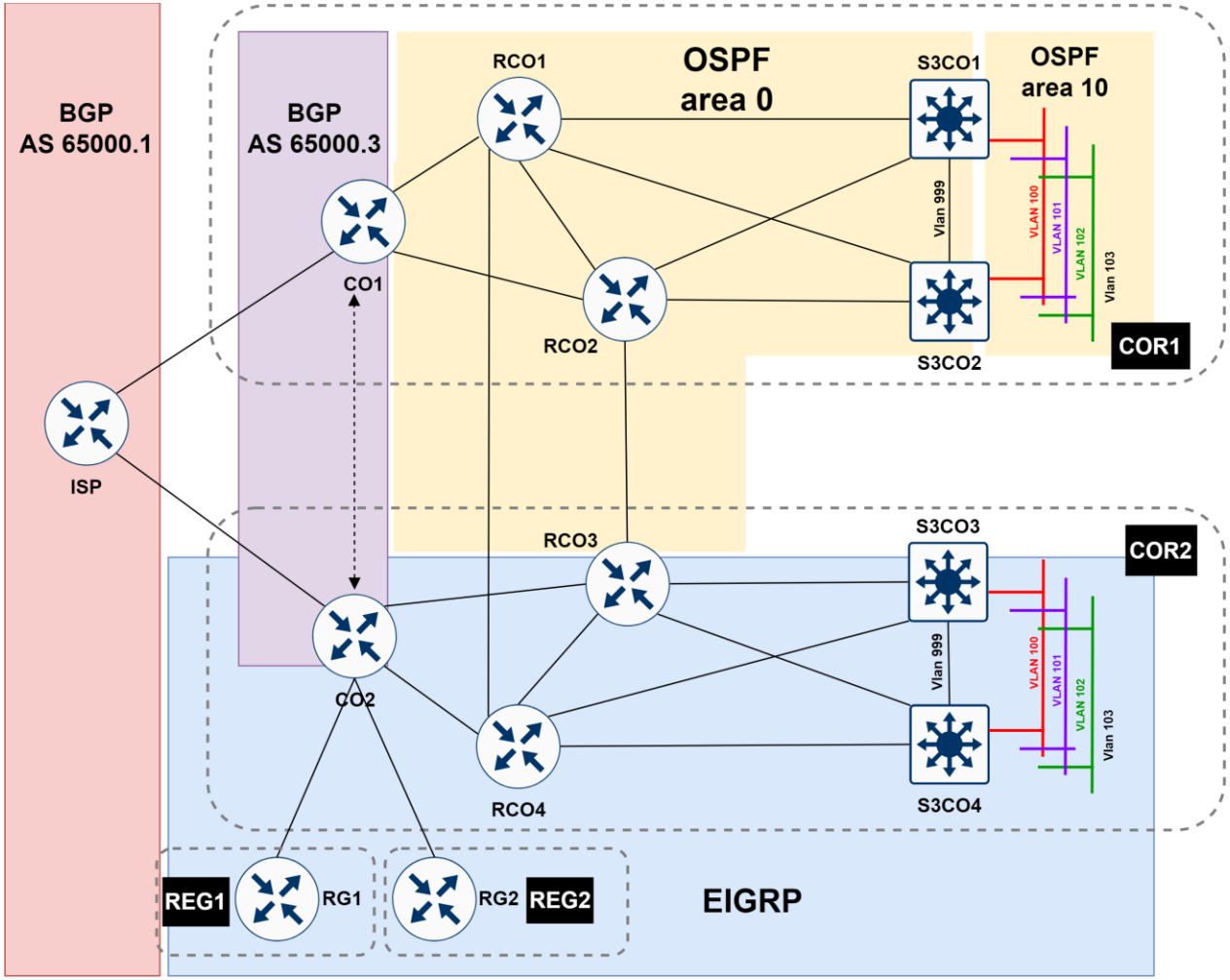



REG1
RG1-CLI
SRG1
vlan103 10.1.103.1/24
G0/1
G0/0
Lo1 10.10.0.21/32
Tun0 172.16.100.11/24
Gi0/1.100 10.1.100.110/24
Gi0/1.101 10.1.101.10/24
Gi0/1.102 10.1.102.10/24
Gi0/1.103 10.1.103.10/24
RG1
192.0.2.0/30
192.0.2.96/28
ISP
Lo8 8.8.8.8/32
Lo100 198.51.100.1/32
Lo200 203.0.113.1/32
192.0.2.4/30
192.0.2.192/28
REG2
Lo1 10.10.0.22/32
Tun0 172.16.100.12/24
Gi0/1.100 10.2.100.10/24
Gi0/1.101 10.2.101.10/24
Gi0/1.102 10.2.102.10/24
Gi0/1.103 10.2.103.10/24
RG2
RG2-CLI
vlan103 10.2.103.1/24
SRG2
COR1
L01 10.10.0.1/32
CO1
RCO1
L01 10.10.0.2/32
10.10.0.104/30
10.10.0.120/30
10.10.0.124/30
10.10.0.112/30
10.10.0.128/30
10.10.0.108/30
L01 10.10.0.3/32
RC02
10.10.0.132/30
S3CO1
Lo1 10.10.0.4/32
vlan100 10.10.100.11/24
vlan101 10.10.101.11/24
vlan102 10.10.102.11/24
vlan103 10.10.103.11/24
vlan999 10.10.0.141/30
S2CO1
vlan103 10.10.103.1/24
CO1-SVR
CO1-CLI
S3CO2
Lo1 10.10.0.5/32
vlan100 10.10.100.12/24
vlan101 10.10.101.12/24
vlan102 10.10.102.12/24
vlan103 10.10.103.12/24
vlan999 10.10.0.142/30
COR2
10.10.0.116/30
10.10.0.136/30
RCO3
L01 10.10.0.12/32
10.10.0.220/30
10.10.0.204/30
10.10.0.212/30
10.10.0.224/30
Tun0 172.16.100.1/24
Lo1 10.10.0.11/32
CO2
10.10.0.208/30
10.10.0.228/30
L01 10.10.0.13/32
RC04
10.10.0.232/30
S3CO3
Lo1 10.10.0.14/32
vlan100 10.11.100.11/24
vlan101 10.11.101.11/24
vlan102 10.11.102.11/24
vlan103 10.11.103.11/24
vlan999 10.10.0.241/30
S2CO1
vlan103 10.11.103.1/24
CO2-CLI
S3CO4
Lo1 10.10.0.15/32
vlan100 10.11.100.12/24
vlan101 10.11.101.12/24
vlan102 10.11.102.12/24
vlan103 10.11.103.12/24
vlan999 10.10.0.242/30


REG1
RG1-CLI
SRG1
G0/1
G0/0
G0/1
RG1
G0/0
G0/3
ISP
G0/1
G0/4
G0/2
::1
COR1
RCO1
G0/1
G0/3
G0/4
G0/0
G0/2
S3CO1
G0/0
G0/3
G0/1
G1/0
G0/2
CO1-SVR
S2CO1
G0/1
G0/3
G0/2
G0/0
G0/1
CO1
G0/3
G0/2
G0/0
G1/0
G0/2
G0/0
G0/3
G0/3
G0/1
G0/2
G0/1
RC02
S3CO2
CO1-CLI
G0/4
::1
0:136/64
::2
G0/4
COR2
RCO3
Lo1 0:12::1/64
::1
G0/1
0:220/64
S3CO3
::2
G0/0
G0/3
0:200/64
0:204/64
G0/3
::2
G0/2
::1
G0/0
::1
::2
G0/1
G1/0
G0/2
G0/1
S2CO1
REG2
G0/0
RG2
G0/3
::2
G0/1
::1
0:116/64
0:212/64
0:224/64
G0/0
Tun0 16:100::1/64
Lo1 0:11::1/64
::1
CO2
G0/2
::2
G0/4
::2
G0/0
::1
G0/1
0:228/64
G0/0
G1/0
G0/2
G0/1
0:208/64
::2
0/3
G0/2
0:232/64
G0/1
G0/3
::1
::2
G0/1
CO2-CLI
RG2-CLI
SRG2
Lo1 0:13::1/64
RC04
S3CO4
All IPv6 Addresses start with 2001:DB8:X:X::X/64

Routing Topology

BGP, EIGRP, and OSPF Routing topology is shown below.



Site	VLAN100	VLAN101	VLAN102	VLAN103
COR1	10.10.100.0	10.10.101.0	10.10.102.0	10.10.103.0
COR2	10.11.100.0	10.11.101.0	10.11.102.0	10.11.103.0
REG1	10.1.100.0	10.1.101.0	10.1.102.0	10.1.103.0
REG2	10.2.100.0	10.2.101.0	10.2.102.0	10.2.103.0

Instructions to the Competitor

Please carefully read below instruction.

1. Please do not modify ISP1's configuration. All ISP1 configurations are completed, and you are not supposed to touch that device.
2. Your configuration will be marked with scripts, so therefore we need two important basic configurations:
   (a) no ip domain lookup
   (b) exec-timeout 0 0 on console
   Both configurations are already preconfigigured on all routers and switches. So please do not change these configurations.
3. Read all tasks in each section before proceeding with any configuration. The completion of any item may require the completion of any previous or later item.
4. Points are awarded for working configurations only. Test the functionality of all the requirements before you submit the test project. Be careful, because as you configure one part, you may break a previous requirement or configuration.
5. No partial points can be granted for any aspect; all requirements need to be fulfilled to receive the points for the aspect. Some requirements depend on other aspect's requirements, either before or after the current aspect.
6. Save your configurations frequently; accidents do and will happen.
7. All Clients (CO1-CLI, CO2-CLI, RG1-CLI, RG2-CLI) and Server (CO1-SVR) can be accessible with **admin\ Skill39@ID** credentials. Do not change these passwords.
8. Hosts are preconfigured but check the configuration and change it when necessary.
9. If you disabled any interfaces for testing, ensure that all of them are enabled before submitting your Test Project.
10. No static route configurations are allowed unless it is automatically generated as part of your OSFP/EIGRP confgiruations.
    (a) There is one exception when you are configuring RG1 and RG2 in Task 2 of "Security and VPN" section.
11. All Router and Switch IP Addresses configuration already done for you **EXCEPT IP ADDRESS OF INTERFACE VLAN**.

DEVICE	INTERFACE	IPV4 ADDRESS	NEIGHBOR
ISP1	GigabitEthernet0/1	192.0.2.101/28	CO1
ISP1	GigabitEthernet0/2	192.0.2.201/28	CO2
ISP1	GigabitEthernet0/3	192.0.2.1/30	RG1
ISP1	GigabitEthernet0/4	192.0.2.5/30	RG2
ISP1	Loopback100	198.51.100.1/24	N/A
ISP1	Loopback200	203.0.113.1/24	N/A
CO1	GigabitEthernet0/1	10.10.0.105/30	RCO1
CO1	GigabitEthernet0/2	10.10.0.109/30	RCO2
CO1	GigabitEthernet0/3	192.0.2.102/28	ISP1
CO1	Loopback1	10.10.0.1/32	N/A
CO2	GigabitEthernet0/1	10.10.0.205/30	RCO3
CO2	GigabitEthernet0/2	10.10.0.209/30	RCO4
CO2	GigabitEthernet0/3	192.0.2.202/28	ISP1
CO2	Tunnel0	172.16.100.1/24	RG1/RG2
CO2	Loopback1	10.10.0.11/32	N/A
RCO1	GigabitEthernet0/0	10.10.0.113/30	RCO2

DEVICE	INTERFACE	IPV4 ADDRESS	NEIGHBOR
RCO1	GigabitEthernet0/1	10.10.0.121/30	S3CO1
RCO1	GigabitEthernet0/2	10.10.0.125/30	S3CO2
RCO1	GigabitEthernet0/3	10.10.0.106/30	CO1
RCO1	GigabitEthernet0/4	10.10.0.117/30	RCO4
RCO1	Loopback1	10.10.0.2/32	N/A
RCO2	GigabitEthernet0/0	10.10.0.114/30	RCO1
RCO2	GigabitEthernet0/1	10.10.0.129/30	S3CO1
RCO2	GigabitEthernet0/2	10.10.0.133/30	S3CO2
RCO2	GigabitEthernet0/3	10.10.0.110/30	CO1
RCO2	GigabitEthernet0/4	10.10.0.137/30	RCO3
RCO2	Loopback1	10.10.0.3/32	N/A
RCO3	GigabitEthernet0/0	10.10.0.213/30	RCO4
RCO3	GigabitEthernet0/1	10.10.0.221/30	S3CO3
RCO3	GigabitEthernet0/2	10.10.0.225/30	S3CO4
RCO3	GigabitEthernet0/3	10.10.0.206/30	CO2
RCO3	GigabitEthernet0/4	10.10.0.138/30	RCO2
RCO3	Loopback1	10.10.0.12/32	N/A
RCO4	GigabitEthernet0/0	10.10.0.214/30	RCO3
RCO4	GigabitEthernet0/1	10.10.0.229/30	S3CO3
RCO4	GigabitEthernet0/2	10.10.0.233/30	S3CO4
RCO4	GigabitEthernet0/3	10.10.0.210/30	CO2
RCO4	GigabitEthernet0/4	10.10.0.118/30	RCO1
RCO4	Loopback1	10.10.0.13/32	N/A
S3CO1	GigabitEthernet0/0	10.10.0.122/30	RCO1
S3CO1	GigabitEthernet0/1	10.10.0.130/30	RCO2
S3CO1	Loopback1	10.10.0.4/32	N/A
S3CO2	GigabitEthernet0/0	10.10.0.126/30	RCO1
S3CO2	GigabitEthernet0/1	10.10.0.134/30	RCO2
S3CO2	Loopback1	10.10.0.5/32	N/A
S3CO3	GigabitEthernet0/0	10.10.0.222/30	RCO3
S3CO3	GigabitEthernet0/1	10.10.0.230/30	RCO4
S3CO3	Loopback1	10.10.0.14/32	N/A
S3CO4	GigabitEthernet0/0	10.10.0.226/30	RCO3
S3CO4	GigabitEthernet0/1	10.10.0.234/30	RCO4
S3CO4	Loopback1	10.10.0.15/32	N/A

DEVICE	INTERFACE	IPV4 ADDRESS	NEIGHBOR
S2CO1	Vlan103	10.10.103.1/24	N/A
S2CO2	Vlan103	10.11.103.1/24	N/A
RG1	GigabitEthernet0/0	192.0.2.2/30	ISP1
RG1	GigabitEthernet0/1.100	10.1.100.10/24	N/A
RG1	GigabitEthernet0/1.101	10.1.101.10/24	N/A
RG1	GigabitEthernet0/1.102	10.1.102.10/24	N/A
RG1	GigabitEthernet0/1.103	10.1.103.10/24	N/A
RG1	Loopback1	10.10.0.21/32	N/A
RG1	Tunnel0	172.16.100.11/24	CO2
SRG1	Vlan103	10.1.103.1/24	N/A
RG2	GigabitEthernet0/0	192.0.2.6/30	ISP1
RG2	GigabitEthernet0/1.100	10.2.100.10/24	N/A
RG2	GigabitEthernet0/1.101	10.2.101.10/24	N/A
RG2	GigabitEthernet0/1.102	10.2.102.10/24	N/A
RG2	GigabitEthernet0/1.103	10.2.103.10/24	N/A
RG2	Loopback1	10.10.0.22/32	N/A
RG2	Tunnel0	172.16.100.12/24	CO2
SRG2	Vlan103	10.2.103.1/24	N/A

12. IPv6 addresses in COR2 devices.

DEVICE	INTERFACE	IPV4 ADDRESS	NEIGHBOR
CO2	GigabitEthernet0/1	2001:DB8:0:204::1/64	RCO3
CO2	GigabitEthernet0/2	2001:DB8:0:208::1/64	RCO4
CO2	GigabitEthernet0/3	2001:DB8:0:200::2/64	ISP1
CO2	Tunnel0	2001:DB8:16:100::1/64	RG1
CO2	Loopback1	2001:DB8:0:11::1/64	N/A
RCO3	GigabitEthernet0/0	2001:DB8:0:212::1/64	RCO4
RCO3	GigabitEthernet0/1	2001:DB8:0:220::1/64	S3CO3
RCO3	GigabitEthernet0/2	2001:DB8:0:224::1/64	S3CO4
RCO3	GigabitEthernet0/3	2001:DB8:0:204::2/64	CO2
RCO3	Loopback1	2001:DB8:0:12::1/64	N/A
RCO4	GigabitEthernet0/0	2001:DB8:0:212::2/64	RCO3
RCO4	GigabitEthernet0/1	2001:DB8:0:228::1/64	S3CO3
RCO4	GigabitEthernet0/2	2001:DB8:0:232::1/64	S3CO4
RCO4	GigabitEthernet0/3	2001:DB8:0:208::2/64	CO2

DEVICE	INTERFACE	IPV4 ADDRESS	NEIGHBOR
RCO4	Loopback1	2001:DB8:0:13::1/64	N/A
S3CO3	GigabitEthernet0/0	2001:DB8:0:220::2/64	RCO3
S3CO3	GigabitEthernet0/1	2001:DB8:0:228::2/64	RCO4
S3CO3	Loopback1	2001:DB8:0:14::1/64	N/A
S3CO4	GigabitEthernet0/0	2001:DB8:0:224::2/64	RCO3
S3CO4	GigabitEthernet0/1	2001:DB8:0:232::2/64	RCO4
S3CO4	Loopback1	2001:DB8:0:15::1/64	N/A

Configuration Tasks

Basic Configurations

1. Configure all routers and switches in COR1, COR2, REG1 and REG2 to use GMT+7 timezone.
2. Configure domain name **lksn2025.id** for all devices in the topology.
3. Configure secret password **Skill39@ID** in all routers and switches. Also define local username admin with secret **Skill39@ID** in all routers and switches. That user should have the highest priviledge you can give.
4. Configure IPv4 and IPv6 VLAN Interface in

DEVICE	INTERFACE	IPV4 ADDRESS	NEIGHBOR
S3CO1	Vlan100	10.10.100.11/24	N/A
	Vlan101	10.10.101.11/24	N/A
	Vlan102	10.10.102.11/24	N/A
	Vlan103	10.10.103.11/24	N/A
	Vlan999	10.10.0.141/30	S3CO2
S3CO2	Vlan100	10.10.100.12/24	N/A
	Vlan101	10.10.101.12/24	N/A
	Vlan102	10.10.102.12/24	N/A
	Vlan103	10.10.103.12/24	N/A
	Vlan999	10.10.0.142/30	S3CO2
S3CO3	Vlan100	2001:DB8:11:100::11/64	N/A
		10.11.100.11/24	N/A
	Vlan101	2001:DB8:11:101::11/64	N/A
		10.11.101.11/24	N/A
	Vlan102	2001:DB8:11:102::11/64	N/A
		10.11.102.11/24	N/A
	Vlan103	10.11.103.11/24	N/A
	Vlan999	2001:DB8:0:240::1/64	S3CO4
		10.10.0.241/30	S3CO4

DEVICE	INTERFACE	IPV4 ADDRESS	NEIGHBOR
S3CO4	Vlan100	2001:DB8:11:100::12/64	N/A
		10.11.100.12/24	N/A
	Vlan101	2001:DB8:11:101::12/64	N/A
		10.11.101.12/24	N/A
	Vlan102	2001:DB8:11:102::12/64	N/A
		10.11.102.12/24	N/A
	Vlan103	10.11.103.12/24	N/A
	Vlan999	2001:DB8:0:240::2/64	S3CO3
		10.10.0.242/30	S3CO3

L2 Services

1. Configure VTP domain "**LKSN2025**" on S3CO1, S3CO2, S3CO3, S3CO4, S2CO1, S2CO2, SRG1 and SRG2.
2. Configure following VLANs across all distribution (S3COx) and access switches (S2COx & SRGx) in this topology.

VLAN ID	VLAN NAME	DEVICES
100	SERVER	S3CO1, S3CO2, S3CO3, S3CO4, S2CO1, S2CO2, SRG1, SRG2
101	CLIENT_1	S3CO1, S3CO2, S3CO3, S3CO4, S2CO1, S2CO2, SRG1, SRG2
102	CLIENT_2	S3CO1, S3CO2, S3CO3, S3CO4, S2CO1, S2CO2, SRG1, SRG2
103	MGMT	S3CO1, S3CO2, S3CO3, S3CO4, S2CO1, S2CO2, SRG1, SRG2
999	L3_P2P	S3CO1, S3CO2, S3CO3, S3CO4

3. Configure STP to meet the requirements below
   (a) In COR1, S3CO1 should be the STP root bridge for all vlans (including future vlans) and S3CO2 should become the root bridge if S3CO1 is down.
   (b) In COR2, S3CO3 should be the STP root bridge for all vlans (including future vlans) and S3CO4 should become the root bridge if S3CO3 is down.
   (c) These STP convergences require to happen as quickly as possible. Choose the right STP mode to achieve that outcome.
4. Configure all distribution switches (S3CO1-4) ports connect to S2CO1 and S2CO2 as trunk ports. Configure vlan 888 as native vlan across these trunk ports.
   (a) Also configure SRG1 and SRG2 G0/0 interface as trunk ports. You can leave vlan 1 as native vlan for these trunk ports.
5. Configure a logical interface (use 12 for interface number) between S3CO1 and S3CO2 to pass all vlan across it. Assign physical interface G0/2 and G1/0 to it. You require to use LACP as protocol and both switches should be able to initiate the negotiation. Traffic should be loadbalance across both links based on source and detination IP addresses.

6. Configure a logical interface (use 34 for interface number) between S3CO3 and S3CO4 without using any dynamic negotiation. Assign G0/2 and G1/0 physical interface into logical interface.
7. Configure HSRP for the 4 vlans (100-103) to meet following conditions.
   (a) In each subnet, default gateway IP address needs to be .10 in each /24 subnet. Use vlan number as HSRP group number when configuring.
   (b) S3CO1 should be the HSRP active for COR1 and S3CO3 should be the HSRP active for COR2.
   (c) In case of active device (S3CO1 or S3CO3) goes down S3CO2 or S3CO4 should act as active device in each site. When S3CO1 or S3CO3 comes back after failure, it shoud take over HSRP active role once it is operational.
8. In COR2, configure IPv6 HSRP for vlan 101 and 102 on S3CO3 and S3CO4.
   (a) Use group number 1101 for vlan 101 and group number 1102 for vlan 102.
   (b) HSRP virtual IPv6 address should be FE80::10 for both vlans.
   (c) S3CO3 should be the HSRP active device and S3CO4 should be the standby Device

EIGRP

Configure EIGRP protocol in COR2 (CO2, RCO3, RCO4, S3CO3 and S3CO4 devices) to achieve the following requirements. You will be asked to configure EIGRP on RG1 and RG2 as part of section “Security and VPN”

1. For IPv4, use autonomous system number 100. Makesure loopback 1 IP address become EIGRP router-id.
2. Advertise all loopback and /30 P2P (point-to-point/) networks into EIGRP on CO2, RCO3, RCO4, S3CO3 and S3CO4. Advertise vlan 100-103 networks into EIGRP in S3CO3 and S3CO4.
3. CO2 to advertise default route into EIGRP if it receives a default route from ISP1 via BGP.
4. Modify administrative distane of external EIGRP learned route to 100 on RCO3 and RCO4.
5. On Router RCO3 and RCO4, summarize COR2 vlan 100-103 subnets and advertise it via EIGRP to CO2.
6. Redistribute all network source from Routing Protocol OSPF on RCO3 and RCO4.
7. Configure EIGRP on IPv6 on COR2
   (a) Use autonomous system number 100 for IPv6 as well.
   (b) On S3CO3 and S3CO4, IPv6 EIGRP adjacencies should not established across vlan 100,101,102 or vlan 103.
   (c) Verify you can ping CO2 loopback 1 address (2001:DB8:0:11::1/64) from CO2-CLI.

OSPF

Configure OSPF protocol in COR1 (CO1, RCO1, RCO2, S3CO1 and S3CO2 devices) to achieve the following requirements.

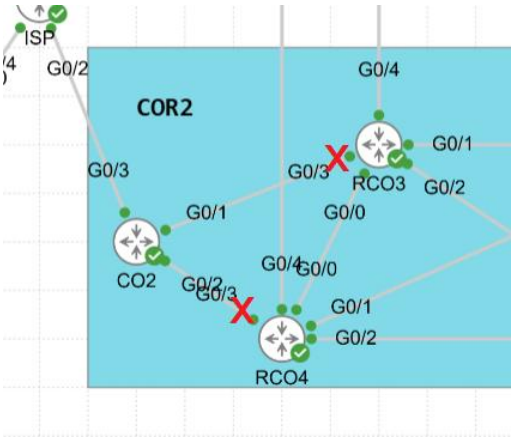
1. Configure OSPF process 100 in each of those devices. Use Loopback 1 interface as router-id in each of those devices.
2. Advertise all /30. P2P links and Loopback 1 interfaces to OSPF area 0.
3. S3CO1 and S3CO2, configure vlan 100-103 network in OSPF area 10.
4. OSPF hello messages should be only sent via /30 networks where devices are interconnected.
5. When establish OSPF adjacencies, devices should not elect DR/BDR
6. Ensure CO1 is advertise default route to other OSPF routers if it receives a default route from ISP1. This should apper as Type 2 route with metric value of 5000
   (a) Advertise a default route into OSPF on RCO4 with metric value 4000.
   (b) RCO4 should inject the default route into OSPF only if 10.10.0.208/30 network (ie G 0/3 interface is up) on their routing table

BGP

Configure the BGP protocol on CO1 and CO2 routers to meet the given requirements. The IP addresses of service provider (ISP1) WAN links (in the 192.0.2.x/24 range) should not be advertised to any routers other than those locally connected (CO1, CO2, RG1 and RG2)

1. Configure eBGP sessions on CO1 and CO2 (both in AS#65000.3) with ISP router G0/1 and G0/2 IPs (192.0.2.101 and 192.0.2.201 IPs). Note that ISP router already configured with following settings.
   (a) Keepalive interval 10s and Holddown time of 30s
   (b) Authentication password **Skill39@ID**
2. On CO1 and CO2, you receive prefixes 198.51.100.0/24 and 203.0.113.0/24 from ISP1. You are required to configure CO1 as primary path (incoming and outgoing) for reaching to these prefixes from COR1 and COR2.
   (a) You can use "198.51.100.1" and "203.0.113.1" IP addresses for reachability testing (ping and traceroute) from CO1-CLI and CO2-CLI.
3. Verifiy internet traffic is working in a scenario of failing primary internet router (CO2).
   (a) Simulate a failure of CO2 by shutting down G 0/3 interfaces of RCO3 and RCO4.

```
RCO3(config)#int g0/3
RCO3(config-if)#shut
!
RCO4(config)#int g0/3
RCO4(config-if)#shut
!
```



   (b) Ping 8.8.8.8 from CO1-CLI and ensure that it is successful. Traceroute output should confirm traffic go via CO1

```
CO1-CLI:~$ traceroute 8.8.8.8
traceroute to 8.8.8.8 (8.8.8.8), 30 hops max, 46 byte packets
 1  10.10.101.11 (10.10.101.11)  8.110 ms  6.477 ms  6.440 ms
 2  10.10.0.142 (10.10.0.142)  9.587 ms  12.553 ms  8.434 ms
 3  10.10.0.125 (10.10.0.125)  7.655 ms  14.774 ms  7.074 ms
 4  10.10.0.105 (10.10.0.105)  11.138 ms  16.037 ms  9.988 ms
 5  192.0.2.101 (192.0.2.101)  11.284 ms  25.961 ms  *
```

   (c) Ping 8.8.8.8 from CO2-CLI and ensure that it is successful. Traceroute output should confirm traffic go via CO1

```
CO2-CLI:~$ traceroute 8.8.8.8
traceroute to 8.8.8.8 (8.8.8.8), 30 hops max, 46 byte packets
 1  10.11.102.11 (10.11.102.11)  4.603 ms  6.894 ms  5.212 ms
 2  10.10.0.221 (10.10.0.221)  9.680 ms  8.064 ms  9.047 ms
 3  10.10.0.137 (10.10.0.137)  9.039 ms  10.686 ms  8.120 ms
 4  10.10.0.109 (10.10.0.109)  8.147 ms  15.148 ms  8.367 ms
 5  192.0.2.101 (192.0.2.101)  19.074 ms  19.037 ms  *
```

If steps **b** and **c** above are not successful, fix that issue.

IP Services

You have been asked to configure following IP services.

1. When vlan 101-102 users (~400 in total users and require simultaneous internet access) in COR1, COR2, REG1 and REG2 communicate with internet (You can use 8.8.8.8 IP for testing) their addresses should be translated to following addresses depend on the internet router it goes through.
   (a) Traffic goes via CO1 -> 192.0.2.104 -192.0.2.110
   (b) Traffic goes via CO2 -> 192.0.2.193 -192.0.2.199
2. When CO1-SVR with IP address 10.10.100.101 goes to internet it should appear as 192.0.2.99 or 192.9.2.205 depend on if traffic goes via CO1 or CO2 respectively. You can configure S2CO1 G0/3 to vlan 100 to test this configuration.
   (a) CO1-SVR has already configured with 10.10.100.101 statically.
3. Configure DHCP services on S3CO1 and S3CO3 to meet requirements below.
   on S3CO1
   (a) VL101 DHCP address scope 10.10.101.101-10.10.101.254 with default router of 10.10.101.10
   (b) VL102 DHCP address scope 10.10.102.101-10.10.102.254 with default router of 10.10.102.10

   on S3CO3
   (c) VL101 DHCP address scope 10.11.101.101-10.11.101.254 with default router of 10.11.101.10
   (d) VL102 DHCP address scope 10.11.102.101-10.11.102.254 with default router of 10.11.102.10
4. Configure DHCP services REG1 and REG2 in a way clients RG1-CLI1 get IP address from vlan 101 and RG2-CLI1 get IP address from vlan 102.
   (a) REG1- VL101 DHCP address scope 10.1.101.101-10.1.101.254 with default-gateway 10.1.101.10.
   (b) REG2- VL102 DHCP address scope 10.2.102.101-10.2.102.254 with default-gateway 10.2.102.10.

Security and VPN

Multiple branch sites need to connect to the COR2 network. To test the new connectivity, RG1 & RG2 have been required to configure as DMVPN spoke site with CO2 router in COR2.

1. Configure CO2 as DMVPN Hub for branch sites connectivity. You require to consider below when configuring CO2.
   (a) Use network-id **2025**.
   (b) Tunnel interface 0 to use 172.16.100.1/24 IP address.
   (c) Use string **LKSN2025** to identify NHRP domain when establishing VPN connecivity.
2. Configure RG1 & RG2 as DMVP Spoke sites.
   (a) You are allowed to add following static routes in RG1 and RG2

   ```
   RG1
   ip route 192.0.2.96 255.255.255.240 192.0.2.1
   ip route 192.0.2.192 255.255.255.240 192.0.2.1
   RG2
   ip route 192.0.2.96 255.255.255.240 192.0.2.5
   ip route 192.0.2.192 255.255.255.240 192.0.2.5
   ```

   (b) RG1 tunnel interface 0 to use 172.16.100.11/24 IP address.
   (c) RG2 tunnel interface 0 to use 172.16.100.12/24 IP address.
   (d) RG1 and RG2 should establish dynamic tunnel between then when communicating each other.
3. Configure EIGRP between RG1, RG2 and CO2.
   (a) RG1 and RG2 to advertise a summary route for networks corresponds to vlan 100-103 networks at that site.
4. Enable SSH on CO1 and CO2 routers to meet requirements given below.
   (a) Use most secure SSH version.
   (b) Use **admin/Skill39@ID** credential.
   (c) Telnet should not be allowed when accessing network devices.
   (d) On two internet routers (CO1 and CO2) increase SSH security by limiting SSH MAC algorithm to **hmac-sha2-512** and **hmac-sha2-256**

5. Limit only CO1-SVR(10.10.100.101/24) can SSH into CO1 and CO2.
6. Enable port security on CO1-CLI and CO2-CLI connected switchports. There is a plan to deploy VOIP handsets in COR1 and COR2 on vlan 150. You can define VLAN150 (named VOIP) on S2CO1 and S2CO2 for this task.
   (a) Limit the mac addreses to minimum required if those PCs go behind VOIP phone.
   (b) In case of port security violation, port should be disabled and syslog message to be generated.
   (c) Port should be automatically recovered in 3 minutes.