

The Cisco Live! logo, featuring the word "CISCO" in a dark blue, sans-serif font, followed by "Live!" in a dark blue, cursive script font.

CISCO *Live!*

The text "Let's go" in a large, dark blue, sans-serif font, positioned to the left of a bright, multi-colored sunburst graphic that radiates from the right side of the image.

Let's go

#CiscoLiveAPJC



The bridge to possible

Cisco's Multicloud Enablers in CCNP Certifications

Three new exams

Hank Preston, Principal Engineer Learning and Certifications

ccie 38336 | devnet expert 20220001

@hfpreston

BRKCRT-2679

CISCO *Live!*

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Agenda

- Value of the Cisco Certification brand
- Cisco's Cloud Enablers
- Three New Exams
 - Cloud Connectivity
 - Cloud Security
 - Cloud Infrastructure
- Preparing for the new exams
- Q&A

Cisco Webex App

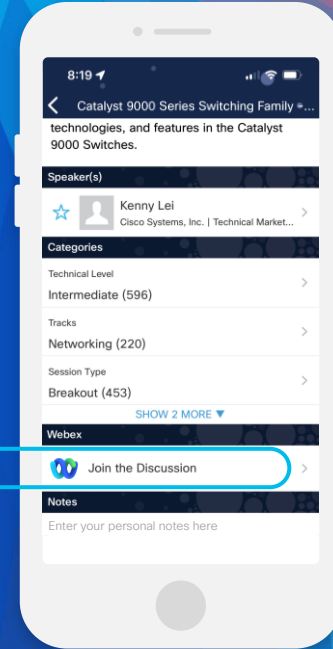
Questions?

Use Cisco Webex App to chat with the speaker after the session

How

- 1 Find this session in the Cisco Live Mobile App
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- 4 Enter messages/questions in the Webex space

Webex spaces will be moderated by the speaker until December 22, 2023.



<https://ciscolive.ciscoevents.com/ciscolivebot/#BRKCRT-2679>

Cisco Career Certifications

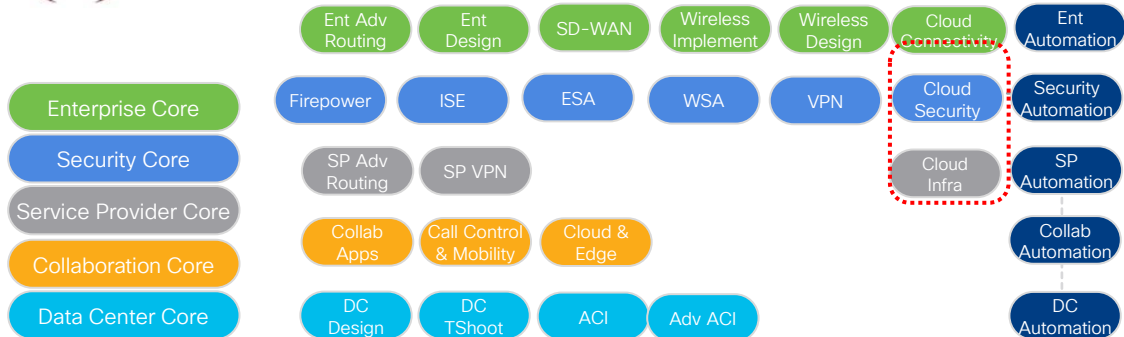


One Exam

CCNA



Two Exams: Core + 1 Concentration



Multicloud Certs



Core + Lab

Ent Wireless Lab

Ent Infrastructure Lab

Security Lab

Service Provider Lab

Collaboration Lab

Data Center Lab



One Exam

DevNet Associate



Two Exams: Core + 1 Concentration



Core + Lab

DevNet Expert



One Exam

CyberOps Associate



Two Exams: Core + 1 Concentration



CyberOps Expert

Future Offering

CISCO Live!

Value of Certification



Benefits of Cisco Certification

- The benefits of certification are real:

- ✓ More attractive to hiring companies and existing managers
- ✓ Ability to gain a higher salary
- ✓ Keeps you in sync with changing technology



37% of respondents received a salary increase after earning their credentials

58% of those who earned a pay increase were rewarded within three months of getting certified, and **83% were rewarded** within six months.

35% received pay increases of 30% or more

Cisco Certifications are time-honored proof you know what you're doing. Plus, they're ANSI and NIST certified, which means they're industry certs with greater value in the marketplace.

¹ [Pearson VUE 2023 Value of IT Certification](#)

Benefits of Cisco Multicloud Specialist Certifications

How Cisco Multicloud Specialist Certifications can improve your career as an IT professional



According to the Cisco *2022 Global Hybrid Cloud Trends Report*, 93% of organizations now operate in Multicloud environments

- Become more marketable as a sought-after Multicloud expert

- Architect optimal solutions using multiple cloud platforms

- Obtain a credential for leading intricate hybrid and Multicloud migration initiatives

- Gain an edge over cloud generalists by showcasing specialized Multicloud proficiency

- Combine with the relevant core Cisco professional exam to attain CCNP professional-level certifications

Future Trends and Tech Focus

TOP TECHNICAL AREAS FOR THE FUTURE

2020

2023

3-Year Change:

+7%

+7%

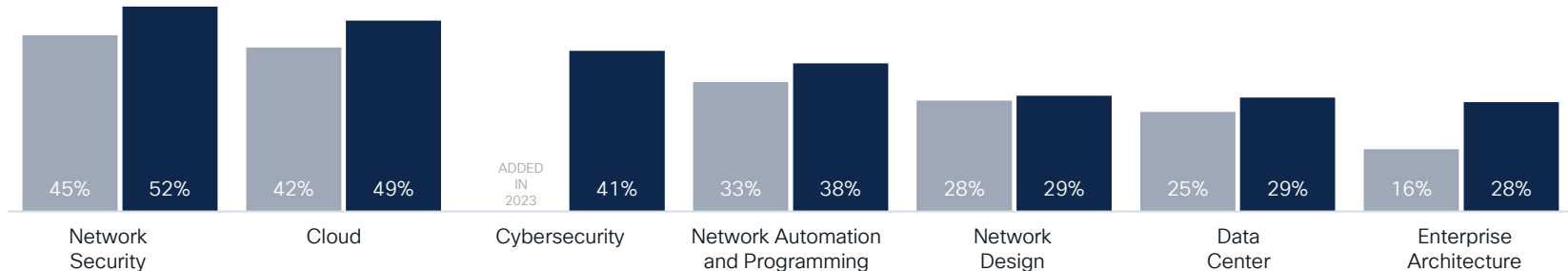
N/A

+5%

+1%

+4%

+12%



The increasing importance of Network Automation & Programming is also reflected in shifting IT responsibilities over the past 3 years. Network Automation responsibilities have grown significantly among both Active and Inactive certification holders.

Specialty areas of interest in the next 12 months

Specialty areas by year and of future interest		
	2022	Intent to certify within 12 months
Cloud Computing (IaaS, PaaS and SaaS)	16.1%	38%
Cybersecurity	12.8%	34%
Security	9.8%	26%
Virtualization	5.5%	21%
Networking and Wireless	12.8%	21%
Servers	2.8%	16%
Artificial Intelligence/Machine Learning	1.1%	16%
DevOps	1.3%	15%
Analytics, Big Data and Data Warehouse	3.4%	14%
Storage	2.5%	12%

Cisco Multicloud Specialist Certifications



Cisco Multicloud Specialist Certifications and CCNP

- These exams are components of their respective CCNP certification tracks.
- They can be combined with the relevant core Cisco professional exam to attain CCNP professional-level certifications.

CCNP Certification Tracks and related Multicloud Concentration

CCNP Enterprise

- Designing and Implementing Cloud Connectivity (ENCC 300-440)

CCNP Security Track

- Designing and Implementing Secure Cloud Access for Users and Endpoints (SCAZT 300-740)

CCNP Service Provider Track

- Designing and Implementing Cisco Service Provider Cloud Network Infrastructure (SPCNI 300-540)

Designing and Implementing Cloud Connectivity (ENCC 300-440)

First date to test: September 20, 2023 (available now)

Exam certifies knowledge of designing and implementing cloud connectivity, including:



Architecture
Models



Design



IPsec Cloud
Connectivity



SD-WAN Cloud
Connectivity



Operation

1.0 Architecture Models	15%
2.0 Design	15%
3.0 IPsec Cloud Connectivity	25%
4.0 SD-WAN Cloud Connectivity	25%
5.0 Operation	20%

Designing and Implementing Secure Cloud Access for Users and Endpoints (SCAZT 300-740)

First date to test: November 20, 2023 (available now)

Exam certifies a candidate's knowledge of:



Cloud Security
Architecture



User and Device
Security



Network and
Cloud Security



Application and
Data Security



Visibility and
Assurance



Threat Response

1.0 Cloud Security Architecture	10%
2.0 User and Device Security	20%
3.0 Network and Cloud Security	20%
4.0 Application and Data Security	25%
5.0 Visibility and Assurance	15%
6.0 Threat Response	10%

Designing and Implementing Cisco Service Provider Cloud Network Infrastructure (SPCNI 300-540)

First date to test: January 20, 2024

Exam certifies a candidate's knowledge of:



Virtualized
Architecture



Cloud
Interconnect



High Availability



Security



Service Assurance
and Optimization

1.0 Virtualized Architecture	25%
2.0 Cloud Interconnect	25%
3.0 High Availability	20%
4.0 Security	15%
5.0 Service Assurance and Optimization	15%



Some fun with Trivia
Time!!!


Preparing for your exams



Exam Blueprint

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Certifications / CCNP Enterprise / 300-440 ENCC Exam Topics


300-440 ENCC v1.0 Exam Topics


Exam Description


To earn your CCNP Enterprise certification you must pass the **350-401 ENCOR** exam and an eligible concentration exam of your choice, such as **300-440 ENCC**. You will be tested on your knowledge of:


Architecture Models


Design


IPsec Cloud Connectivity


SD-WAN Cloud Connectivity


Operation

Expand each item below to view related exam topics.

1.0 Architecture Models	15%	▾
2.0 Design	15%	▾
3.0 IPsec Cloud Connectivity	25%	▾
4.0 SD-WAN Cloud Connectivity	25%	▾
5.0 Operation	20%	▾

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Deciphering the Blueprint:

Cloud Connectivity (300-440)

Domain 15% 1.0 Architecture Models

Task

1.1 Describe internet-based connectivity to cloud providers (AWS, Azure, and Google Cloud)

Subtask

1.1.a Native IPsec

1.1.b Cisco SD-WAN Internet connectivity

1.2 Describe private connectivity to cloud providers (AWS, Azure, and Google Cloud)

1.2.a MPLS provider

1.2.b Colocation provider

1.2.c SDCI regional cross-connect

1.3 Describe connectivity to SaaS cloud providers (AWS, Azure, and Google Cloud)

Blueprint Verbs

Describe/Explain

Compare/Differentiate

Configure/Interpret

Diagnose/Troubleshoot

Depth of Knowledge



Types of questions

Multiple
choice

Drag and drop

Lablets

300-440 Cloud Connectivity



Designing and Implementing Cloud Connectivity (300-440)

Exam Blueprint

Five major areas of knowledge

Domain / Weight

- | | |
|------------------------------|-----|
| 1. Architecture Models | 15% |
| 2. Design | 15% |
| 3. IPsec Cloud Connectivity | 25% |
| 4. SD-WAN Cloud Connectivity | 25% |
| 5. Operation | 20% |

Tasks

Domain 1: Architecture Models

- 1.1 Describe internet-based connectivity to cloud providers (AWS, Azure, Google Cloud)
 - 1.1.a Native IPsec
 - 1.1.b Cisco SD-WAN internet connectivity
- 1.2 Describe private connectivity to cloud providers (AWS, Azure, and Google Cloud)
 - 1.2.a MPLS provider
 - 1.2.b Colocation provider
 - 1.2.c SDCI regional cross-connect
- 1.3 Describe connectivity to SaaS cloud providers (AWS, Azure, and Google Cloud)
 - 1.3.a Direct internet access models into SaaS
 - 1.3.b Indirect access models via a Cloud Security Provider
 - 1.3.c SaaS connectivity via a centralized internet gateway
 - 1.3.d Dedicated connectivity to a SaaS provider

Multiple Choice “Describe”

Task

1.3 Describe connectivity to SaaS cloud providers (AWS, Azure, and Google Cloud)

1.3.a Direct internet access models into SaaS

Question

Which model provides direct internet access (DIA) to SaaS applications?

- A. split tunnel
- B. cloud proxy
- C. hub-and-spoke
- D. in-line network security

Direct internet access models into SaaS

Split tunneling (Local Breakout)

deploying Cisco SD-WAN Direct Internet Access within remote sites to allow certain Internet-bound traffic or public cloud traffic from the branch to be routed directly to the Internet instead of tunneling the Internet traffic to a central site or datacenter for Internet access.

One of the many ways to overcome these organizational challenges is to use Direct Internet Access (DIA) with Cisco Software Defined WAN (SD-WAN). DIA is a component of the Cisco SD-WAN architecture in which certain Internet-bound traffic or public cloud traffic from the branch can be routed directly to the Internet, thereby bypassing the latency of tunneling Internet-bound traffic to a central site.

Benefits of using DIA include

- Reduced bandwidth consumption, latency and cost savings on WAN links by offloading Internet traffic from the private WAN circuit.
- Improved branch office user experience by providing Direct Internet Access (DIA) for employees at remote site Locations

[Documentation Link](#)

Domain 2: Design

Tasks

- 2.1 Recommend the connectivity model to provide high availability, resiliency, SLAs, and reliability based on business and technical requirements
- 2.2 Recommend the connectivity model based on network architecture requirements such as bandwidth, QoS, dedicated vs shared, multi-homing, and routing needs based on business and technical requirements
- 2.3 Recommend a connectivity model to meet regulatory compliance (NIST, FEDRAMP, ISO) based on business and technical requirements
- 2.4 Describe cloud-native security policies for AWS, Azure, and Google, such as east/west traffic within the cloud provider, backhaul internet traffic, inbound connectivity to the internet

Multiple Choice “Recommend”

Task

- 2.1 Recommend the connectivity model to provide high availability, resiliency, SLAs, and reliability based on and technical requirements

Question

A company has multiple branch offices across different geographic locations and a centralized data center. The company plans to migrate its critical business applications to the public cloud infrastructure hosted in AWS. The company requires high availability, redundancy, and low latency for its business applications. Which connectivity model meets these requirements?

- A. Direct Connect with dedicated connections
- B. site-to-site VPN with AWS VPN gateway
- C. Express Route
- D. hybrid connectivity with Cisco SD-WAN

Connectivity Models

AWS Direct Connect

- Establishes a dedicated connection from an on-premises network to one or more VPCs.
- Reduces network costs, increases bandwidth throughput
- Links to the internal network over a standard Ethernet fiber-optic cable
- Cable connects to your router and to the AWS Direct Connect router
- Creates *virtual interfaces* directly to public AWS services (Amazon S3) or to Amazon VPC, and bypasses the ISPs in your network path
- Utilizes a single connection in a public Region or AWS GovCloud

[Documentation Link](#)

Tasks

Domain 4: SD-WAN Cloud Connectivity

- 4.1 Configure Cisco SD-WAN internet-based secure cloud connectivity for AWS, Azure, and Google Cloud
- 4.2 Configure Cisco SD-WAN OnRamp to a SaaS cloud provider
- 4.3 Configure Cisco SD-WAN policies (north/south and east/west)
 - 4.3.a Security
 - 4.3.b Routing
 - 4.3.c Application

Cloud On-Ramp for SaaS

A customer gateway provides information to AWS about your customer gateway device or software application. The source IP address of the remote router is the IP address of the customer gateway in AWS.

- Open the Amazon VPC console at <https://console.aws.amazon.com/vpc/>.
- In the navigation pane, choose **Customer gateways**.
- (Optional) For **IP address**, enter the static, internet-routable IP address for your customer gateway device. If your customer gateway device is behind a NAT device that's enabled for NAT-T, use the public IP address of the NAT device.
- (Optional) If you want to use a private certificate, for **Certificate ARN**, choose the Amazon Resource Name of the private certificate.
- (Optional) For **Device**, enter a name for the customer gateway device associated with this customer gateway.
- Choose **Create customer gateway**.

Task

4.2 Configure Cisco SD-WAN OnRamp to a SaaS cloud provider

Configure Question

An engineer must use Cisco vManage to update the Cisco Webex server information in Cloud OnRamp for SaaS. Drag and drop the steps from the left into the order on the right to complete the configuration.

Select Application Aware Policy Routing

Select Configure

Select Cloud OnRamp for SaaS

Modify the webex server information

Step 1

Step 2

Step 3

Step 4

Cloud On-Ramp for SaaS

Update the Webex Server Information for Cloud OnRamp for SaaS

Minimum releases: Cisco IOS XE Catalyst SD-WAN Release 17.7.1a and Cisco vManage Release 20.7.1

1. From the Cisco SD-WAN Manager menu, choose Configuration > Cloud OnRamp for SaaS to display the Cloud OnRamp for SaaS dashboard.
2. (This step applies only to releases earlier than Cisco vManage Release 20.10.1.) If the dashboard shows a dialog box prompting you to synchronize Webex server information, click Yes in the dialog box.
3. Cisco SD-WAN Manager displays the Application-Aware Routing Policy page, enabling you to review the policy. The policy includes updated match conditions that use the latest Webex server information.
4. Click Save Policy.

[Documentation Link](#)

Domain 5: Operation

Tasks

- 5.1 Diagnose IPsec internet-based secure cloud connectivity between an on-premises Cisco IOS XE router to a native AWS, Azure, and Google Cloud endpoint
- 5.2 Diagnose routing issues on Cisco IOS XE to integrate with cloud networks using BGP and OSPF, including redistribution and static routing
- 5.3 Diagnose Cisco SD-WAN internet-based secure cloud connectivity for AWS, Azure, and Google Cloud
- 5.4 Diagnose Cisco SD-WAN policy issues (north/south and east/west)
 - 5.4.a Security
 - 5.4.b Routing
 - 5.4.c Application

Task



Diagnose Question

5.1 Diagnose IPsec internet-based secure cloud connectivity between an on-premises Cisco IOS XE router to a native AWS, Azure, and Google Cloud endpoint

```
1 daemon.info: May 13 10:12:22 vedge01 charon: 07[IKE] failed to establish CHILD_SA, keeping IKE_SA
2 daemon.info: May 13 10:12:22 vedge01 charon: 07[IKE] no acceptable proposal found
3 daemon.info: May 13 10:12:22 vedge01 charon: 07[CFG] configured proposals:
4 ESP:AES_CBC_256/HMAC_SHA1_96/MODP_4096/NO_EXT_SEQ
5 daemon.info: May 13 10:12:22 vedge01 charon: 07[CFG] received proposals: ESP:AES_GCM_16_256/NO_EXT_SEQ,
6 ESP:AES_CBC_256/HMAC_SHA1_96/NO_EXT_SEQ
7 daemon.info: May 13 10:12:22 vedge01 charon: 07[ENC] parsed CREATE_CHILD_SA request 559 [ SA No Tsi TSr ]
8 daemon.info: May 13 10:12:22 vedge01 charon: 07[NET] received packet: from 10.10.1.1[4500] to 10.10.2[4500] (396 bytes)
9 daemon.info: May 13 10:12:21 vedge01 charon: 08[NET] sending packet: from 10.10.2[4500] to 10.10.1.1[4500] (76 bytes)
10 daemon.info: May 13 10:12:21 vedge01 charon: 08[ENC] generating INFORMATIONAL response 558 [ ]
11 daemon.info: May 13 10:12:21 vedge01 charon: 08[ENC] parsed INFORMATIONAL request 558 [ ]
12 daemon.info: May 13 10:12:21 vedge01 charon: 08[NET] received packet: from 10.10.1.1[4500] to 10.10.2[4500] (76 bytes)
```

An engineer is troubleshooting an IPsec connectivity issue between an on-premises data center and a public cloud provider. What is occurring?

- A. mismatched organization name
- B. mismatched Perfect Forward Secrecy
- C. certificate revocation failure
- D. certificate verification failure

IPsec Connectivity

```
1 daemon.info: May 13 10:12:22 vedge01 charon: 07[IKE] failed to establish CHILD_SA, keeping IKE_SA
2 daemon.info: May 13 10:12:22 vedge01 charon: 07[IKE] no acceptable proposal found
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12 daemon.info: May 13 10:12:21 vedge01 charon: 08[NET] received packet: from 10.10.1.1[4500] to 10.10.2[4500] (76 bytes)
```

The debug iked is enabled and the negotiation is displayed. IKE debugs show the same behavior and it is constantly repeated, so it is possible to take a part of the information and analyze it:

CREATE_CHILD_SA means a rekey, with the purpose for the new SPIS to be generated and exchanged between the IPsec endpoints.

- The vedge receives the CREATE_CHILD_SA request packet from 10.10.10.1.
- The vedge processes the request and verifies the proposals (SA) sent by peer 10.10.10.1
- The vedge compares the received proposal sent by the peer against its configured proposals.
- The CREATE_CHILD_SA exchanged fails with " no acceptable proposals found".

At this point, the question is: **Why is there a configuration mismatch if the tunnel worked previously and no changes were done?**

Analyze in deep, there is an extra field on the configured proposals that the peer is not sending.

configured proposals: ESP:AES_CBC_256/HMAC_SHA1_96/MODP_4096/NO_EXT_SEQ

Received proposals: ESP:AES_GCM_16_256/NO_EXT_SEQ,

PFS (perfect-forward-secrecy) is the only mismatch configuration in which the tunnel can be successfully established or not according to who is the initiator or responder in the IKE negotiation.

However, when the rekey starts the tunnel is not be able to continue and this symptom can be presented or related to.

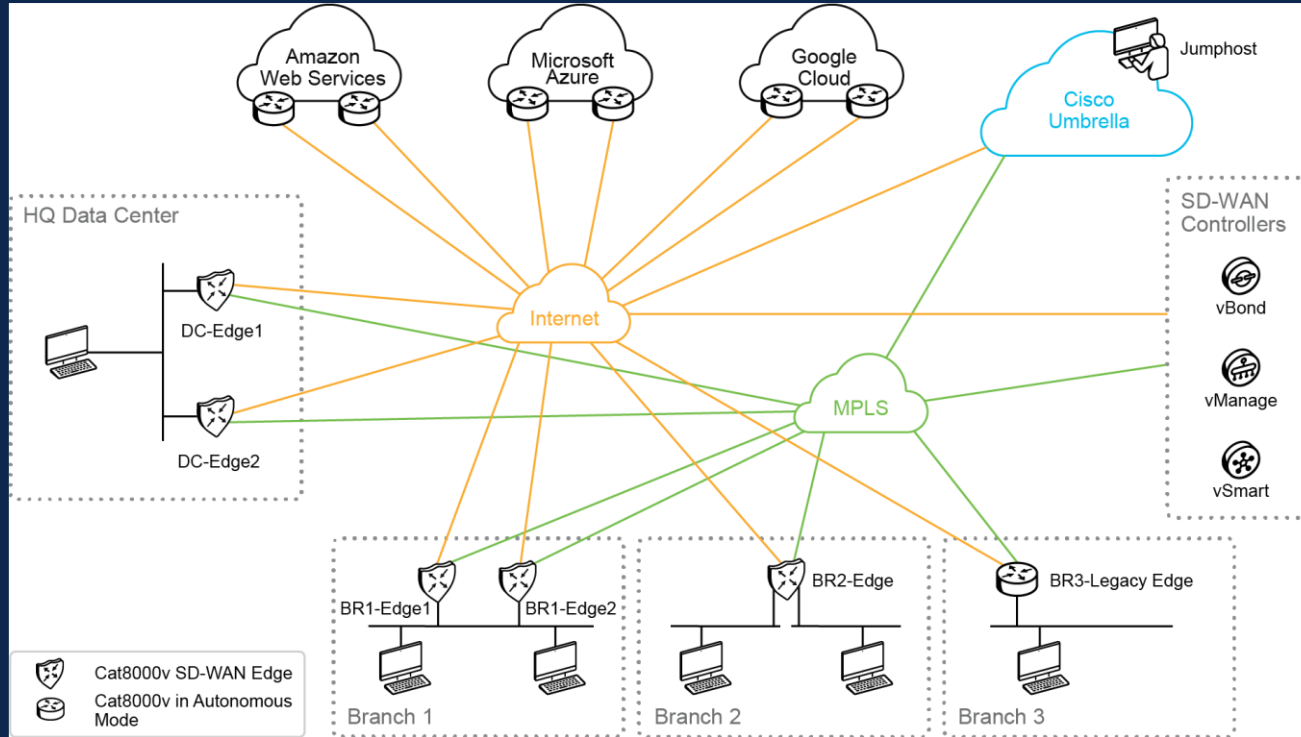
[Documentation Link](#)

IPsec Connectivity

- PFS ensures that the same key will not be generated again, so forces a new Diffie Hellman key exchange. This would ensure if a hacker\criminal wants to compromise a private key, he would be able to access data in transit which is protected by that key, and not any future data, as future data will not be associated with that compromised key. Both sides of the VPN should support PFS in order for PFS to work. Therefore, using PFS provides a more secure VPN connection.
- With PFS, every time a new security association is negotiated, a new Diffie-Hellman exchange occurs, which requires additional processing time.
- The default (group1) is sent if the set pfs statement does not specify a group. If the peer initiates the negotiation and the local configuration specifies PFS, the peer must perform a PFS exchange or the negotiation fails.

[Documentation Link](#)

ENCC Hands-On Lab Topology



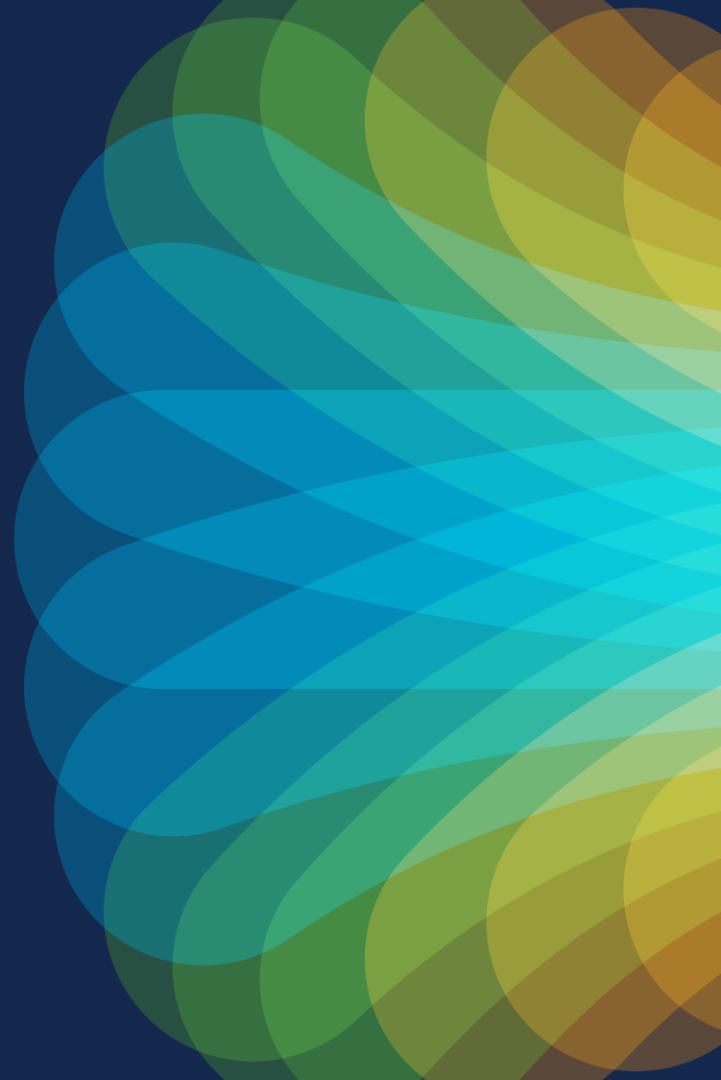
- Implement IPsec connectivity to public cloud gateways and cloud-hosted Cisco IOS XE routers
- Implement overlay routing
- Implement Cloud OnRamp for Multicloud
- Implement Cisco Umbrella Cloud Security
- Implement Cloud OnRamp for SaaS
- Diagnose underlay connectivity
- Diagnose overlay routing
- Diagnose Cloud OnRamp
- + Design Case Study



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Time!!!

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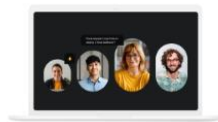
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Exam

350-401 ENCOR: Implementing Cisco Enterprise Network Core Technologies

Implementing Cisco Enterprise Network Core Technologies v1.1 (ENCOR 350-401) is a 120-minute exam associated with the CCNP and CCIE Enterprise Certifications. This exam tests a candidate's knowledge of implementing core enterprise network technologies, including dual stack (IPv4 and IPv6) architecture, virtualization, infrastructure, network assurance, security, and automation. The course Implementing Cisco Enterprise Network Core Technologies helps candidates to prepare for this exam.

[Exam Topics](#)[Study Material](#)[E-Learning](#)

Concentration exams (choose one):

300-410 ENARSI: Implementing Cisco Enterprise Advanced Routing and Services

Implementing Cisco Enterprise Advanced Routing and Services v1.1 (ENARSI 300410) is a 90-minute exam associated with the CCNP Enterprise Certification. This exam certifies a candidate's knowledge for implementation and troubleshooting of advanced

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Karlo Bobiles
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Implementing ThousandEyes for Success -
Lessons Learned From Complex
Deployments

Requirements for successful DNS monitoring

- Test full delegation chain from root all the way to an IP
- Correlate application with DNS health: to make monitoring data more business relevant
- Use in protocol DNS tests, just checking port 53 is open or ping a DNS server is no good
- Correlate DNS with other dependencies such as the network

DNS and BGP Exposed - How to Monitor
and Mitigate Two Notorious Uptime Killers



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Observability and network intelligence coming together



Full-Stack Observability: The HOW!

DevNet Sandbox: Cisco Modeling Labs Demo

<https://developer.cisco.com>

ALWAYS-ON

or

RESERVE

Networking Sandbox Highlights

Version 2.0



Cisco Modeling Labs Enterprise

Start your Network DevOps journey

RESERVATION SANDBOX

Cisco Modeling Labs Enterprise

Cisco Modeling Labs is a tool for building virtual network simulations (or labs) for you to test out new topologies, protocols, and config changes; automate network tests via CI/CD pipeline integration; and learn new things about the cool world of networking. This sandbox provides access to a Cisco Modeling Labs system that can be used to explore the capabilities of the newest release of Cisco Modeling Labs Personal and Enterprise.



Multi Domain

RESERVATION SANDBOX

Multi Domain

This Sandbox was designed for developers to build applications and operational tools to manage the diverse set of platforms deployed across an enterprise. This Sandbox provides developers access to multiple domains and platforms, including Cisco HyperFlex, Cisco SD-WAN, Cisco Action Orchestrator, as well as open source tools like NetBox and GitLab.

Version 19.2



Cisco SD-WAN Cloud-delivered overlay WAN architecture

RESERVATION SANDBOX

Cisco SD-WAN

This sandbox consists a complete virtual SD-WAN environment and all of its components, that developers can utilize to develop, debug and test their sample SD-WAN applications. The developer can also interact with the SD-WAN API calls using a variety of REST clients such as POSTMAN.

Some fun with Trivia
Time!!!

Questions?



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Thursday	9:30am – 4:00pm
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Thank you

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The background is a vibrant, abstract graphic. On the left, there are overlapping, wavy shapes in shades of red, orange, and yellow, resembling a stylized cloud or a series of overlapping circles. On the right, a bright white light source emits a series of colorful rays in shades of blue, green, and yellow, creating a sunburst effect. The overall color palette is a rainbow spectrum.

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Let's go

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