# How to Prepare for the CCNP Enterprise Adv-Routing Concentration Certification


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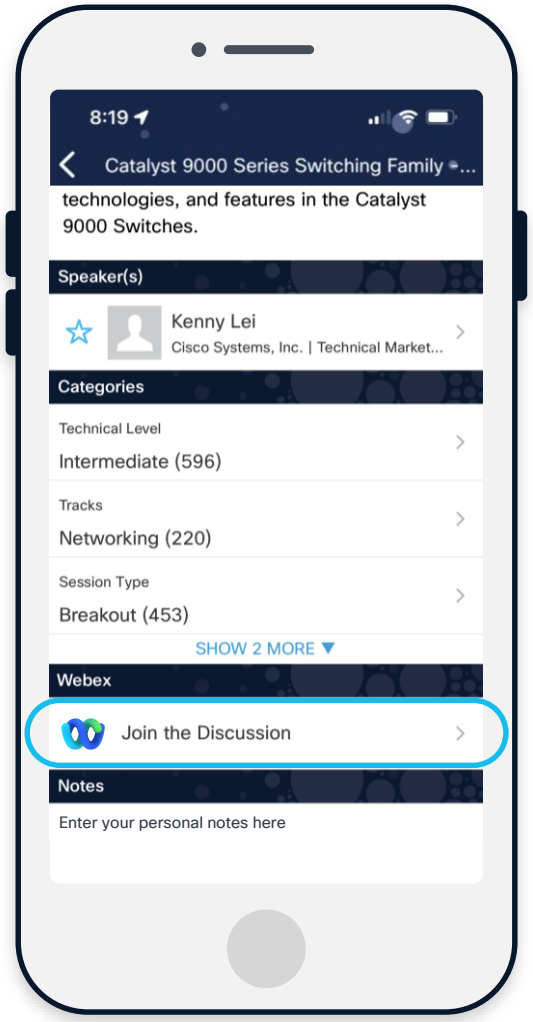


# Agenda

01 Value of the Cisco Certification placeholder

02 CCNP Enterprise Certifications

03 Understand the Adv-Routin Blueprint

04 Technology depth

05 What to expect (Sample questions)

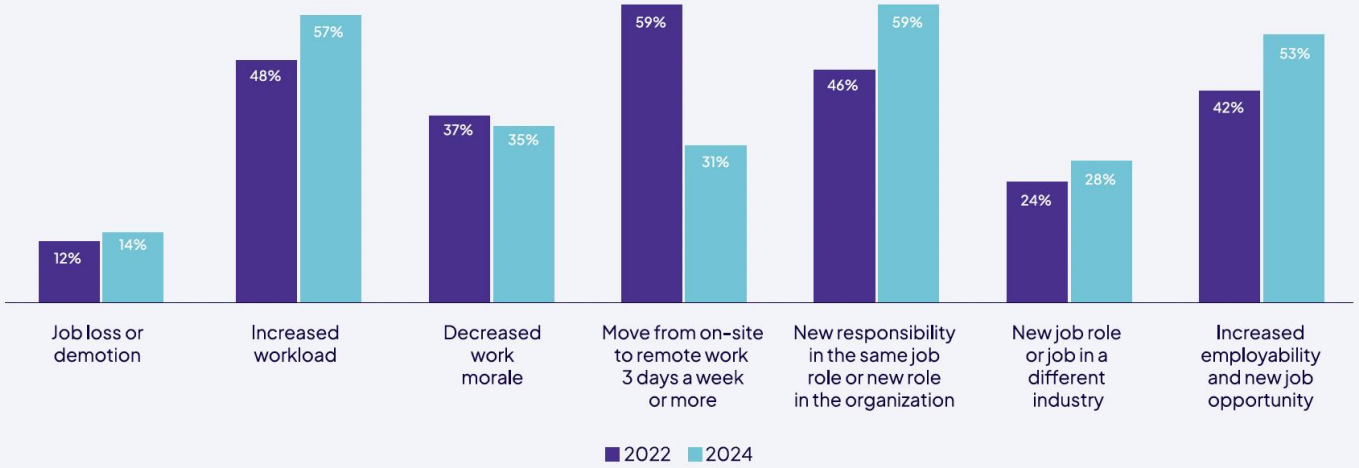
06 Learning Resources and Roadmap

07 Q&A

# Value of the Cisco Certification

# Did you experience any of the following over the past year?

## Workplace Trends



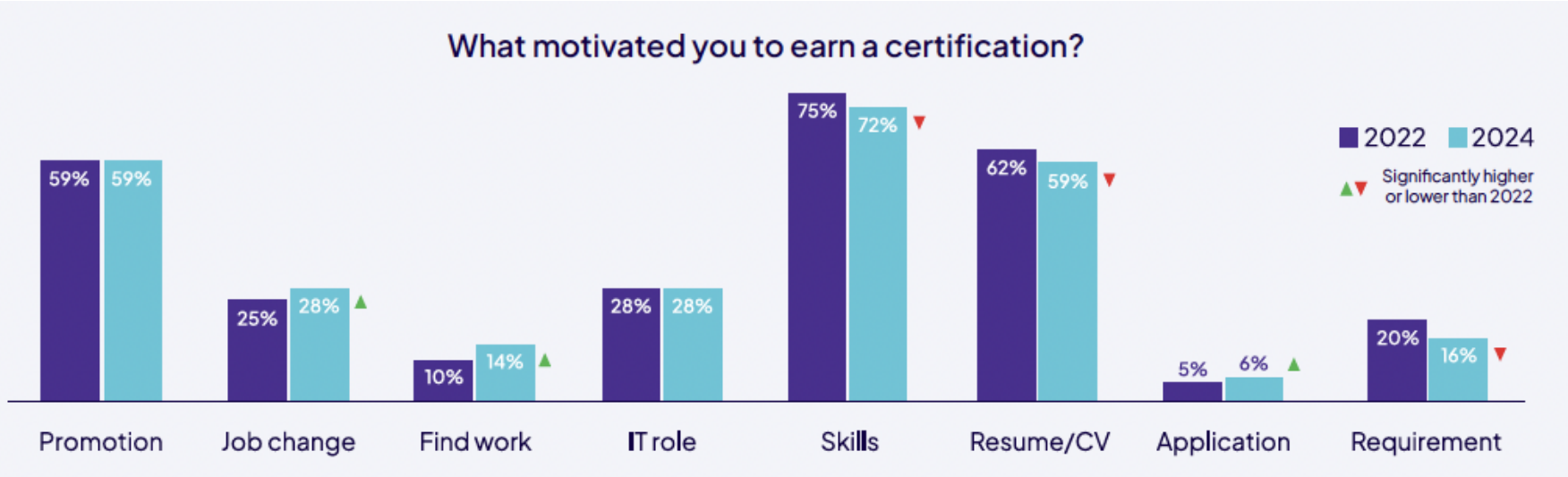

**Did you experience any of the following over the past year?** (% yes)

| | Global average | Asia-Pacific | UK and Europe | India | Japan | Latin America | Middle East and Africa | North America |
|---|---|---|---|---|---|---|---|---|
| Job loss or demotion | 14% | 18% | 13% | 13% | 4% | 18% | 15% | 17% |
| Increased workload | 57% | 62% | 52% | 49% | 54% | 64% | 60% | 56% |
| New responsibility in the same job role or new role in the organization | 59% | 63% | 55% | 67% | 44% | 67% | 64% | 53% |
| New job role or job in a different industry | 28% | 33% | 26% | 34% | 15% | 29% | 34% | 24% |
| Decreased work morale | 35% | 39% | 41% | 28% | 32% | 36% | 32% | 40% |
| Move from on-site to remote work 3 days a week or more | 31% | 30% | 32% | 32% | 29% | 37% | 33% | 23% |
| Increased employability and new job opportunities | 53% | 56% | 51% | 57% | 31% | 62% | 66% | 49% |

● Significantly higher than global average ● Significantly lower than global average

*Pearson VUE 2025 Value of IT Certification Candidate Report* 31

# What motivated you to earn a certification?




## What motivated you to earn a certification? (by geography)

| | Asia-Pacific | UK and Europe | India | Japan | Latin America | Middle East and Africa | North America |
|---|---|---|---|---|---|---|---|
| Promotion | 61% | 58% | 67% | 49% | 69% | 57% | 55% |
| Job change | 28% | 23% | 32% | 18% | 28% | 35% | 34% |
| Find work | 16% | 9% | 15% | 3% | 12% | 25% | 20% |
| IT role | 37% | 22% | 32% | 14% | 26% | 40% | 29% |
| Skilling | 73% | 70% | 76% | 72% | 73% | 73% | 67% |
| Resume/CV | 60% | 61% | 65% | 31% | 68% | 65% | 62% |
| College application | 7% | 3% | 10% | 0% | 7% | 9% | 6% |
| Required | 21% | 17% | 13% | 13% | 13% | 15% | 18% |

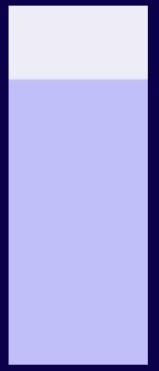
VUE 2025 Value of IT Certification Candidate Report

● Significantly higher than global average ● Significantly lower than global average

# Benefits of Certification

**Benefits for candidates:**

**82%**
gained confidence to explore and pursue new job opportunities

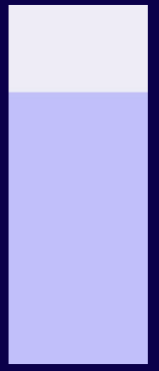


**63%**
received or expected a job promotion after certification

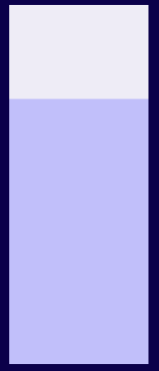
**32%**
received salary increases

**Benefits for organizations:**

**79%**
of certified employees produce higher quality work



**76%**
show increased ability to innovate and enhance processes



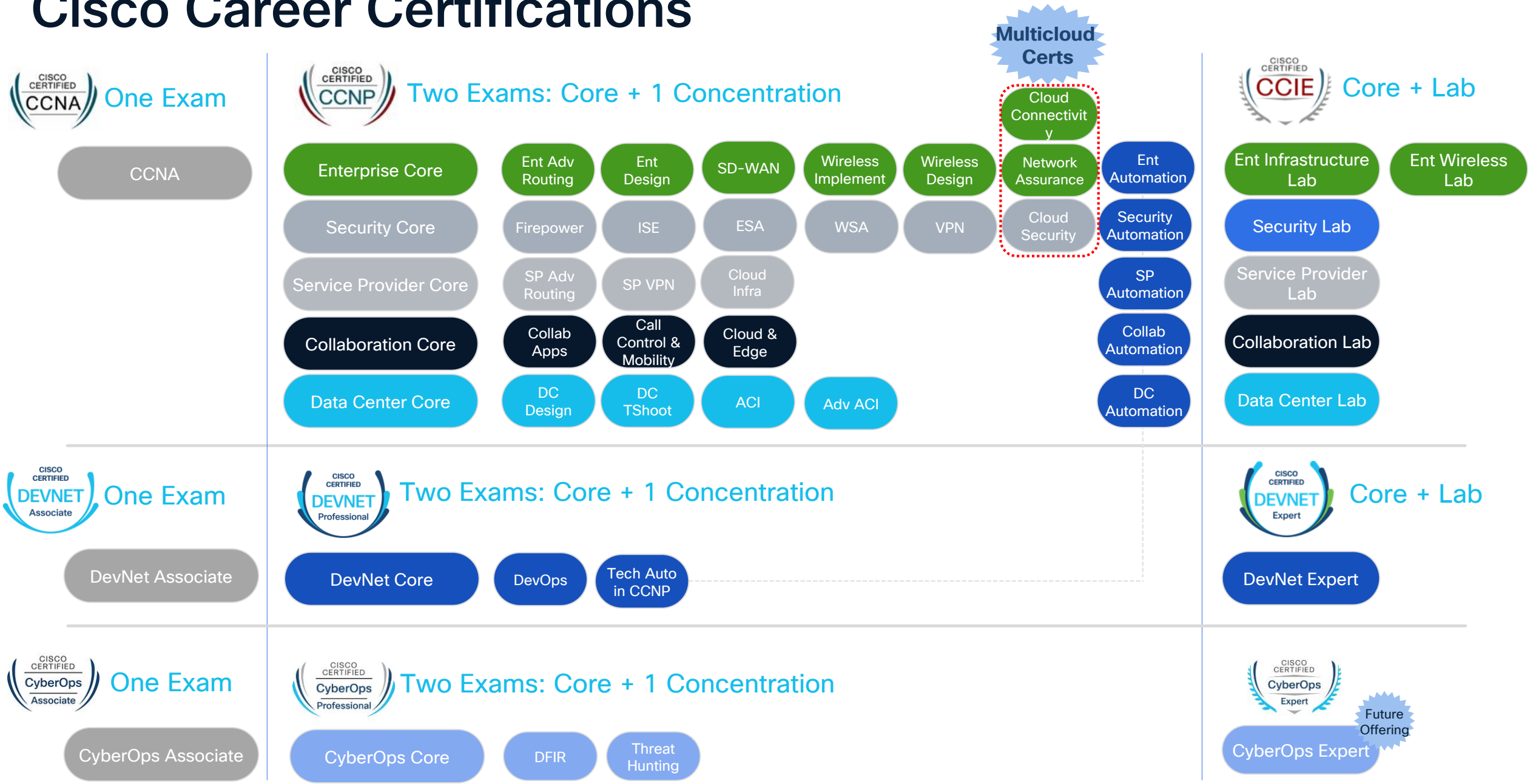
**70%**
demonstrate improved productivity on the job

# Certified employees are valued assets

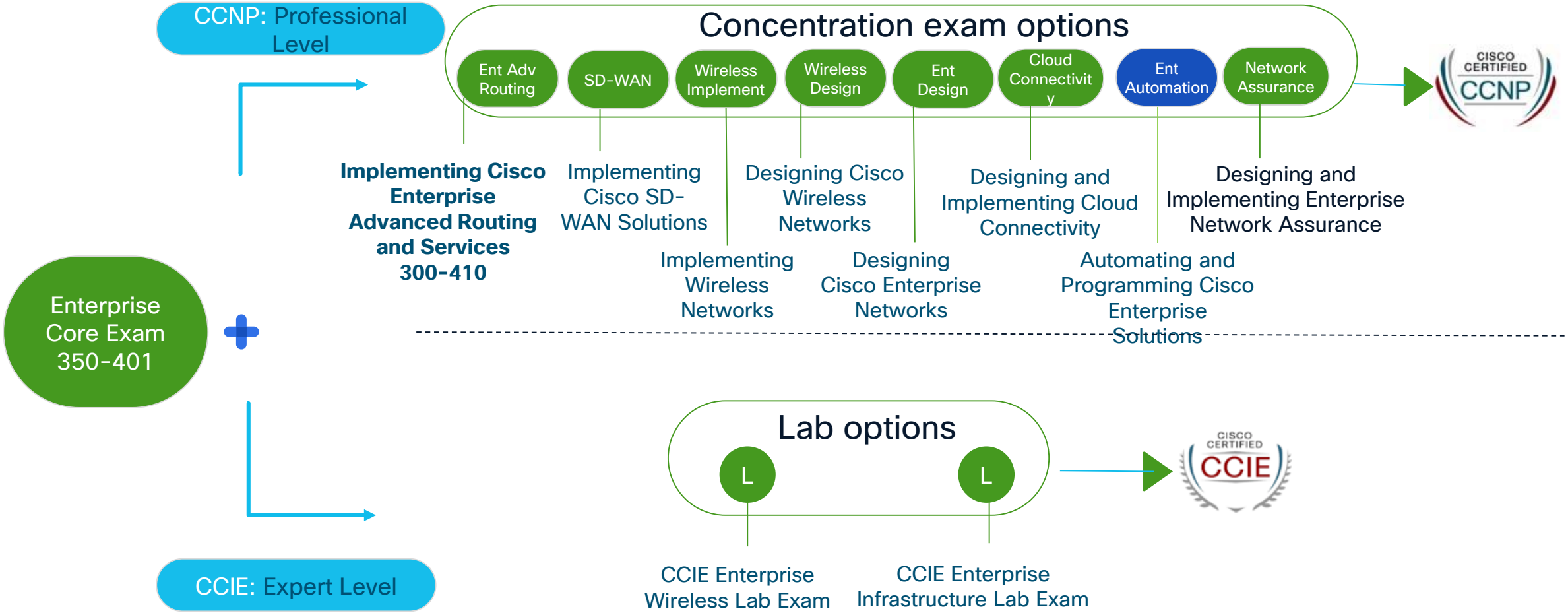
- Certification shortlists candidates
- Gives confidence to the employer. In most cases, it gets you an interview ☺
- Virtually represents a job seeker through a resume/LinkedIn prescreening
- Cisco Certifications are time-honored proof your knowledge. These are ANSI and NIST certified, which means a certification with greater value in the marketplace.

# CCNP Enterprise Certifications

# Cisco Career Certifications



# Cisco Enterprise certification track

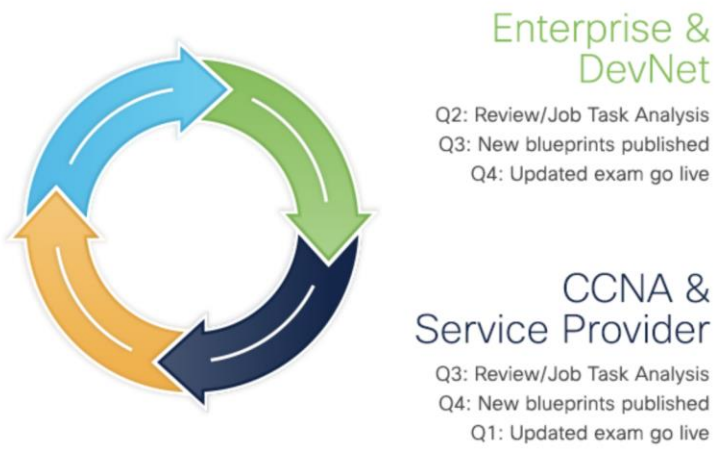


# Cisco Certifications Roadmap

Here are some helpful hints to help you manage your certification journey:

- Check the Release Notes section listed on the Certification Roadmap tables for specific updates to your exam.
- Sign up for the Cisco Certification Roadmap newsletter for the latest exam info updates.
- If you have questions, check the Cisco Learning Network Community forum that corresponds to your certification of interest, or contact our team of experts.

We want you to succeed, and we're here to help!




**How it works:**

1. Cisco **reviews** each technology on the same quarterly schedule each year to make sure our exams align with the latest Cisco technologies.
2. We **announce** blueprint changes 3-6 months in advance along with revised exam topics and release notes, if applicable.
3. We **publish** the updated exam 3-6 months after the exam blueprint publication, if applicable.

*Dates shown reflect Cisco's fiscal year calendar.*

Q1: August-October, Q2: November-January, Q3: February-April, Q4: May-July

www.cisco.com/go/CertRoadmap

- Annual, iterative, agile model
- Cadence-based systemic approach
- Align with rapid technology evolution
- Ensure relevancy for today
- Prepare for the future
- Add new technologies
- Remove obsolete technologies
- Predictable cadence for planning

# 300-410 ENARSI Exam Blueprint

*300-410 ENARSI Blueprint Ver 1.1 Release Notes*

https://learningcontent.cisco.com/documents/marketing/exam-topics/CCNP_Enterprise_v1.1_Release_Notes.pdf

Cisco Certification Roadmaps

https://learningnetwork.cisco.com/s/cisco-certification-roadmaps?tabset-07517=1&tabset-72da6=1

*300-410 ENARSI Blueprint*

*https://learningnetwork.cisco.com/s/enarsi-exam-topics*

# 300-410 ENARSI Ver 1.1 Exam Blueprint Release Notes

| 300-410 Implementing Cisco Enterprise Advanced Routing and Services | |
|---|---|
| **v1.0** | **v1.1** |
| 1.9 Troubleshoot EIGRP (classic and named mode)<br>1.9.a Address families (IPv4, IPv6)<br>1.9.b Neighbor relationship and authentication<br>1.9.c Loop-free path selections (RD, FD, FC, successor, feasible successor, stuck in active)<br>1.9.d Stubs<br>1.9.e Load balancing (equal and unequal cost)<br>1.9.f Metrics | 1.9 Troubleshoot EIGRP (classic and named mode; VRF and global)<br>1.9.a Address families (IPv4, IPv6)<br>1.9.b Neighbor relationship and authentication<br>1.9.c Loop-free path selections (RD, FD, FC, successor, feasible successor, stuck in active)<br>1.9.d Stubs<br>1.9.e Load balancing (equal and unequal cost)<br>1.9.f Metrics |
| 1.11 Troubleshoot BGP (Internal and External)<br>1.11.a Address families (IPv4, IPv6)<br>1.11.b Neighbor relationship and authentication (next-hop, mulithop, 4-byte AS, private AS, route refresh, synchronization, operation, peer group, states and timers)<br>1.11.c Path preference (attributes and best-path)<br>1.11.d Route reflector (excluding multiple route reflectors, confederations, dynamic peer)<br>1.11.e Policies (inbound/outbound filtering, path manipulation) | 1.11 Troubleshoot BGP (Internal and External; unicast and VRF-Lite)<br>1.11.a Address families (IPv4, IPv6)<br>1.11.b Neighbor relationship and authentication (next-hop, mulithop, 4-byte AS, private AS, route refresh, synchronization, operation, peer group, states and timers)<br>1.11.c Path preference (attributes and best-path)<br>1.11.d Route reflector (excluding multiple route reflectors, confederations, dynamic peer)<br>1.11.e Policies (inbound/outbound filtering, path manipulation) |

# Understand the Adv-Routing Blueprint

# Implementing Cisco Enterprise Advanced Routing and Services

300-410

Four major areas of knowledge

Domain / Weight

| | | |
|---|---|---|
| 1. | Layer 3 Technologies | 35% |
| 2. | VPN Technologies | 20% |
| 3. | Infrastructure Security | 20% |
| 4. | Infrastructure Services | 25% |

# 300-410 ENARSI Ver1.1 Exam Blueprint

## 1.0 Layer 3 Technologies 35%

- 1.1 Troubleshoot administrative distance (all routing protocols)
- 1.2 Troubleshoot route map for any routing protocol (attributes, tagging, filtering)
- 1.3 Troubleshoot loop prevention mechanisms (filtering, tagging, split horizon, route poisoning)
- 1.4 Troubleshoot redistribution between any routing protocols or routing sources
- 1.5 Troubleshoot manual and auto-summarization with any routing protocol
- 1.6 Configure and verify policy-based routing
- 1.7 Configure and verify VRF-Lite
- 1.8 Describe Bidirectional Forwarding Detection
- 1.9 Troubleshoot EIGRP (classic and named mode; VRF and global)
  - 1.9.a Address families (IPv4, IPv6)
  - 1.9.b Neighbor relationship and authentication
  - 1.9.c Loop-free path selections (RD, FD, FC, successor, feasible successor, stuck in active)
  - 1.9.d Stubs
  - 1.9.e Load balancing (equal and unequal cost)
  - 1.9.f Metrics
- 1.10 Troubleshoot OSPF (v2/v3)
  - 1.10.a Address families (IPv4, IPv6)
  - 1.10.b Neighbor relationship and authentication
  - 1.10.c Network types, area types, and router types
    - 1.10.c.i Point-to-point, multipoint, broadcast, nonbroadcast
    - 1.10.c.ii Area type: backbone, normal, transit, stub, NSSA, totally stub
    - 1.10.c.iii Internal router, backbone router, ABR, ASBR
    - 1.10.c.iv Virtual link
  - 1.10.d Path preference
- 1.11 Troubleshoot BGP (Internal and External, unicast, and VRF-Lite)
  - 1.11.a Address families (IPv4, IPv6)
  - 1.11.b Neighbor relationship and authentication (next-hop, mulithop, 4-byte AS, private AS, route refresh, synchronization, operation, peer group, states and timers)
  - 1.11.c Path preference (attributes and best-path)
  - 1.11.d Route reflector (excluding multiple route reflectors, confederations, dynamic peer)
  - 1.11.e Policies (inbound/outbound filtering, path manipulation)

## 2.0 VPN Technologies 20%

## 3.0 Infrastructure Security 20%

## 4.0 Infrastructure Services 25%

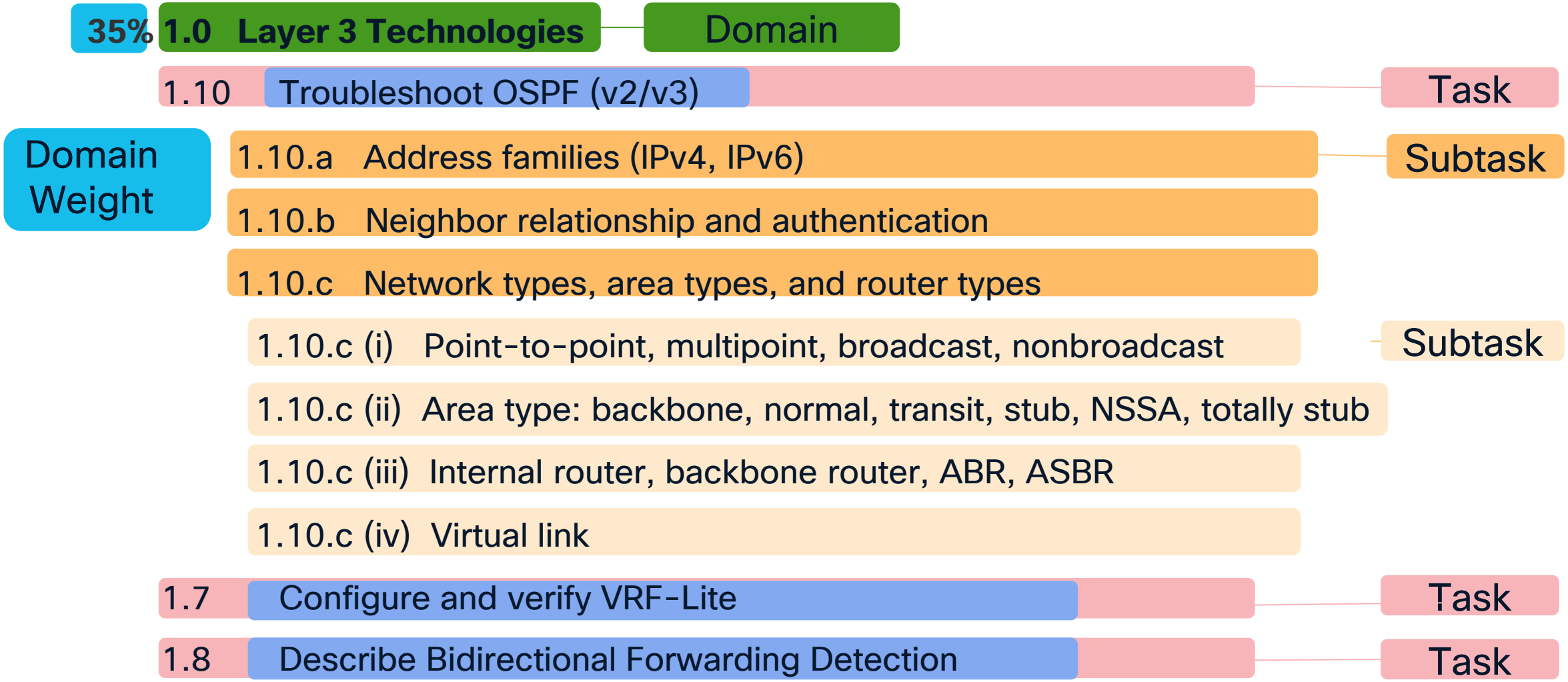
The above topics are likely to be included on the **300-410 ENARSI** exam. The topics are subject to change at any time to reflect the latest technologies aligned to Cisco's products.

# Don’t be scared...

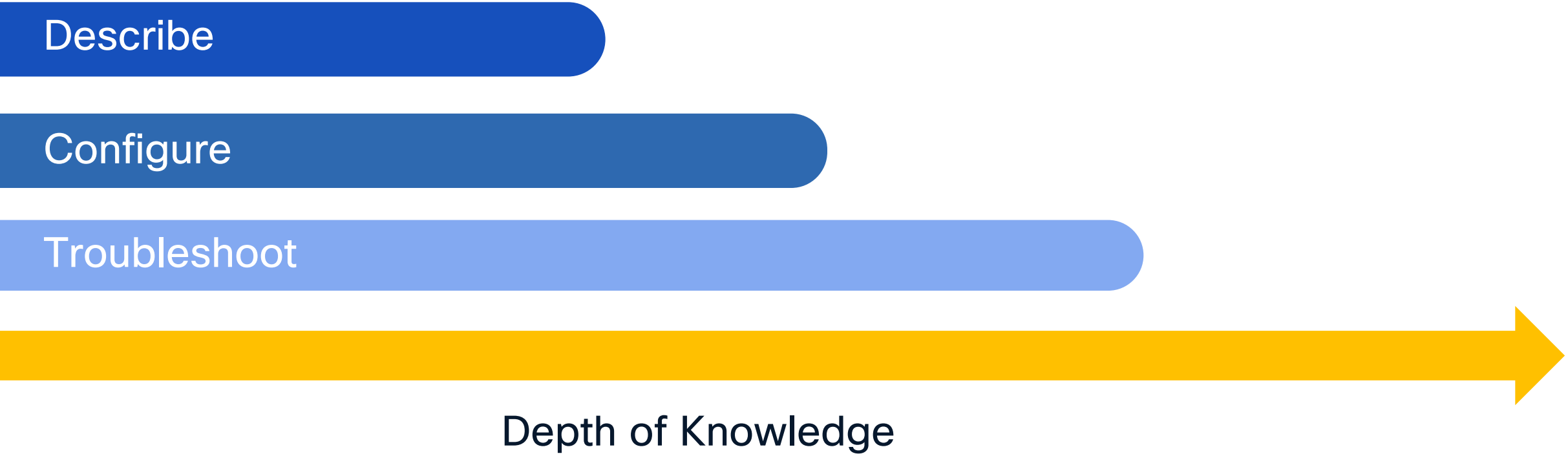
# Be prepared

# Deciphering the Blueprint:

Implementing Cisco Enterprise Advanced Routing and Services (300-410)



# Blueprint Verbs



# Types of questions

Multiple choice

Drag and drop

Performance-based Lab question

# Technology Depth

# Tasks

Sample Tasks on Multiple Domains

2.1 Describe MPLS operations (LSR, LDP, label switching, LSP)

1.6 Configure and verify VRF-Lite

1.7 Configure and verify Policy-based Routing

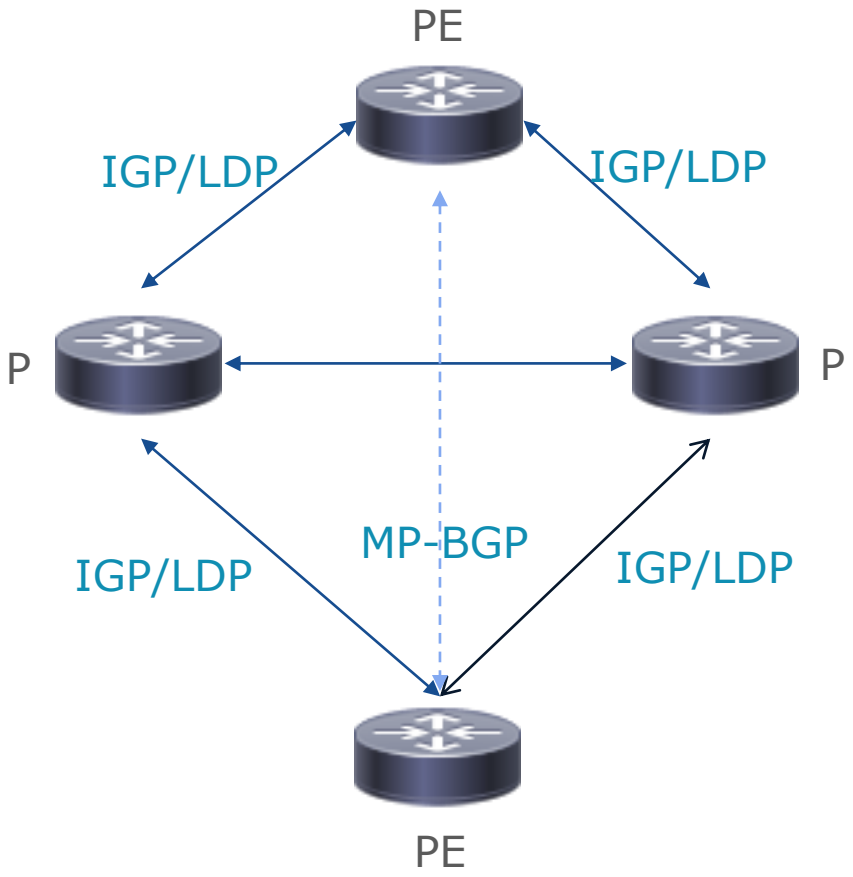
1.4 Troubleshoot redistribution between any routing protocols or routing sources

1.10 Troubleshoot OSPF (v2/v3)

1.10.d Path preference

# 2.1 Describe MPLS operations

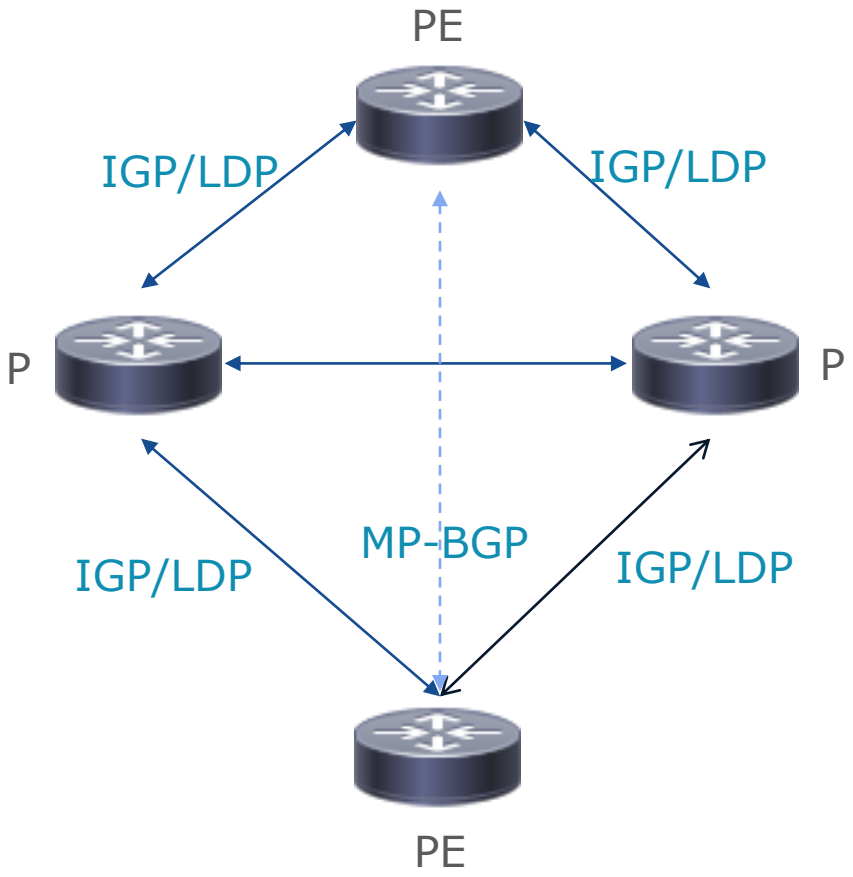
(LSR, LDP, label switching, LSP)




- Labeling inside MPLS cloud between P (LSR) and PE (Edge-LSR)
- PE-P-PE, P-P communication
- Customer to PE (CE-PE)
- PE carrying multiple customer routes communicate among them keeping segregation between customers
- Customers with overlapping IP addresses communicate and carry routes between PE-CE
- Advanced- TE (RSVP)

# 2.1 Describe MPLS operations

(LSR, LDP, label switching, LSP)



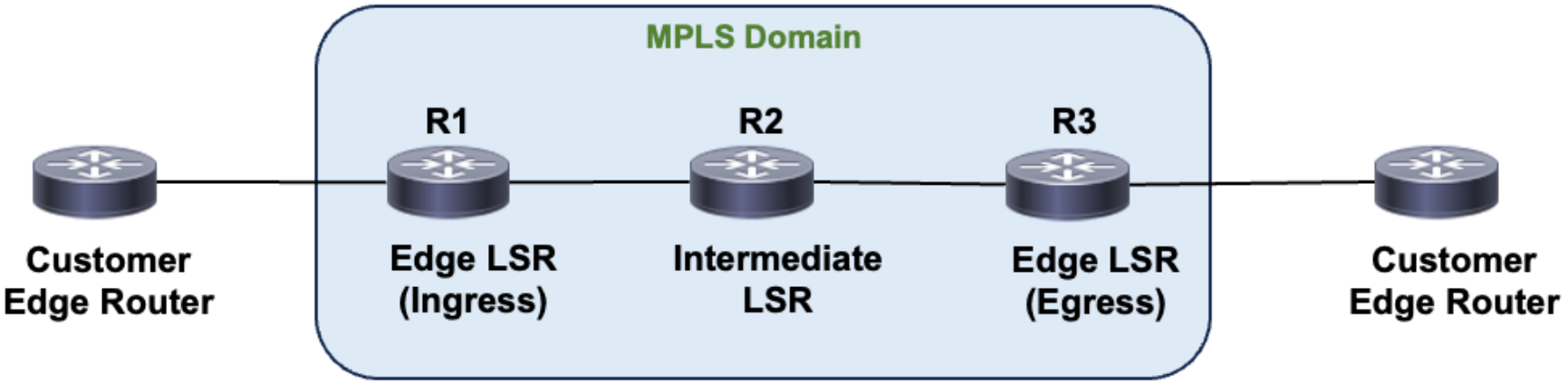

- IGP is used to build an end-to-end layer 3 network and LDP is used to establish  hop-by-hop forwarding between LSRs using labels
- LDP distributes labels for prefixes advertised by unicast routing protocols
- BGP to support VPNs and establish communication between a set of sites using the same criteria (customer) – Label mapping info carried as part of NLRI (Network Layer Reachability Information)
- Forwarding plane consists of label imposition, swapping, and disposition – Regardless of the control plane (BGP, LDP, RSVP)

# 2.1 Describe MPLS operations

(LSR, LDP, label switching, LSP)

**Ingress LSRs** receive a packet that still needs to be labeled, insert a label (stack) in front of the packet, and send the packet on a data link.

**Egress LSRs** receive a labeled packet, remove the label, and send the packet on a data link.




**Intermediate LSRs** receive an incoming labeled packet, perform an operation on the packet, switch the packet, and send the packet on the correct data link.

# 2.1 Describe MPLS operations

(LSR, LDP, label switching, LSP)

- IP CEF (default)
- Enable MPLS globally or at the interface level
- LDP 32 bit (4 byte)
- Labels (Max 3 --> VPN, IGP, TE) (Max 12 bytes)
- MPLS MTU 1512
- Push, SWAP, Pull
- Avoid double lookup by Penultimate hop popping or PHP by LSR before LER
- https://www.cisco.com/c/en/us/td/docs/routers/ios/config/17-x/mpls/b-mpls/m_mp-mpls-cisco-rtrs.html

# 1.6 Configure and verify VRF-Lite

- Allows overlapping IP addresses on the same router using VRF
- Address-family aware VRF-Lite must use ***address-family ipv4/ipv6*** under the VRF definition
- Show ip route must use vrf aware show command to display routing i.e. ***show ip route vrf cust_A***
- Dynamic routing is supported over VRF-Lite e.g. EIGRP, OSPF, BGP
- When using OSPF, ***capability vrf-lite*** must be configured under ***router ospf*** command.
- https://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst9500/software/release/17-1/configuration_guide/rtng/b_171_rtng_9500_cg/configuring_vrf_lite.html

# 1.7 Configure and verify Policy-based Routing

- Identify traffic to be routed through specific requirements rather than default CEF exit
- Create a ***route-map*** for the required traffic
- Set next-hop using ***set ip next-hop ip-address [ip-address]*** OR ***set ip default next-hop ip-address [ip-address]***
- Apply the policy map on the interface using ***ip policy route-map map-tag*** command
- The **set ip next-hop** and **set ip default next-hop** commands are similar but have a different order of operation. Configuring the **set ip next-hop** command causes the system to first use policy routing and then use the routing table. Configuring the **set ip default next-hop** command causes the system to first use the routing table and then the policy-route-specified next hop.
- https://www.cisco.com/c/en/us/td/docs/routers/ios/config/17-x/ip-routing/b-ip-routing/m_iri-pbr.html

# 1.4 Troubleshoot redistribution between any routing protocols or routing sources

(Redistributing OSPF into BGP)

- OSPF intra-area and inter-area routes (internal) are redistributed by default if no keyword is mentioned with the redistribute OSPF command
- OSPF external routes must be defined in the match statement on the redistribute command
- Both External type-1 and type-2 must be matched to redistribute both types
  - redistribute OSPF 1 match internal external
  - redistribute OSPF 1 match internal external 1 external 2
- To redistribute all OSPF routes, internal external type-1, and type-2 routes must be matched on the redistribute OSPF command under BGP
- https://www.cisco.com/c/en/us/support/docs/ip/border-gateway-protocol-bgp/5242-bgp-ospf-redis.html

# 1.4 Troubleshoot redistribution between any routing protocols or routing sources

(Redistributing EIGRP)

- EIGRP uses five different variables to calculate the metric
- Redistribute routes do not have these parameters, and this causes irregularities in the route setting.
- To improve performance – set a **default metric** when redistributing routes. Example Router(config-router)#**default-metric 10000 100 255 100 1500**
- A redistributed static route takes precedence over the summary route
  - a static route has an admin distance of 1
  - The EIGRP summary route has an admin distance of 5
- https://www.cisco.com/c/en/us/support/docs/ip/enhanced-interior-gateway-routing-protocol-eigrp/8606-redist.html

# 1.10.d Troubleshoot OSPF (v2/v3)

(Path preference)

- Routes in the same area are called intra-area routes O.
- Routes crossing an ABR (between areas) are called inter-area routes (IA).
- Routes from an ASBR or from other protocols to OSPF are external routes. There are two types of external routes; E1 and E2.
- The cost of an E2 route is always the external cost, irrespective of the interior cost to reach that route. An E1 route cost is the addition of the external cost and the internal cost used to reach that route.
- Multiple routes to the same destination are preferred in the following order: intra-area (O), inter-area (O IA), external E1, external E2.
- https://www.cisco.com/c/en/us/support/docs/ip/open-shortest-path-first-ospf/7039-1.html

# What to Expect (Sample Questions)

# Tasks

Sample Tasks on Multiple Domains

2.1 Describe MPLS operations (LSR, LDP, label switching, LSP)

1.6 Configure and verify VRF-Lite

1.7 Configure and verify Policy-based Routing

1.4 Troubleshoot redistribution between any routing protocols or routing sources

1.10 Troubleshoot OSPF (v2/v3)

1.10.d Path preference

# Multiple Choice

Task → Question

2.1 Describe MPLS operations (LSR, LDP, label switching, LSP)

https://app.sli.do/event/g7n2kkM958A9zXxLZSywbh

Which protocols does a P router use to transfer VPN traffic between PE routers in an MPLS network?

A. OSPF and MP-BGP

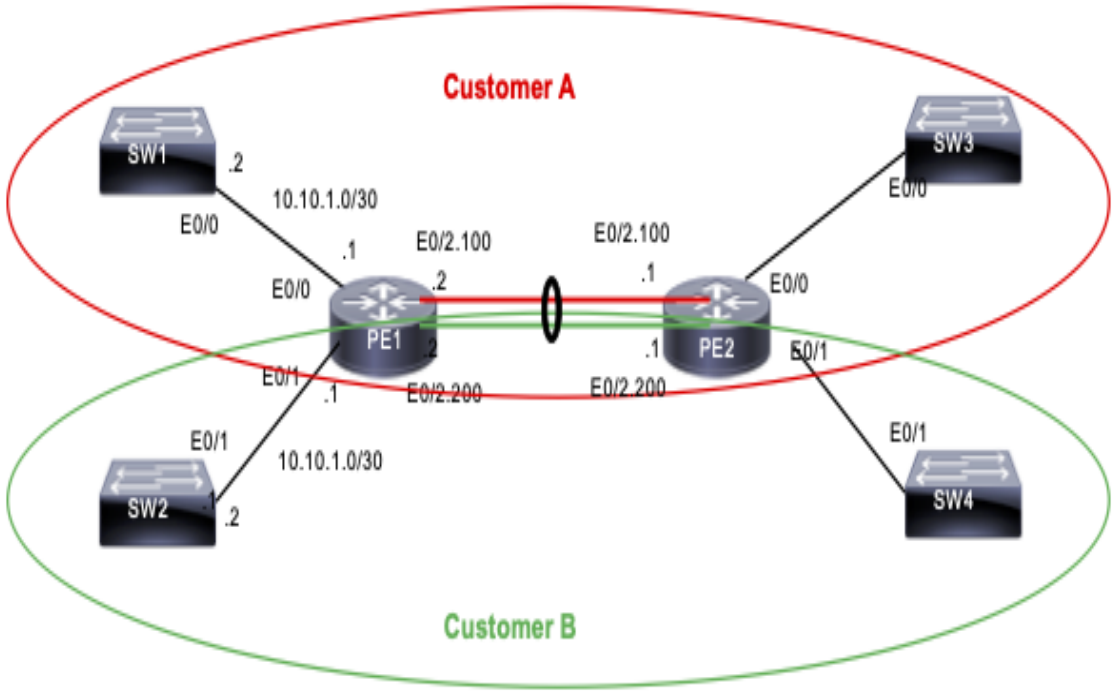
B. OSPF and LDP

C. LDP and MP-BGP

D. LDP and RSVP

# 1.7 Configure and verify VRF-Lite

Refer to the exhibit. An engineer is required to configure overlapping IP addresses (10.10.1.1/30) for multiple customers on a Customer Edge (CE) router for IPv4 and IPv6. Which configuration is required to connect customer A (Cust_A) on the PE1 router for IPv4, assuming PE2 and remote Cust_A devices are configured properly?




**A**

```
ip vrf Cust_A
 rd 10:1
 !
interface Ethernet0/0
 description Cust_A
 ip vrf forwarding Cust_A
 ip address 10.10.1.1
        255.255.255.252
```

**B**

```
vrf definition Cust_A
!
interface Ethernet0/0
 description Cust_A
 ip vrf forwarding Cust_A
 ip address 10.10.1.1
        255.255.255.252
```

**C**

```
vrf definition Cust_A
!
 address-family ipv4
!
interface Ethernet0/0
 description Cust_A
 ip vrf forwarding Cust_A
 ip address 10.10.1.1
        255.255.255.252
```

**D**

```
vrf definition Cust_A
!
 address-family ipv4
!
interface Ethernet0/0
 description Cust_A
 vrf forwarding Cust_A
 ip address 10.10.1.1
        255.255.255.252
```

https://app.sli.do/event/g7n2kkM958A9zXxLZSywbh

# 1.6 Configure and verify VRF-Lite

- Address-family aware VRF-Lite must use ***address-family ipv4/ipv6*** under the VRF definition
- Must configure vrf forwarding under interface before configuring IP address i.e. interface e0/0 > ***vrf forwarding cust_A > ip address***

# 1.6 Configure and verify policy-based routing

Refer to the exhibit. An engineer is required to direct all premier customers to ISP1 regardless of the routes in the routing table. Which configuration meets the requirement?

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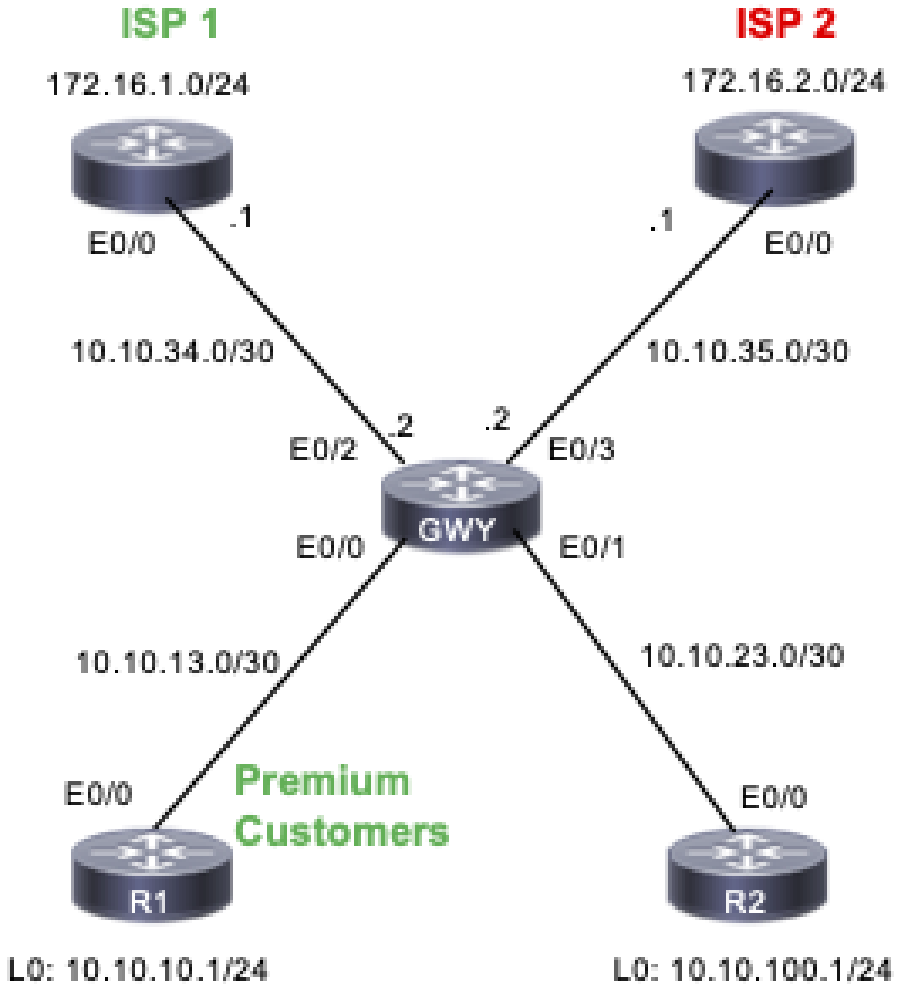


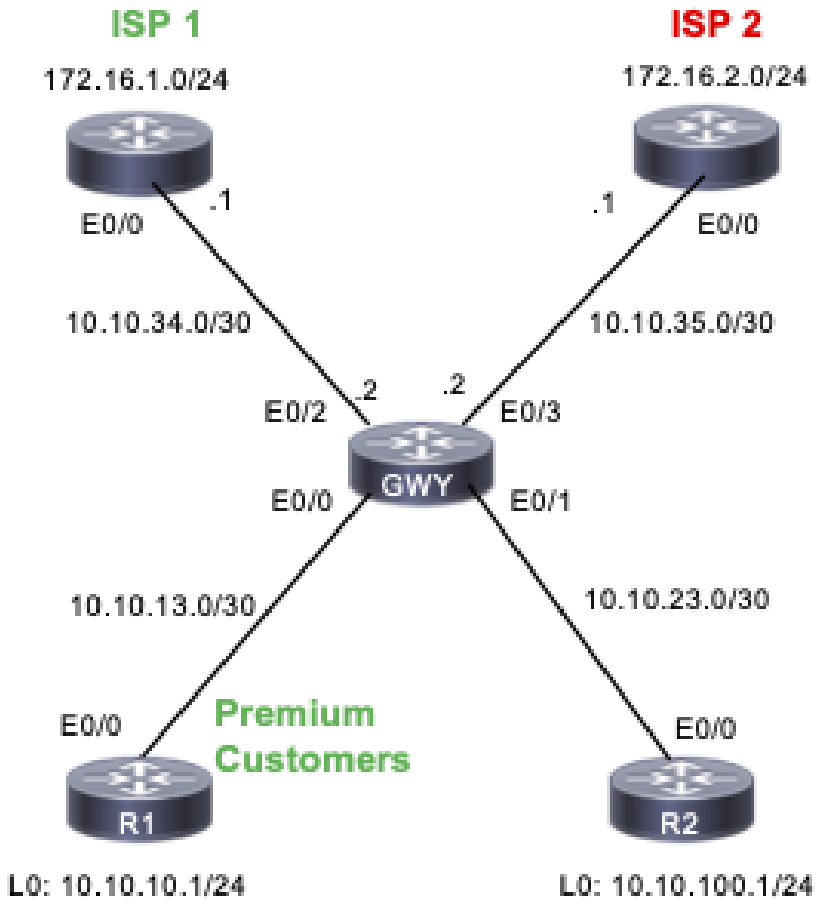
# Contd.

A
```
access-list 1 permit ip 10.10.10.0
255.255.255.0
!
interface e0/0
 ip policy route-map premium_cust
!
route-map premium_cust permit 10
 match ip address 1
 set ip default next-hop 10.10.34.1
!
ip route 172.16.1.0 255.255.255.0 10.10.35.1
ip route 172.16.2.0 255.255.255.0 10.10.35.1
```

B
```
access-list 1 permit ip 10.10.10.0
255.255.255.0
!
interface e0/0
 ip policy route-map premium_cust
!
route-map premium_cust permit 10
 match ip address 1
 set ip default next-hop 10.10.34.1
!
ip route 172.16.1.0 255.255.255.0 10.10.35.1
ip route 0.0.0.0 255.255.255.0 10.10.35.1
```

C
```
access-list 1 permit ip 10.10.10.0
255.255.255.0
!
interface e0/0
 ip policy route-map premium_cust
!
route-map premium_cust permit 10
 match ip address 1
 set ip next-hop 10.10.34.1
!
ip route 172.16.1.0 255.255.255.0 10.10.35.1
ip route 172.16.2.0 255.255.255.0 10.10.35.1
```

D
```
access-list 1 permit ip 10.10.10.0
255.255.255.0
!
interface e0/0
 ip policy route-map premium_cust
!
route-map premium_cust permit 10
 match ip address 1
 set ip next-hop 10.10.35.1
!
ip route 172.16.1.0 255.255.255.0 10.10.34.1
ip route 172.16.2.0 255.255.255.0 10.10.35.1
```

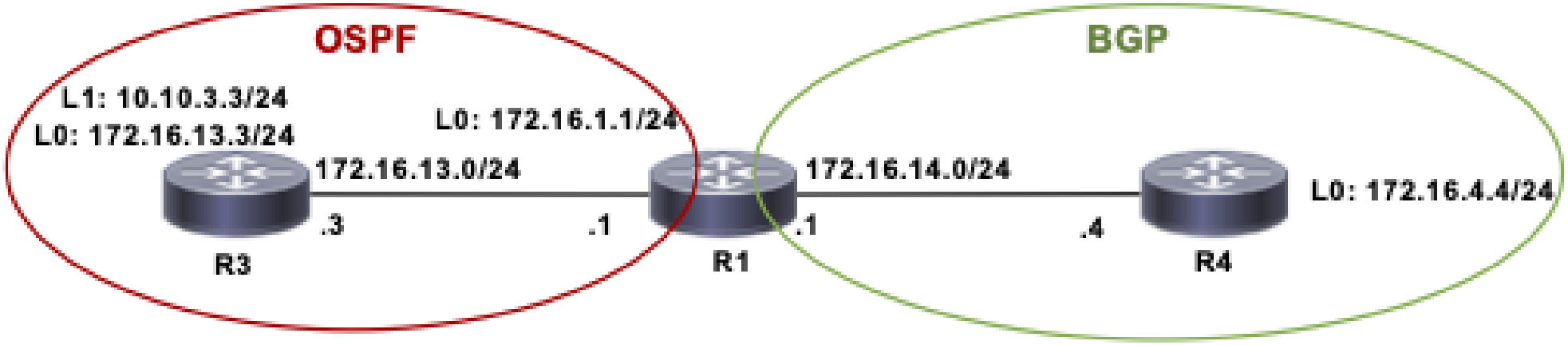


# 1.7 Configure and verify Policy-based Routing

- The **set ip next-hop** and **set ip default next-hop** commands are similar but have a different order of operation. Configuring the **set ip next-hop** command causes the system to first use policy routing and then use the routing table. Configuring the **set ip default next-hop** command causes the system to first use the routing table and then the policy-route-specified next hop.

# 1.4 Troubleshoot redistribution between any routing protocols or routing sources.

Refer to the exhibit. An engineer redistributes OSPF into BGP, but not all the routes are redistributed. Which action resolves the issue on R1 with minimum configuration?



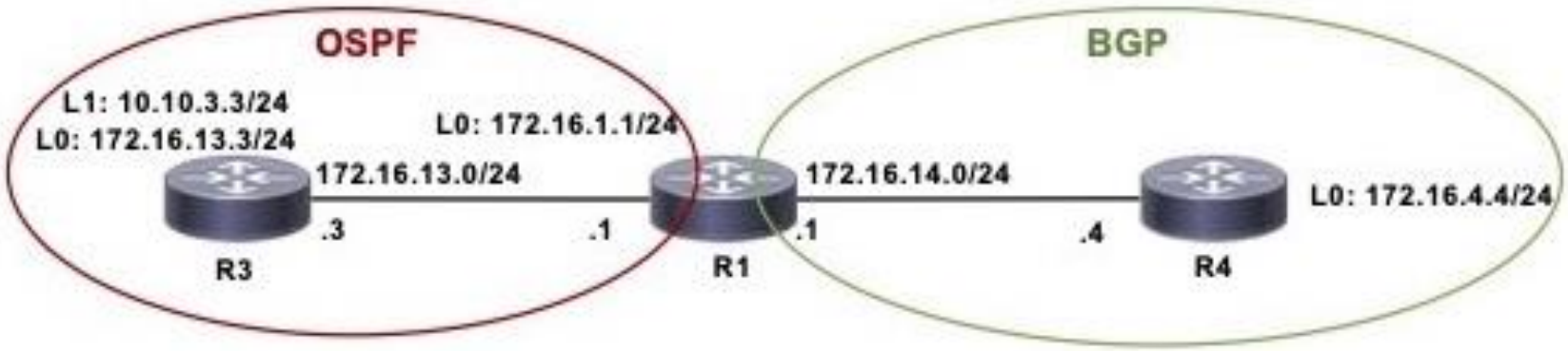

https://app.sli.do/event/g7n2kkM958A9zXxLZSywbh

A. Configure /32 network statement under BGP for R3 Loopback1.

B. Configure metric with the redistribute command to advertise external routes.

C. Configure route map to redistribute OSPF internal and external routes into BGP.

D. Configure to match OSPF internal external routes with the redistribute command.




```
R1#sh run | s bgp
router bgp 65000
 bgp log-neighbor-changes
 redistribute ospf 1
 neighbor 172.16.14.4 remote-as 65000

R1#sh ip ro
Gateway of last resort is not set

     10.0.0.0/24 is subnetted, 1 subnets
O E2    10.10.3.0 [110/20] via 172.16.13.3, 00:15:47, Ethernet0/1
     172.16.0.0/16 is variably subnetted, 8 subnets, 2 masks
C       172.16.1.0/24 is directly connected, Loopback0
O       172.16.3.3/32 [110/11] via 172.16.13.3, 00:15:47, Ethernet0/1
B       172.16.4.0/24 [200/0] via 172.16.14.4, 00:00:53
C       172.16.13.0/24 is directly connected, Ethernet0/1
C       172.16.14.0/24 is directly connected, Ethernet0/2
R1#
```

```
R1#sh ip bgp nei 172.16.14.4 advertised-routes

   Network          Next Hop            Metric LocPrf Weight Path
*>  172.16.1.1/32    0.0.0.0                  0         32768 ?
*>  172.16.3.3/32    172.16.13.3             11         32768 ?
*>  172.16.13.0/24   0.0.0.0                  0         32768 ?
*>  172.16.14.0/24   0.0.0.0                  0         32768 ?

Total number of prefixes 4

R4#sh ip bgp

   Network          Next Hop            Metric LocPrf Weight Path
*>i 172.16.1.0/24    172.16.14.1              0    100      0 ?
*>i 172.16.3.3/32    172.16.13.3             11    100      0 ?
*>  172.16.4.0/24    0.0.0.0                  0         32768 i
*>i 172.16.13.0/24   172.16.14.1              0    100      0 ?
R4#
```

# 1.4 Troubleshoot redistribution between any routing protocols or routing sources

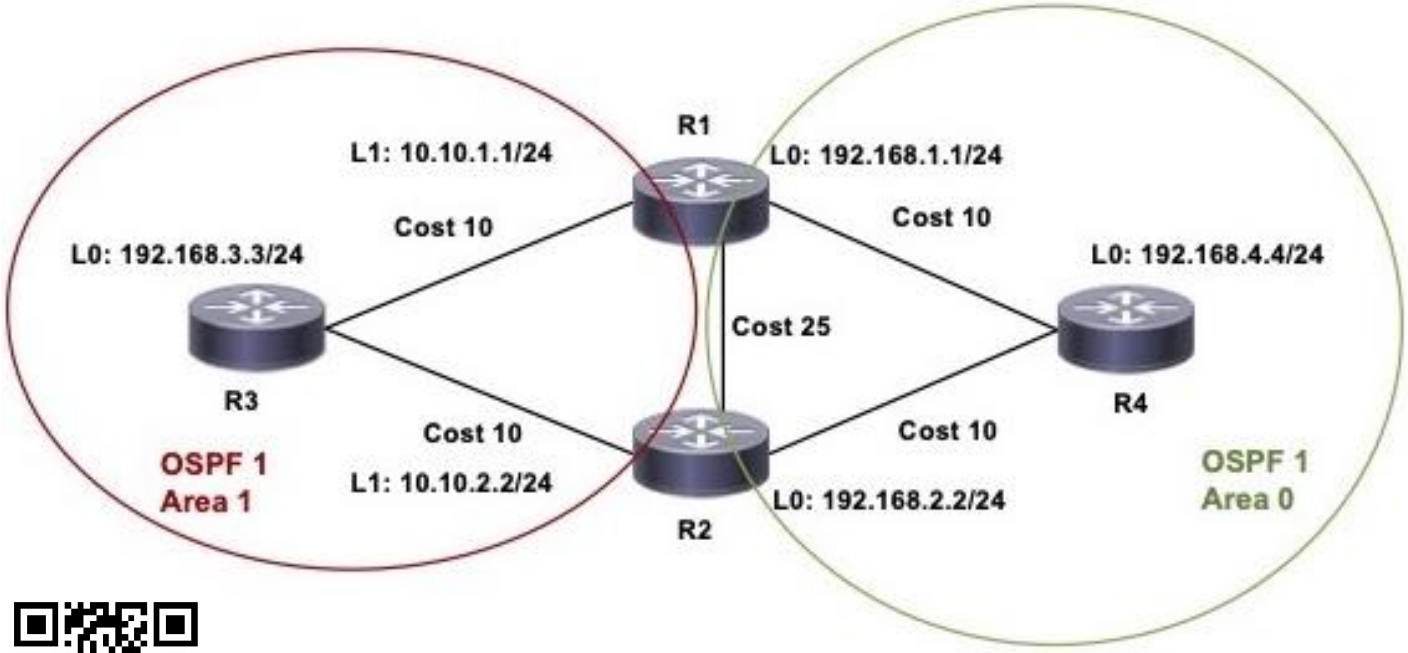
(Redistributing OSPF into BGP)

- To redistribute all OSPF routes, internal external type-1, and type-2 routes must be matched on the redistribute OSPF command under BGP

# 1.10 Troubleshoot OSPF (v2/v3)

1.10.d Path preference

Refer to the exhibit. The network 10.10.1.1 on R1 reaches network 10.10.2.2 on R2 through the link to R3 instead of the directly connected link between R1 and R2. Which action resolves the issue?



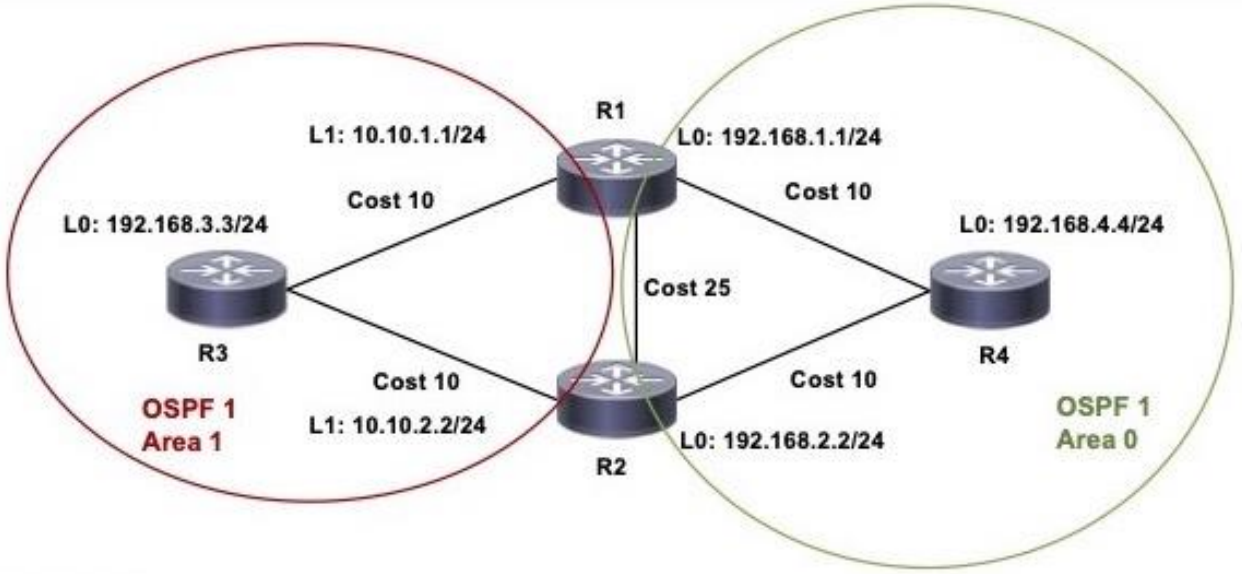

A. Reduce OSPF link cost to 10 between R1 and R2 in area 0.

B. Increase OSPF link cost to 20 between R1 and R3 in area 1.

C. Move link between R1 and R2 to area 1 with OSPF link cost to 10.

D. Change OSPF link type to point-to-point with a link cost of 10 between R1 and R2.

https://app.sli.do/event/g7n2kkM958A9zXxLZSywbh




```
R1#sh ip route ospf
Gateway of last resort is not set

      10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
O        10.10.2.2/32 [110/21] via 192.168.13.3, 00:03:52, Ethernet0/1
      192.168.2.0/32 is subnetted, 1 subnets
O        192.168.2.2 [110/11] via 192.168.12.2, 00:03:16, Ethernet0/0
      192.168.3.0/32 is subnetted, 1 subnets
O        192.168.3.3 [110/11] via 192.168.13.3, 00:03:52, Ethernet0/1
      192.168.4.0/32 is subnetted, 1 subnets
O        192.168.4.4 [110/11] via 192.168.14.4, 00:03:52, Ethernet0/2
O     192.168.23.0/24 [110/20] via 192.168.13.3, 00:03:52, Ethernet0/1
O     192.168.24.0/24 [110/20] via 192.168.14.4, 00:03:52, Ethernet0/2
              [110/20] via 192.168.12.2, 00:03:16, Ethernet0/0

R1#trace 10.10.2.2 source 10.10.1.1
Type escape sequence to abort.
Tracing the route to 10.10.2.2
VRF info: (vrf in name/id, vrf out name/id)
  1 192.168.13.3 1 msec 0 msec 0 msec
  2 192.168.23.2 0 msec *  2 msec
R1#
```

```
R2#sh ip route ospf
Gateway of last resort is not set

      10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
O        10.10.1.1/32 [110/21] via 192.168.23.3, 00:08:03, Ethernet0/2
      192.168.1.0/32 is subnetted, 1 subnets
O        192.168.1.1 [110/11] via 192.168.12.1, 00:07:28, Ethernet0/0
      192.168.3.0/32 is subnetted, 1 subnets
O        192.168.3.3 [110/11] via 192.168.23.3, 00:08:33, Ethernet0/2
      192.168.4.0/32 is subnetted, 1 subnets
O        192.168.4.4 [110/11] via 192.168.24.4, 00:08:33, Ethernet0/1
O     192.168.13.0/24 [110/20] via 192.168.23.3, 00:08:33, Ethernet0/2
O     192.168.14.0/24 [110/20] via 192.168.24.4, 00:08:33, Ethernet0/1
              [110/20] via 192.168.12.1, 00:07:28, Ethernet0/0

R2#trace 10.10.1.1 source 10.10.2.2
Type escape sequence to abort.
Tracing the route to 10.10.1.1
VRF info: (vrf in name/id, vrf out name/id)
  1 192.168.23.3 1 msec 0 msec 1 msec
  2 192.168.13.1 1 msec *  1 msec
R2#
```

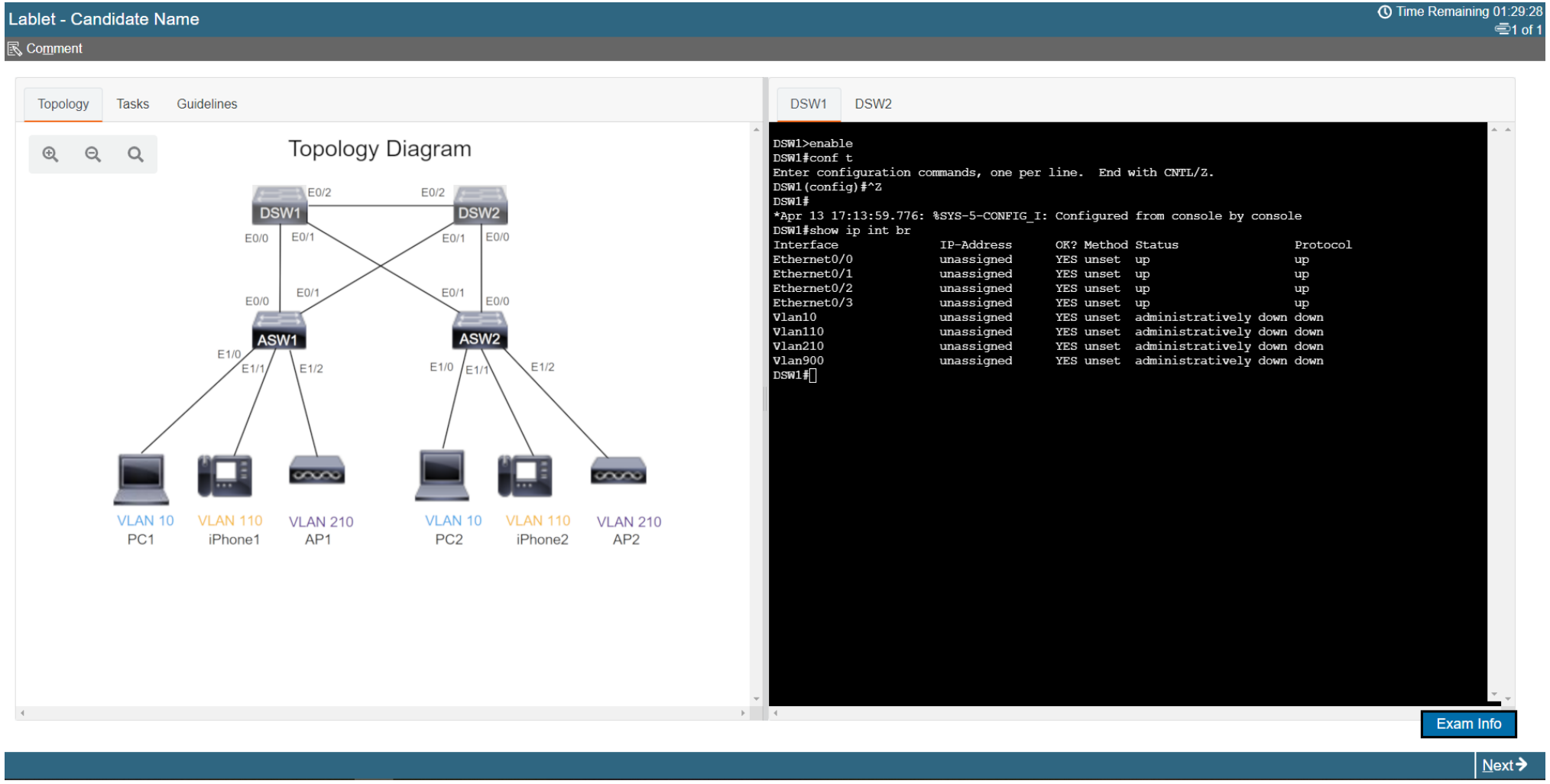
# 1.10.d Troubleshoot OSPF (v2/v3)

(Path preference)

- Multiple routes to the same destination are preferred in the following order: intra-area (O), inter-area (O IA), external E1, external E2.

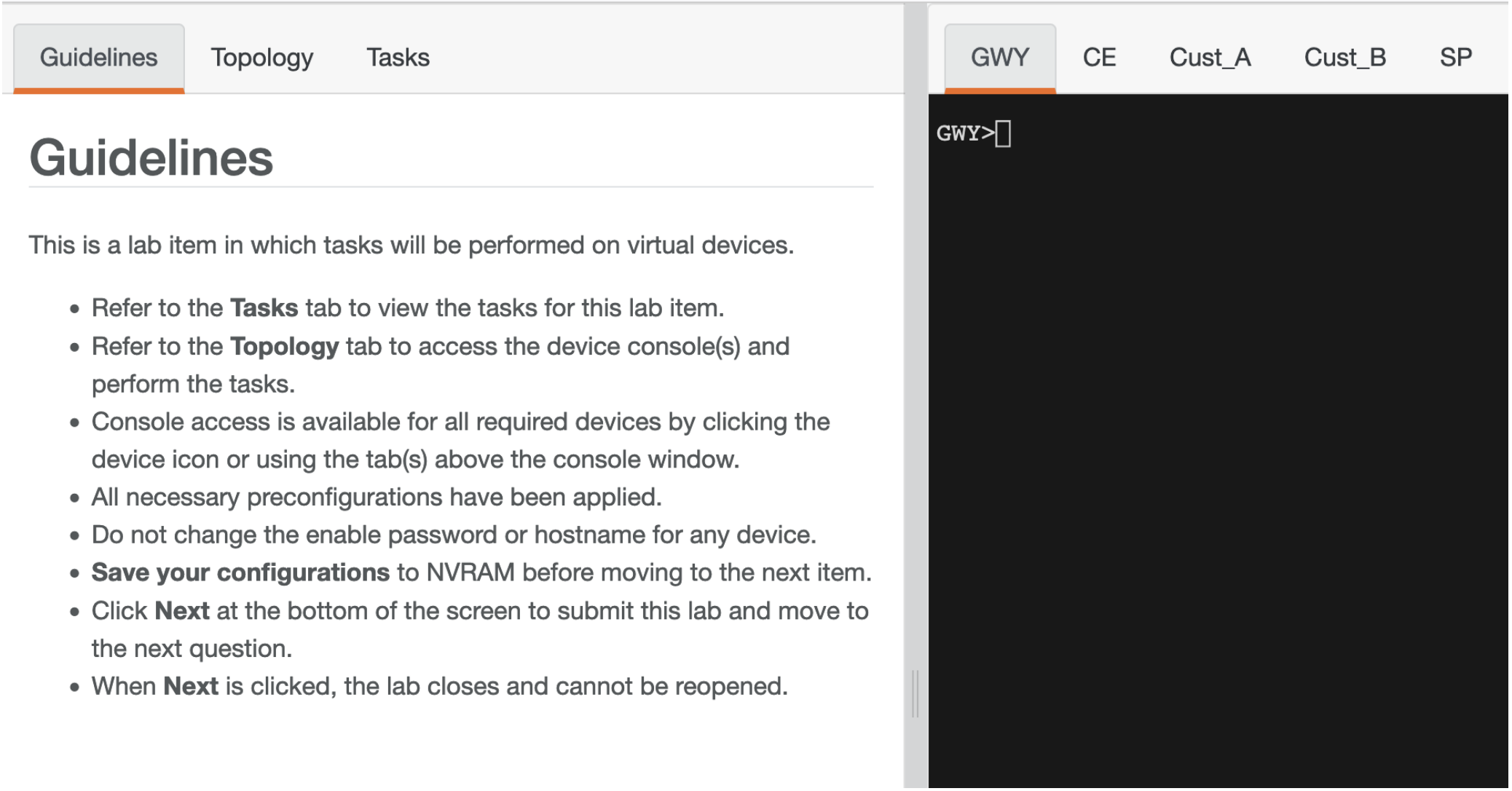
# New Performance-Based Lab Exam Items

https://blogs.cisco.com/learning/new-performance-based-lab-exam-items-build-opportunities

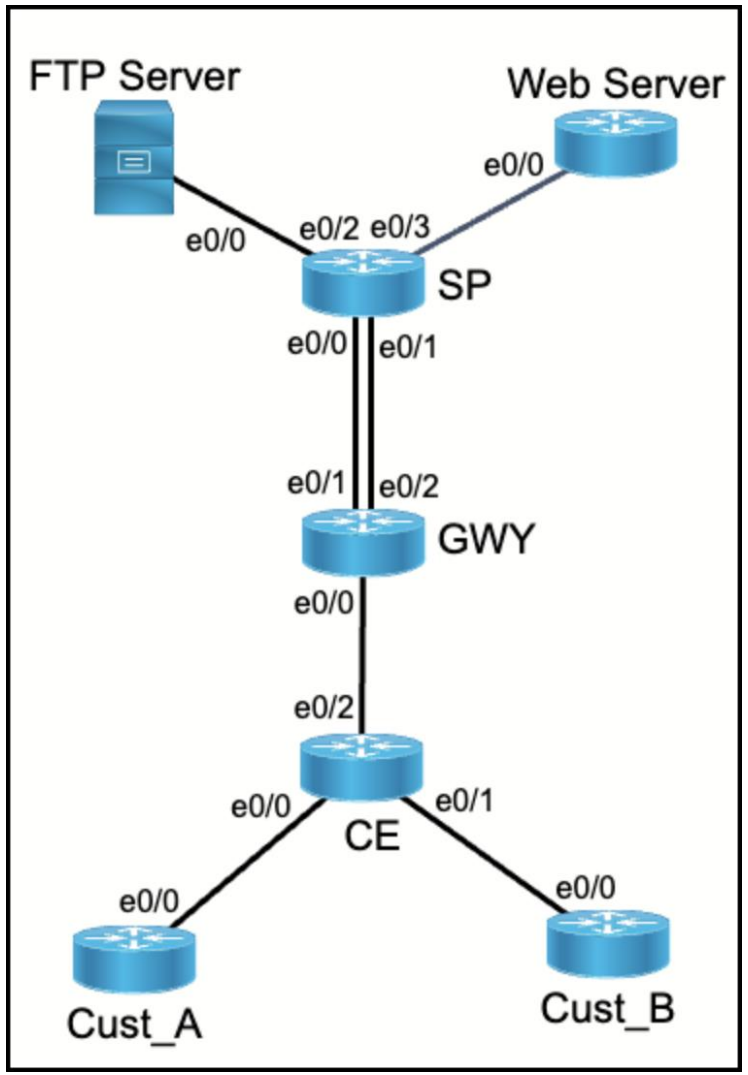


# New Performance-Based Lab Exam Items Demo

(Contd.)



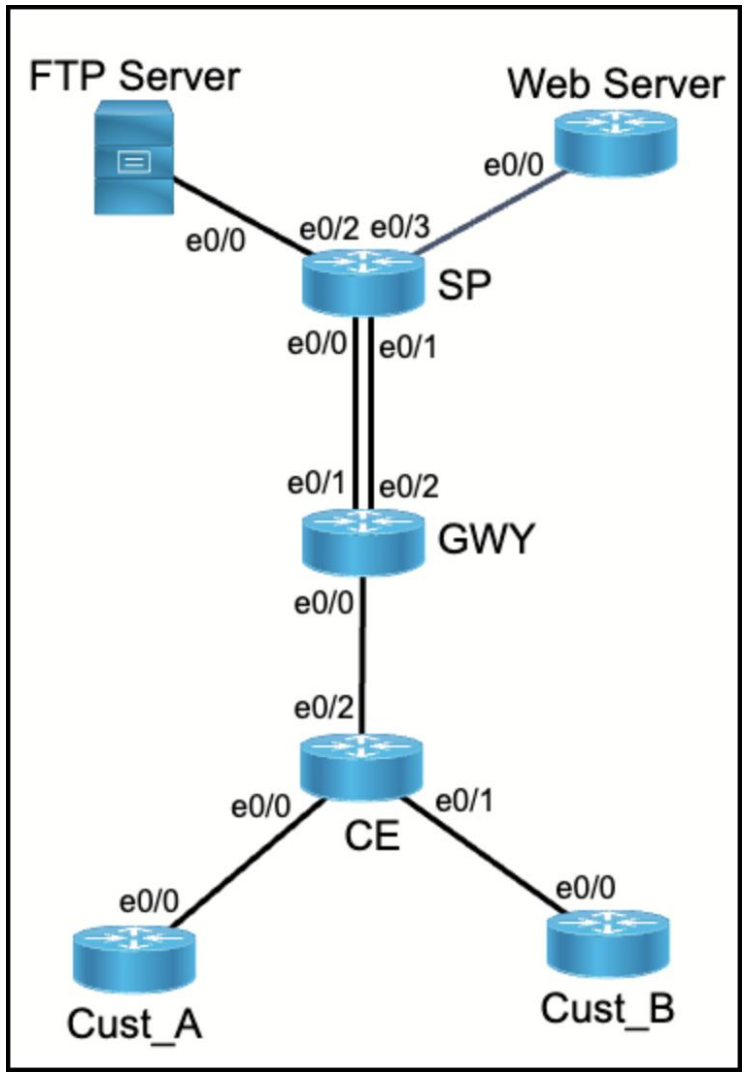
# New Performance-Based Lab Exam Items Demo




Configure the routers for each customer to meet these requirements:

1. Configure CE router interfaces facing Cust_A and Cust_B routers with IP address 10.10.1.1/30 and should be able to support IPv6 if required. Use "Cust_A" and "Cust_B" as variables for any related configuration.
2. Configure CE router interfaces for Cust_A and Cust_B to ping the corresponding interface IP address on the GWY router. Configure static routes to reach Cust_A loopback 0 and Cust_B loopback 0. Configure default routes for Cust_A to reach FTP Server and Cust_B to reach Web Server without introducing dynamic routing. Do not change IP addresses or dot1q configurations on interfaces connecting GWY and CE routers.

# New Performance-Based Lab Exam Items Demo (Contd.)




Configure the routers for each customer to meet these requirements:

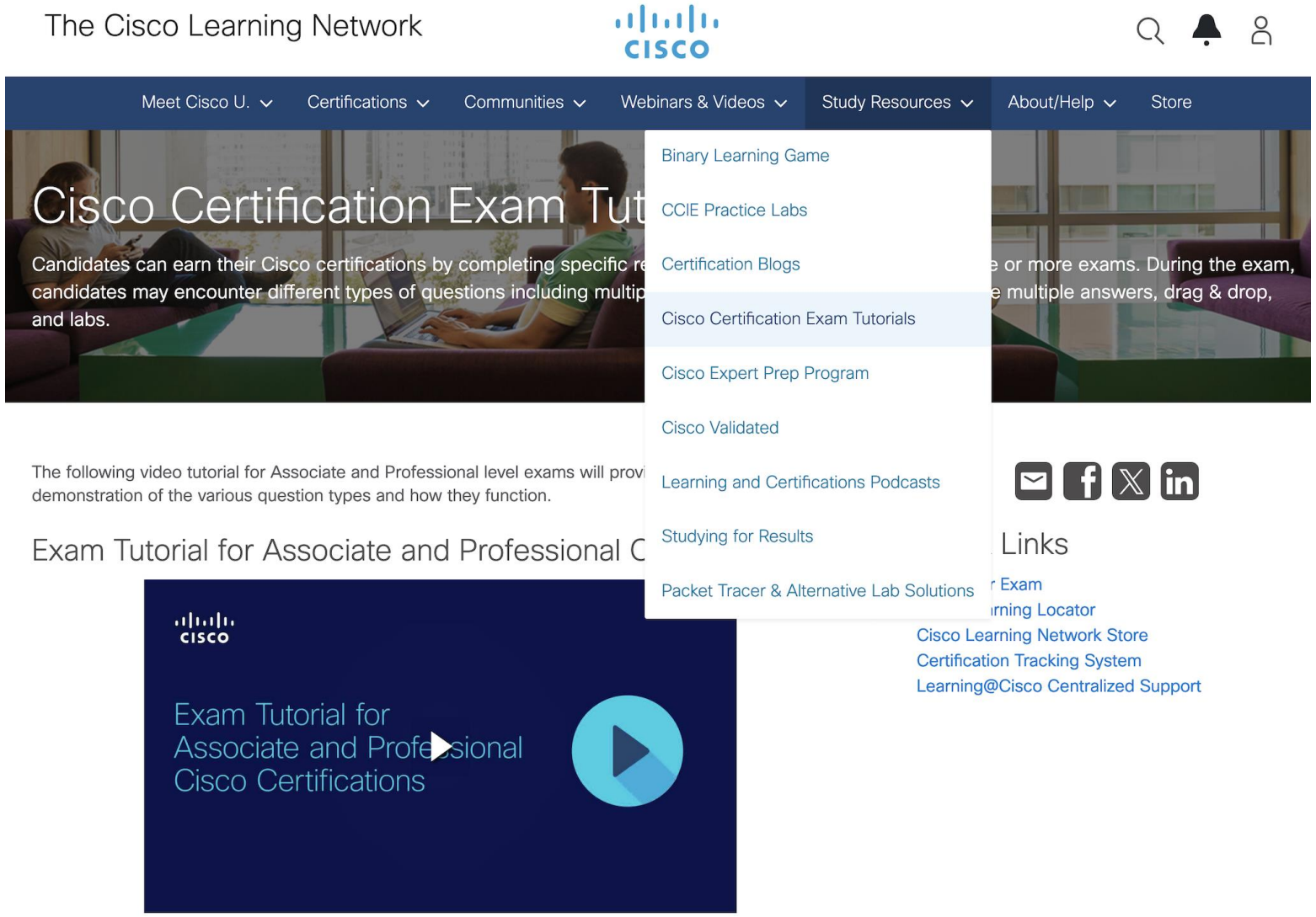
3. Configure the GWY router so that Cust_A always uses next-hop 10.10.10.2 to reach FTP Server (192.168.10.1). Do not add, remove, or modify preconfigured static routes to achieve results. Verify the results using extended ping from loopback0 to FTP Server on Cust_A router.
4. Configure GWY router so that Cust_B always uses next-hop 10.10.20.2 for Web Server (192.168.20.1). Do not add, remove, or modify preconfigured static routes to achieve results. Verify the results using extended ping from loopback0 to Web Server on Cust_B router.

# Learning Resources

# Learning Resources

- Cisco Learning Network Study Resources
- Cisco U
- Configure/Design/Study Guides
- Cisco Live On-Demand Sessions
- Webinars/Podcasts
- Sandboxes
- Cisco Press
- Training Videos
- Continue your journey

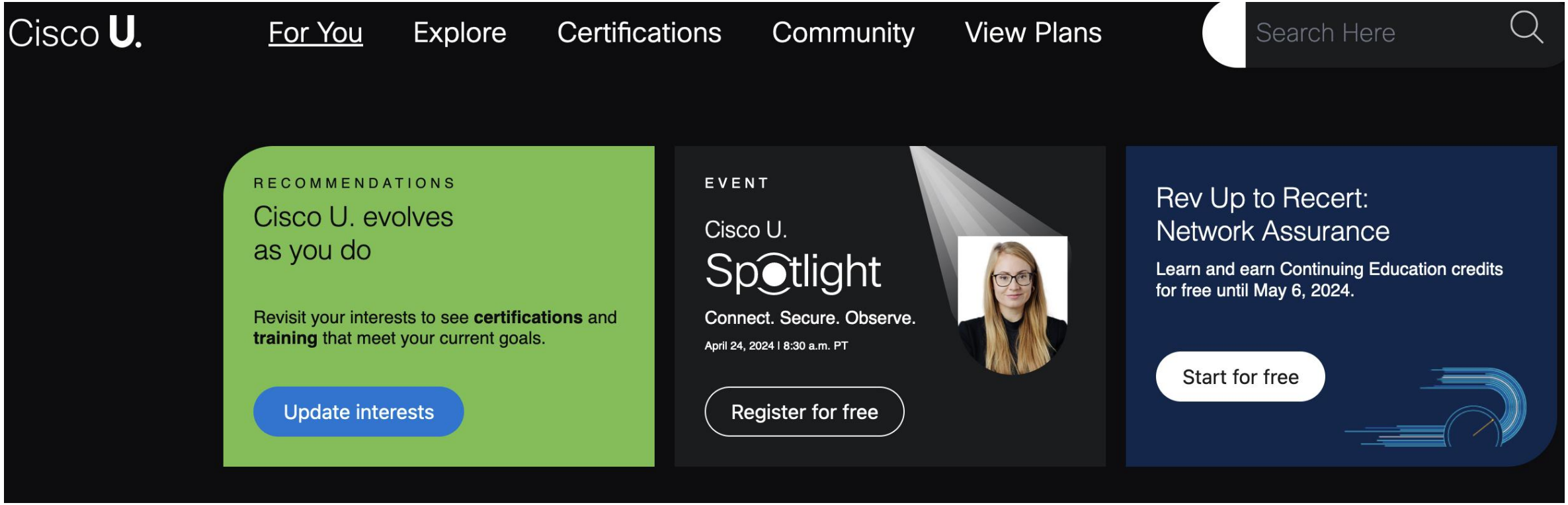
# Cisco Learning Network Study Resources



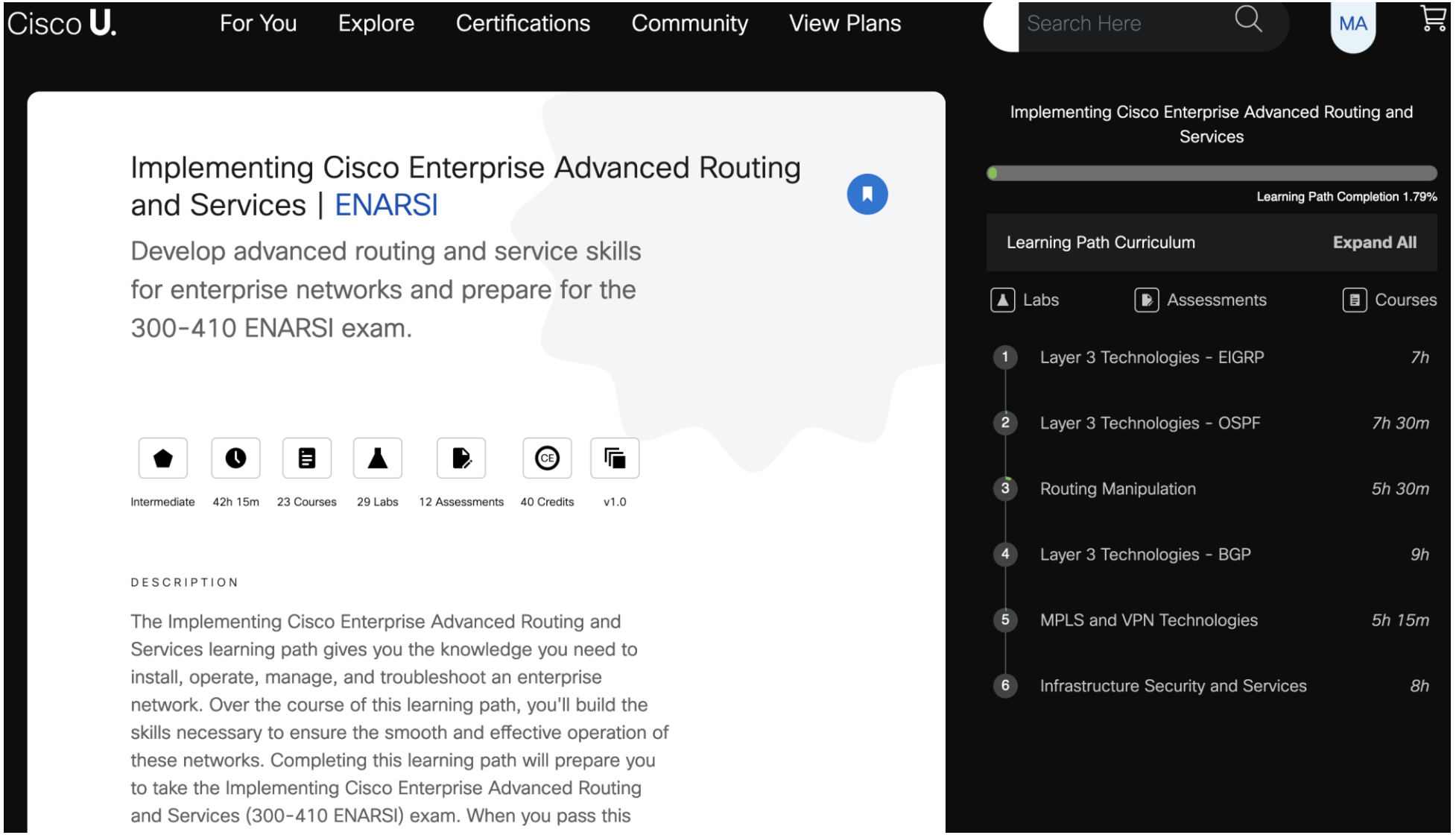
# Cisco Certification Exam Tutorial Videos

https://learningnetwork.cisco.com/s/certification-exam-tutorials

# Cisco U



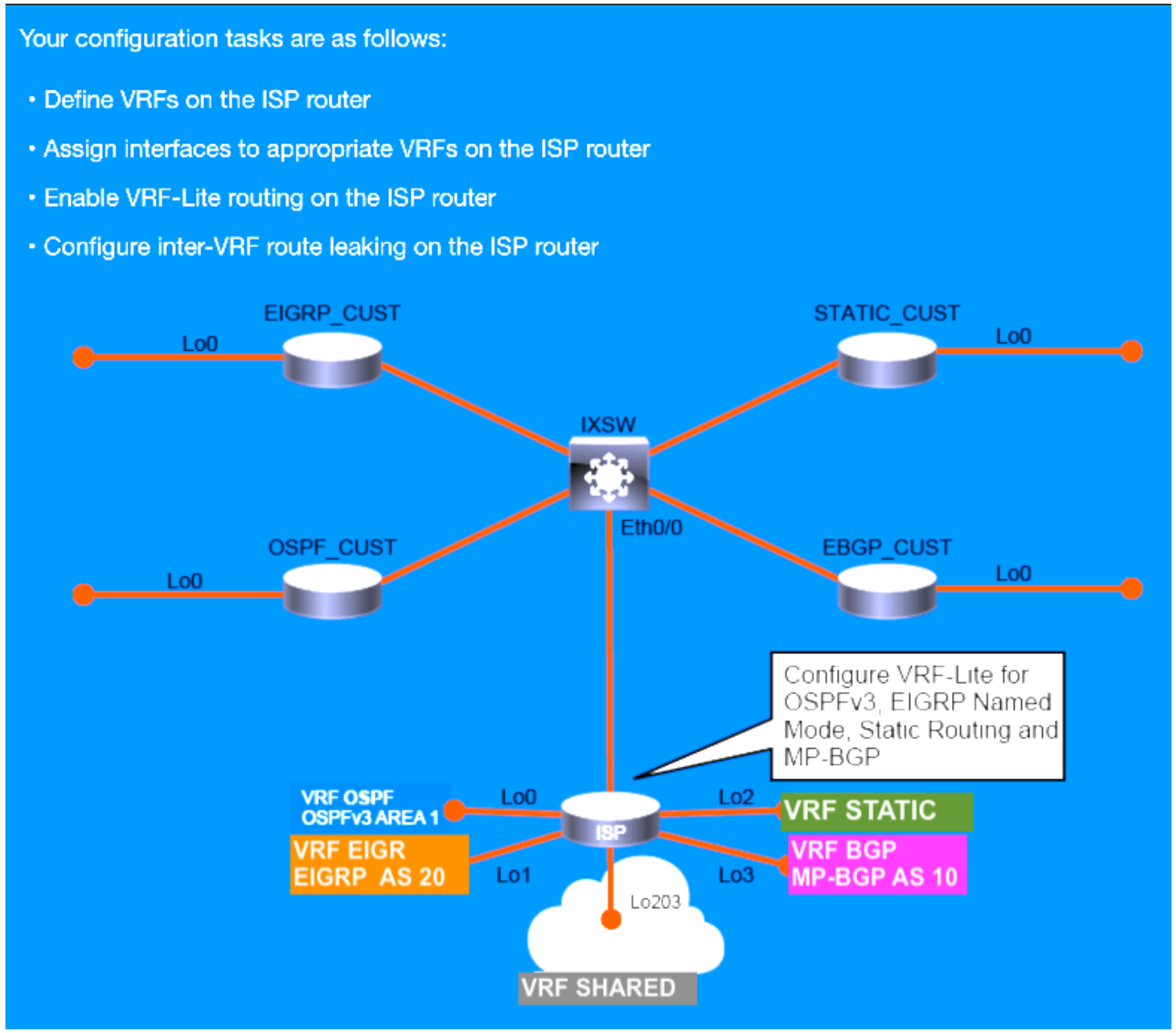
# Cisco U ENARSI – https://u.cisco.com/path/9



# Cisco U ENARSI (Contd.)

# Cisco U ENARSI – VRF-Lite Lab

https://ondemandelearning.cisco.com/apollo-alpha/mc_enarsi10_17/pages/9



# ENARSI – VRF-Lite Lab

https://ondemandelearning.cisco.com/apollo-alpha/mc_enarsi10_17/pages/9

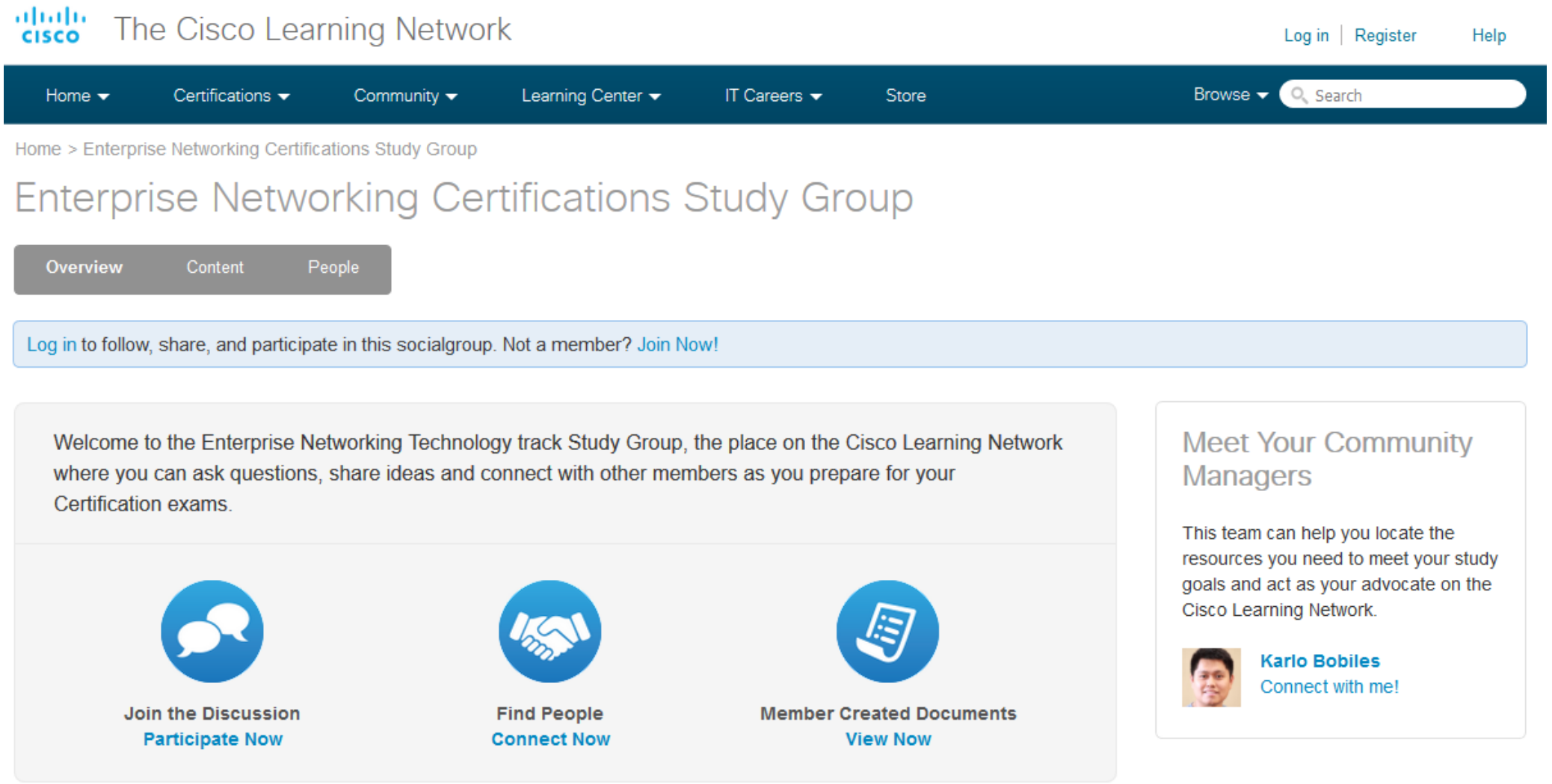
Cisco U. Exit Course

**Step 1**

On ISP, configure the VRFs according to table above.
**Answer**

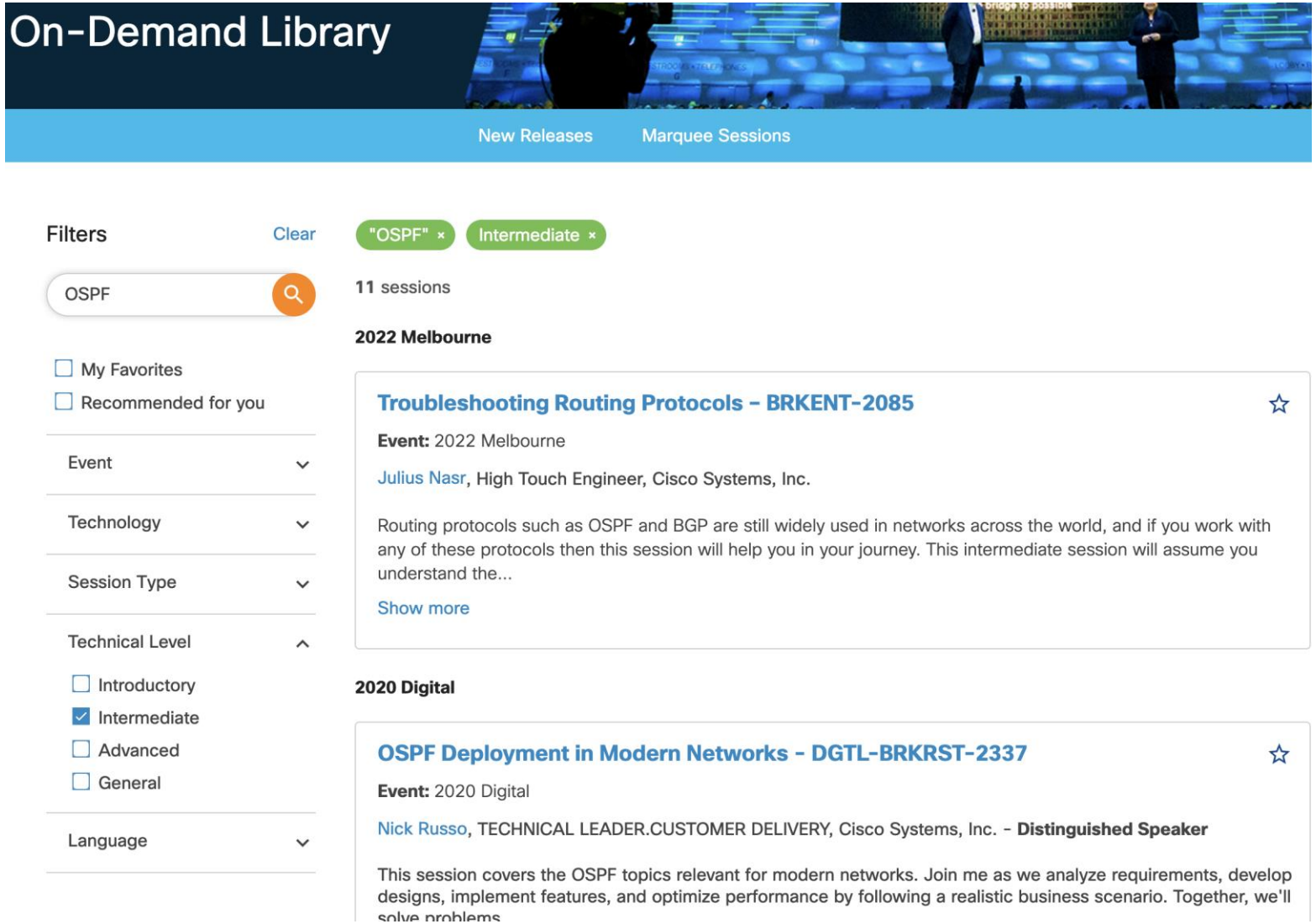
```
ISP(config)# vrf definition OSPF
ISP(config-vrf)# address-family ipv4
ISP(config-vrf-af)# exit
ISP(config-vrf)# address-family ipv6
ISP(config-vrf-af)# exit
ISP(config-vrf)# exit
ISP(config)# vrf definition EIGRP
ISP(config-vrf)# address-family ipv4
ISP(config-vrf-af)# exit
ISP(config-vrf)# address-family ipv6
ISP(config-vrf-af)# exit
ISP(config-vrf)# exit
```

# Community – Study groups



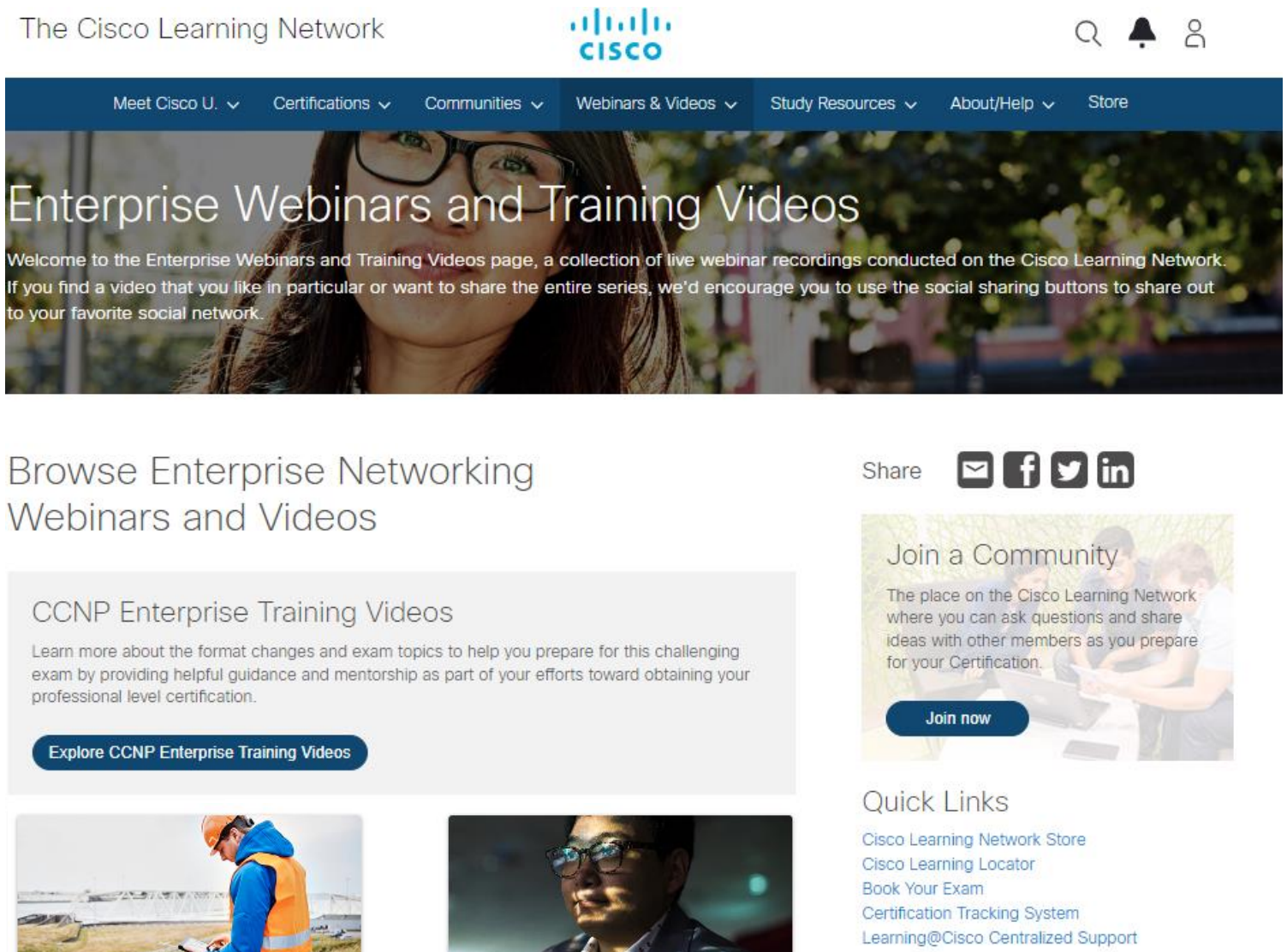
# Cisco Live - On-Demand Library

https://www.ciscolive.com/on-demand/on-demand-library.html



# Webinars & Videos

https://learningnetwork.cisco.com



# Cisco DevNet Sandbox

https://developer.cisco.com/site/sandbox/

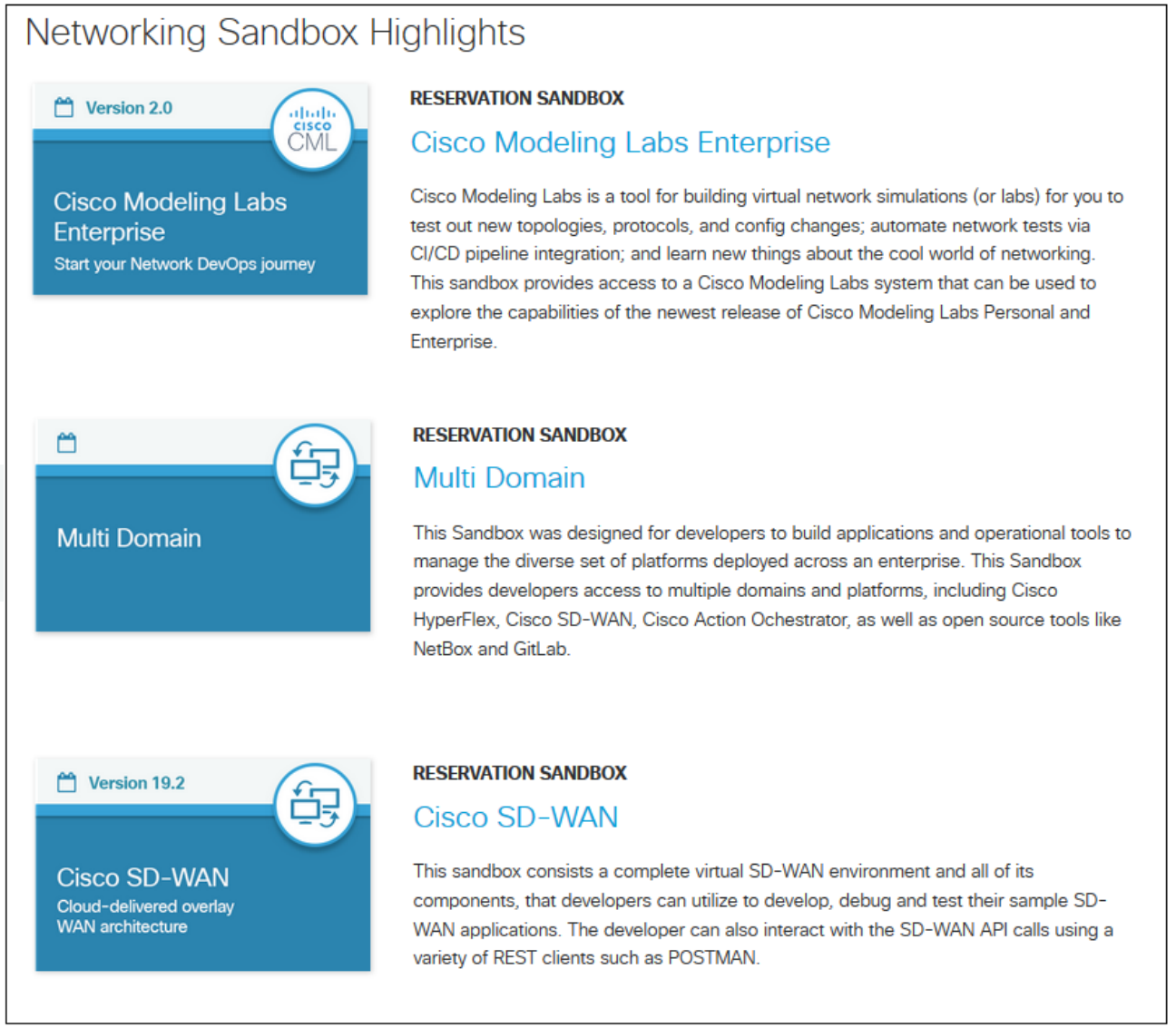
# DevNet Sandbox – Cisco Modeling Labs Demo

https://developer.cisco.com

ALWAYS-ON

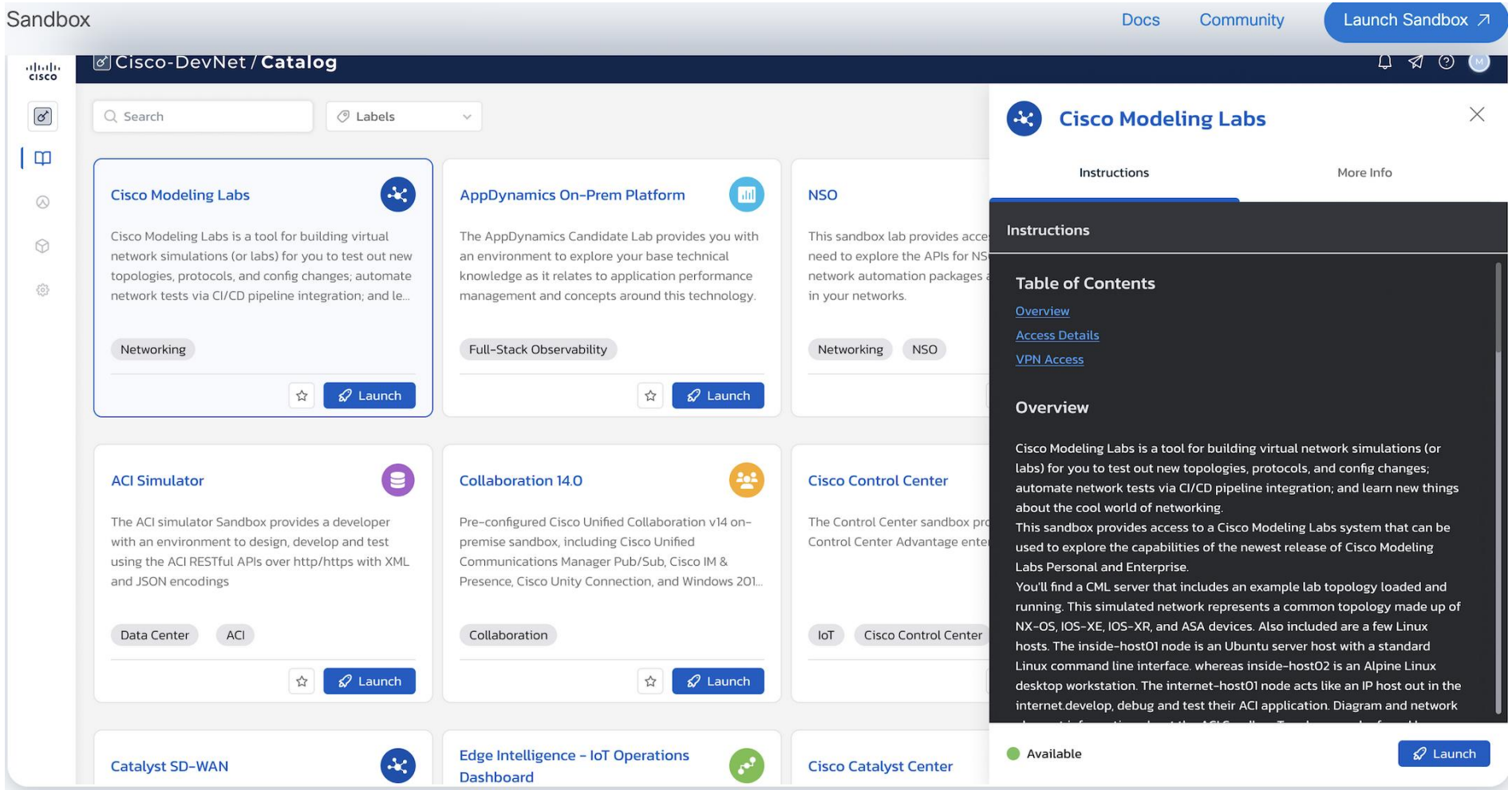
or

RESERVE



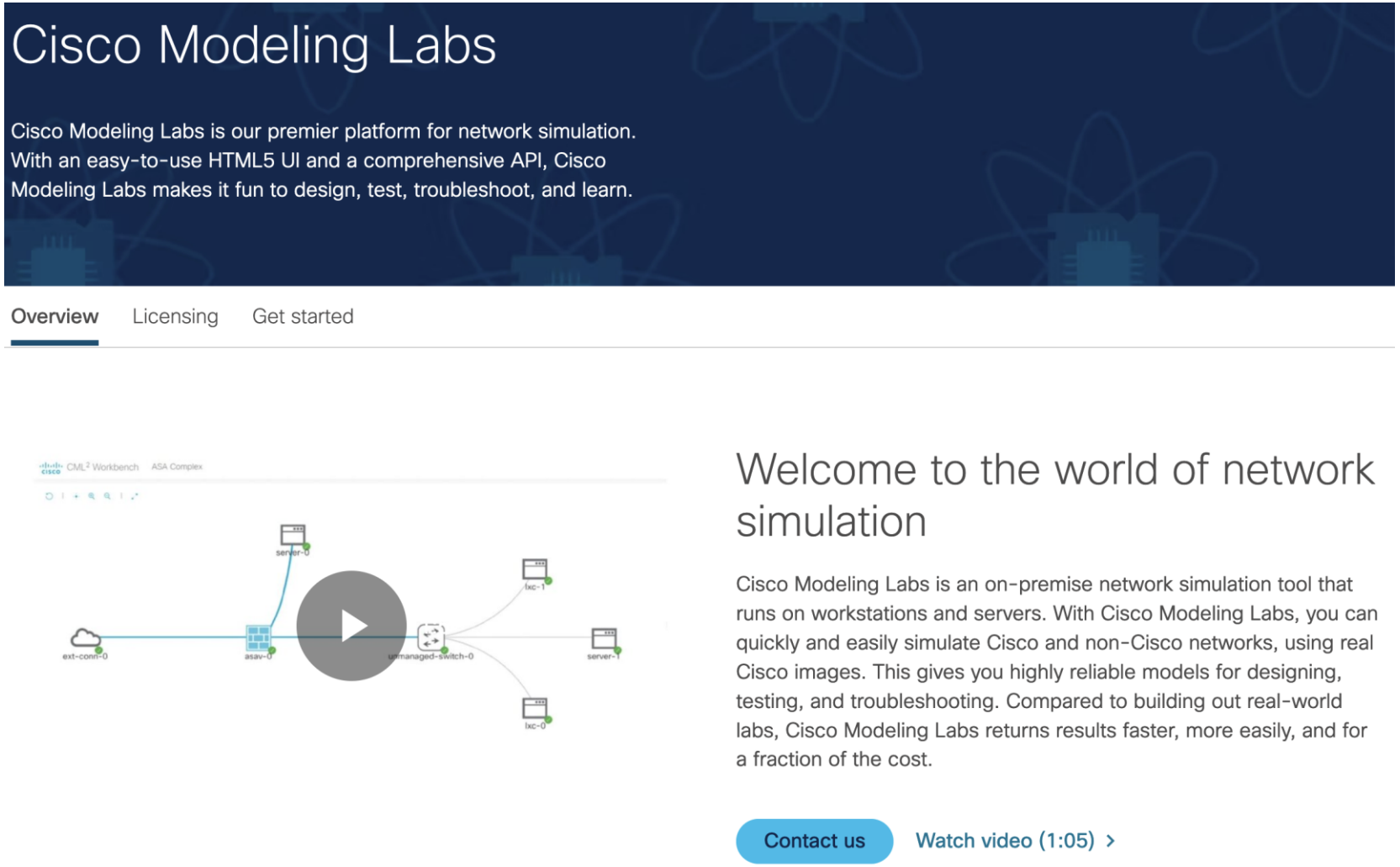
# Cisco DevNet Sandbox

https://developer.cisco.com/site/sandbox/)



# Cisco DevNet Sandbox - Cisco Modeling Labs

https://www.cisco.com/c/en/us/products/cloud-systems-management/modeling-labs/index.html



# Continue your journey

- MPLS – https://www.cisco.com/c/en/us/td/docs/routers/ios/config/17-x/mpls/b-mpls/m_mp-mpls-cisco-rtrs.html
- VRF-Lite - https://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst9500/software/release/17-1/configuration_guide/rtng/b_171_rtng_9500_cg/configuring_vrf_lite.html
- PBR - https://www.cisco.com/c/en/us/td/docs/routers/ios/config/17-x/ip-routing/b-ip-routing/m_iri-pbr.html
- BGP-OSPF-Redistribute - https://www.cisco.com/c/en/us/support/docs/ip/border-gateway-protocol-bgp/5242-bgp-ospf-redis.html
- EIGRP - https://www.cisco.com/c/en/us/support/docs/ip/enhanced-interior-gateway-routing-protocol-eigrp/8606-redist.html
- OSPF - https://www.cisco.com/c/en/us/support/docs/ip/open-shortest-path-first-ospf/7039-1.html
- Redistribution – https://www.cisco.com/c/en/us/support/docs/ip/enhanced-interior-gateway-routing-protocol-eigrp/8606-redist.html
- DMVPN - https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/sec_conn_dmvpn/configuration/xe-16-12/sec-conn-dmvpn-xe-16-12-book/sec-conn-dmvpn-dmvpn.html
- BFD - https://www.cisco.com/c/en/us/td/docs/routers/ios/config/17-x/ip-routing/b-ip-routing/m_irb-bi-fwd-det-0-1.html

# Continue your journey

- IP Routing (BFD, EIGRP, OSPF, BGP) - https://www.cisco.com/c/en/us/td/docs/routers/ios/config/17-x/ip-routing/b-ip-routing/m_ire-eigrp-over-the-top.html
- IPv6 Traffic Filetring - https://www.cisco.com/c/en/us/support/docs/ip/ip-version-6/113126-ipv6-acl-00.html
- uRPF - https://www.cisco.com/c/en/us/td/docs/routers/ios/config/17-x/ip-routing/b-ip-routing/m_cfg-unicast-rpf-0.html
- IPv6 FHSP - https://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst9400/software/release/17-9/configuration_guide/sec/b_179_sec_9400_cg/configuring_ipv6_first_hop_security.html
- CoPP - https://www.cisco.com/c/en/us/td/docs/routers/ios/config/17-x/qos/b-quality-of-service/m_qos-plcshp-ctrl-pln-plc-0.html
- IP SLA - https://www.cisco.com/c/en/us/td/docs/routers/ios/config/17-x/ip-addressing/b-ip-addressing/m_sla_overview.html
- Flexible Netflow - https://www.cisco.com/c/en/us/td/docs/routers/ios/config/17-x/ntw-servs/b-network-services/m_fnf-fnetflow.html
- Cisco Catalyst Center - https://www.cisco.com/c/dam/en/us/solutions/collateral/enterprise-networks/digital-network-architecture/nb-06-cisco-dna-assurance-technical-ebook-cte-en.pdf

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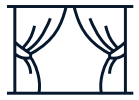

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