
TOMORROW starts here.
cisco
Cisco live!

CCIE Routing & Switching Version 5.0 Update

BRKCRT-8004

Bruno van de Werve

CCIE R&S Exam Program Manager #20066

Cisco live!

BRKCRT- 8004 Session Abstract

If you're starting the journey to gain your CCIE Routing and Switching number, this session is for you!

It introduces the new curriculum of the CCIE Routing and Switching Program and highlights the changes to both the training and the exams (written and lab).

The main objective of this session is to provide candidates with clear expectations of what to expect with the new training and exams.

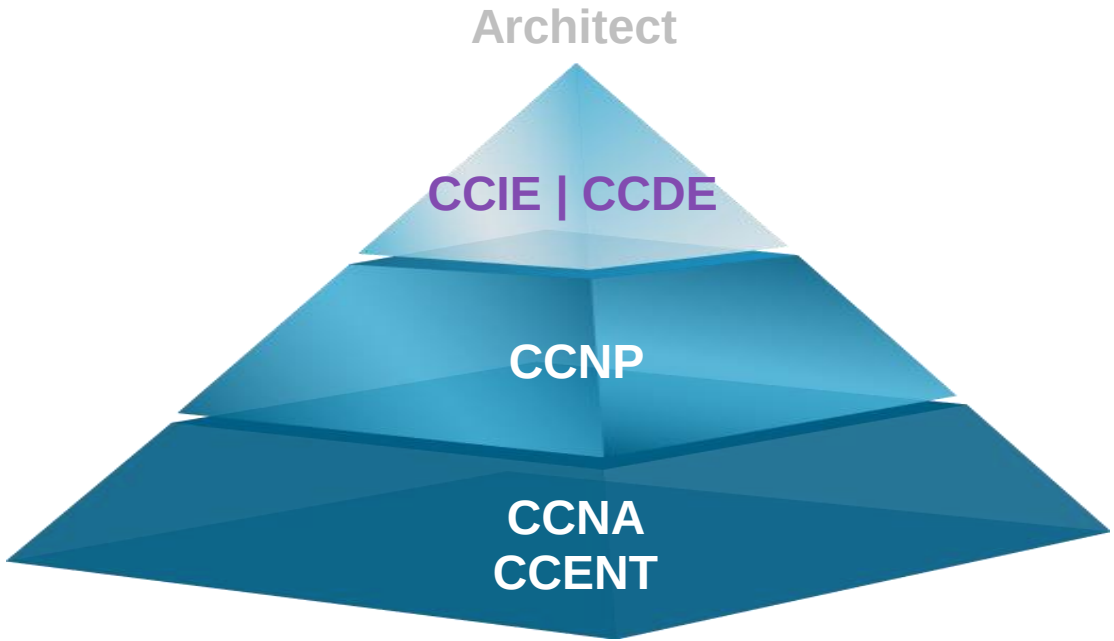
While not covering or teaching detailed technical content, this includes some illustrations and sample questions.

There is no prerequisite to this session.

Agenda

- **Overall CCIE Program**
- New CCIE R&Sv5 Curriculum
- New CCIE R&Sv5 Exam Format
- Sample Questions
- Preparation Materials
- Questions & Answers

Cisco Certifications



learningnetwork.cisco.com

CCIEs Worldwide

- Most highly respected IT certification since 20+ years!
- Industry standard validating and endorsing expert skills and experience
- Demonstrate strong commitment and investment to networking career, life-long learning, and dedication to remaining an active CCIE

CCIE and CCDE Tracks

Routing & Switching

- Expert level knowledge of networking across LAN and WAN interfaces and variety of routers and switches
- Solve complex connectivity problems to increase bandwidth, improve response times, maximise performance, and support global operations

Security

- Expert level knowledge of security and VPN solutions
- Demonstrate in-depth understanding of Layer 2 and 3 network infrastructure; Solid understanding of Windows, Unix, Linux and HTTP, SMTP, FTP and DNS

Voice

- Expert level knowledge of Cisco Voice over IP (VoIP) products and solutions
- Capable of building and configuring complex end-to-end telephony network, troubleshooting and resolving VoIP-related problems

Design

- Expert level knowledge of network design principles for the Layer 2 and 3 network infrastructure
- Capable of assessing and translating network business requirements into technical designs

Data Centre

- Expert level knowledge of Data Centre Technologies, including DC infrastructure, storage, compute and virtualisation
- Capable of building, configuring, and troubleshooting an end-to-end virtualised Data Centre using Cisco DC technologies

Service Provider

- Expert level knowledge of IP fundamentals and technologies Expertise in building an extensible service provider network
- Expert level knowledge to troubleshoot and maintain complex service provider networks

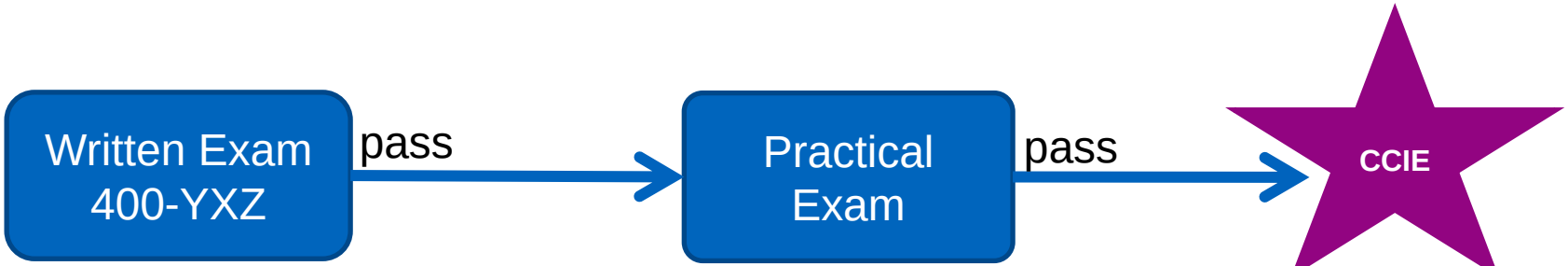
SP Operations

- Expert level knowledge of SP IP NGN technologies
- Capable of troubleshooting SP networks, managing SP processes (incident, fault, change, configuration, and performance), and knowledge of NMS technology

Wireless

- Expert level knowledge of WLAN technologies
- Provides next step for individuals interested in a career in managing or working with Cisco wireless technologies

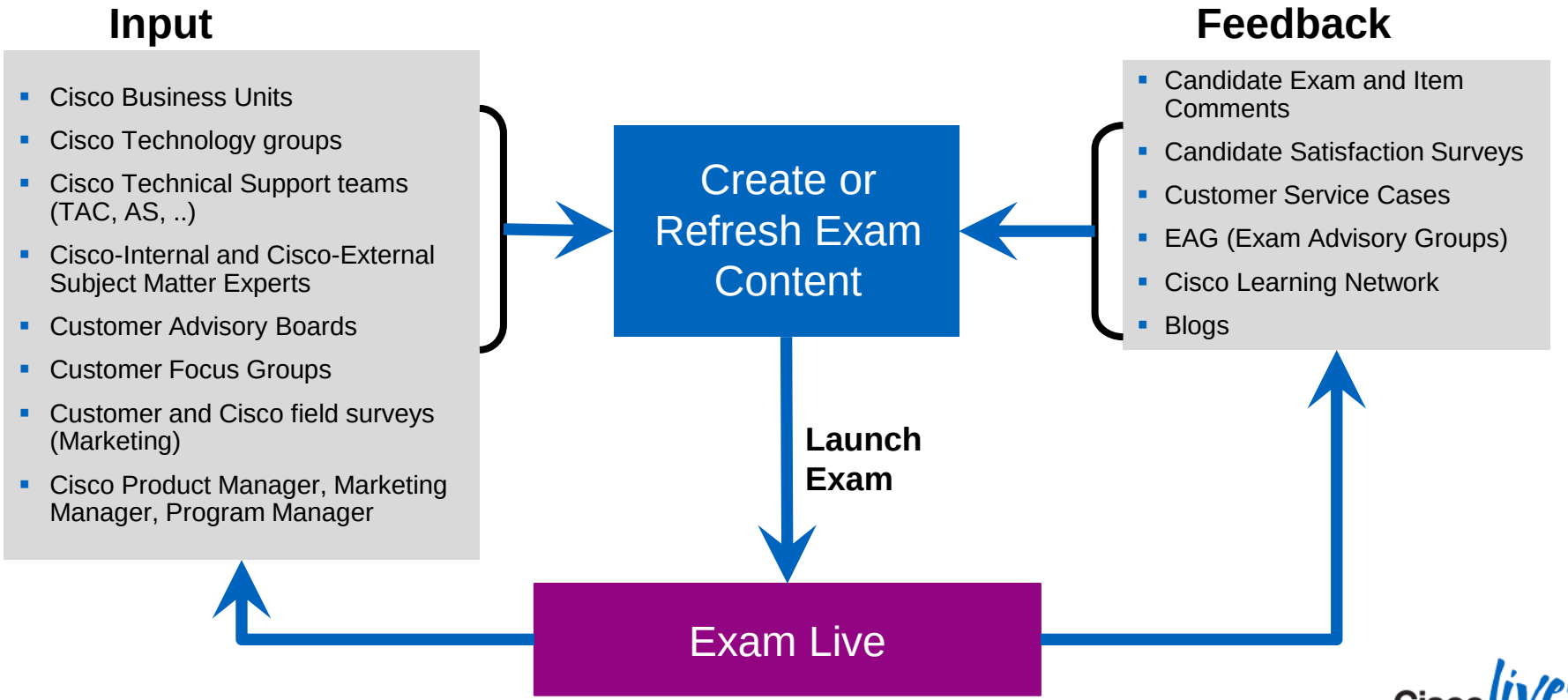
Certification Process



- Pearson
- 2 hours
- Multiple choices
- Flash items
- No documentation
- Immediately scored

- Select Cisco locations
- 8 hours
- Configurations
- Troubleshooting
- Cisco documentation
- Scored within 48h

Proactive and Holistic Candidate Feedback

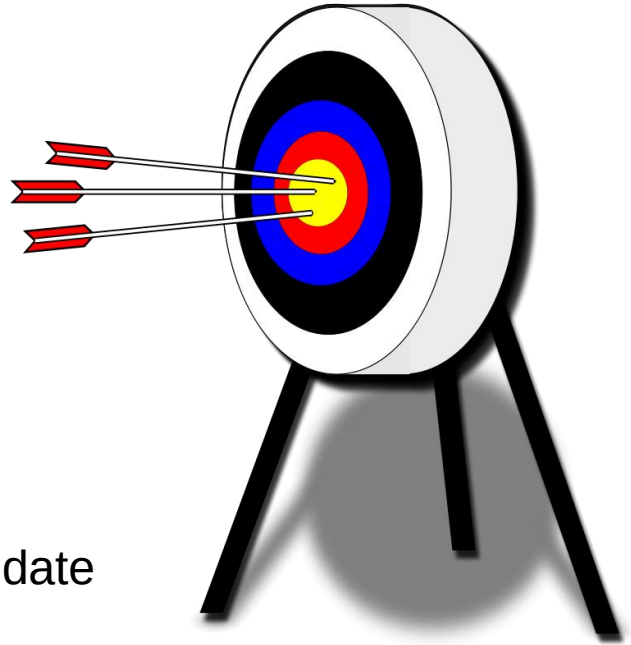


Performance Assessment

- Validity
- Reliability
- Fairness

- Congruency
- Relevancy

- Intended use of the test scores
- Definition of Minimally Qualified Candidate



Agenda

- Overall CCIE Program
- **New CCIE R&Sv5 Curriculum**
- New CCIE R&Sv5 Exam Format
- Sample Questions
- Preparation Materials
- Questions & Answers

CCIE R&Sv5 Curriculum Overview

- Certification process unchanged
- Exam **curriculum** and **format** changed
- Designed and validated with industry experts (Cisco internals and externals)
- Aligned with evolution of job role and relevant technologies

Check the official information on CLN

https://learningnetwork.cisco.com/community/certifications/ccie_routing_switching

More coming soon, stay tuned!

CCIE R&Sv5 Curriculum Overview

- More emphasis on dual stack IPv4/IPv6 Layer 3 Technologies
- More emphasis on Troubleshooting methodologies
- New VPN Technologies domain
- Reduced emphasis on legacy technologies

CCIE R&Sv5 Curriculum Overview

- Assessment of platform-independent concepts
  - Improved Certification's validity, reliability, integrity and security
- Cisco IOS Software Release 15
  - 15.3T
  - 15.0S
- Equipment used in the exam are all **virtual devices** (routers and switches)
  - Hardware equipment may be used to learn and practice
  - Older equipment supports large portion of the new curriculum
  - Refer to Feature Navigator

http://www.cisco.com/go/fn

CCIE R&Sv5 Curriculum Overview

- 6 main domains in Written exam
- 5 main domains in Lab exam, all common with the Written exam
- New weighting factors
- 4 levels of details, help scoping the expected knowledge
  - Domain
  - Sub-domain
  - Task
  - Sub-task
- Two documents: Written exam Topics (blueprint) + Lab exam Topics
  - https://learningnetwork.cisco.com/community/certifications/ccie_routing_switching
  - https://learningnetwork.cisco.com/docs/DOC-22705
  - https://learningnetwork.cisco.com/docs/DOC-22706
- No more “Checklist” (embedded in new Topics)

CCIE R&Sv5 Curriculum Overview

CCIE RSv4
1.00 Implement Layer 2 Technologies
2.00 Implement IPv4
3.00 Implement IPv6
4.00 Implement MPLS Layer 3 VPNs
5.00 Implement IP Multicast
6.00 Implement Network Security
7.00 Implement Network Services
8.00 Implement Quality of Service
9.00 Troubleshoot a Network
10.00 Optimise the Network
11.00 Evaluate proposed changes to a Network (Written only)

	CCIE RSv5	% WR	% LAB
★	1.0.0 Network Principles	10	0
	2.0.0 Layer 2 Technologies	15	20
	3.0.0 Layer 3 Technologies	40	40
★	4.0.0 VPN Technologies	15	20
	5.0.0 Infrastructure Security	5	5
	6.0.0 Infrastructure Services	15	15

CCIE R&Sv5 Lab Curriculum Alignment

Blueprint sections = Exam sections = Score report sections

CCIE RSv5 **Lab Topics domains**	**Weight**
1.0.0 Layer 2 Technologies	20
2.0.0 Layer 3 Technologies	40
3.0.0 VPN Technologies	20
4.0.0 Infrastructure Security	5
5.0.0 Infrastructure Services	15

CCIE RSv5 **Lab Exam sections**	
1.0.0	**Layer 2 Technologies**
2.0.0	**Layer 3 Technologies**
3.0.0	**VPN Technologies**
4.0.0	**Infrastructure Security**
5.0.0	**Infrastructure Services**

Candidate: **John Smith**
Exam date: 02/30/2015

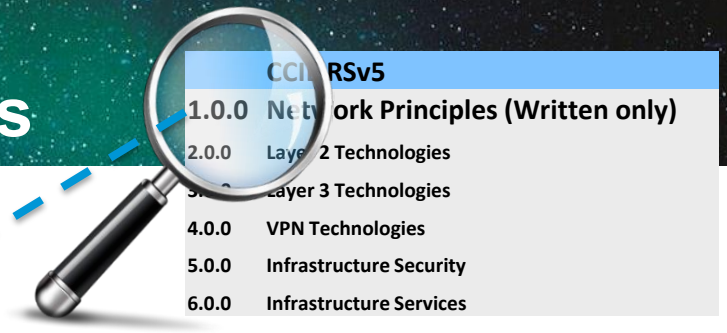
CCIE RSv5 **Score report sections**	
1.0.0 Layer 2 Technologies	85%
2.0.0 Layer 3 Technologies	45%
3.0.0 VPN Technologies	15%
4.0.0 Infrastructure Security	0%
5.0.0 Infrastructure Services	20%

Failed ☹

Or…

Passed! ☺ Your CCIE# is 1025

CCIE R&Sv5 Curriculum's Details



ID	Domains / Sub-Domains / Task	Sub Task	Weight
1.0.0	**Network Principles**		10
1.1.0	**Network Theory**		
1.1.1	**Describe basic software architecture differences between IOS and IOS XE**		
1.1.1 a		Control plane and Forwarding plane	
1.1.1 b		Impact to troubleshooting and performances	
1.1.1 c		Excluding specific platform's architecture	
1.1.2	**Identify Cisco Express Forwarding concepts**		
1.1.2 a		RIB, FIB, LFIB, Adjacency table	
1.1.2 b		Load balancing Hash	
1.1.2 c		Polarization concept and avoidance	

CCIE R&Sv5 Key Topic Changes

- New topics
  - Written: **IOS-XE, VSS, ISIS, EIGRP OTP*, L2VPN, GETVPN**
  - Written & Lab: **Packet capture analysis, DMVPN, IPsec, IPv6 FHS**
- Topics moved from v4 Lab to v5 Written
  - **PfR, L2QoS, IPv6 Multicast, 802.1x**
- Topics retired
  - **Frame-Relay, FRTS, LFI, WRR/SRR, ZBF, IPS, RSVP, WCCP**

Check the official Topics on CLN

https://learningnetwork.cisco.com/community/certifications/ccie_routing_switching

EIGRP OTP = Over The toP

CCIE R&Sv5 New Topics on Written Exam

- Network Principles
  - Network Theory
    - Describe basic software architecture differences between IOS and IOS XE
    - Identify Cisco Express Forwarding concepts
    - Explain general network challenges
    - Explain IP, TCP, UDP operations

CCIE R&Sv5 New Topics on Written Exam

- Layer 2 Technologies
  - LAN Switching technologies
    - Describe Chassis Virtualisation and Aggregation Technologies
  - Layer 2 Multicast
    - Explain PIM Snooping
  - Layer 2 WAN Circuit technologies
    - Describe WAN rate-based ethernet circuits

CCIE R&Sv5 New Topics on Written Exam

- Layer 3 Technologies
  - BGP
    - Describe BGP fast convergence features
  - ISIS
    - Describe basic ISIS network
    - Describe neighbour relationship
    - Describe network types, levels and router types
    - Describe operations
    - Describe optimisation features

CCIE R&Sv5 New Topics on Written Exam

- VPN Technologies
  - Tunnelling
    - Describe basic layer 2 VPN – wireline
      - L2TPv3, ATOM General principals
    - Describe basic layer 2 VPN – LAN services
      - VPLS, OTV General principals
  - Encryption
    - Describe GETVPN
- Infrastructure Services
  - Network Services
    - Describe IPv6 Network Address Translation
      - NAT64, NPTv6

CCIE R&Sv5 New Topics on Written & Lab Exams

- Network Troubleshooting
  - Use IOS troubleshooting tools
  - Apply troubleshooting methodologies
  - Interpret packet capture

Applicable to **all** lab domains

CCIE R&Sv5 New Topics on Written & Lab Exams

- Layer 3 Technologies
  - Fundamental routing concepts
    - Implement and Troubleshoot Bidirectional Forwarding Detection
  - EIGRP
    - Implement EIGRP (multi-address) Named Mode
    - Implement, troubleshoot and optimise EIGRP convergence and scalability
  - OSPF
    - Implement, troubleshoot and optimise OSPF convergence and scalability

CCIE R&Sv5 New Topics on Written & Lab Exams

- VPN Technologies
  - Tunnelling
    - Implement and Troubleshoot DMVPN (single hub)
  - Encryption
    - Implement and Troubleshoot IPsec with pre-shared key

CCIE R&Sv5 Topics Moved from v4 Lab to v5 Written

- Describe IPv6 Multicast
- Describe RIPv6 (RIPng)
- Describe IPv6 Tunnelling Techniques
- Describe Device Security using IOS AAA with TACACS+ and RADIUS
- Describe 802.1x
- Describe Layer 2 QoS
- Identify Performance Routing (PfR)

CCIE R&Sv5 Topics Removed from v4 Exams

- Flexlink, ISL, Layer 2 Protocol Tunnelling
- Frame-Relay (LFI, FR Traffic Shaping)
- WCCP
- IOS Firewall and IPS
- RITE, RMON
- RGMP
- RSVP QoS, WRR/SRR

Agenda

- Overall CCIE Program
- New CCIE R&Sv5 Curriculum
- **New CCIE R&Sv5 Exam Format**
- Sample Questions
- Preparation Materials
- Questions & Answers

CCIE R&Sv5 Written Exam

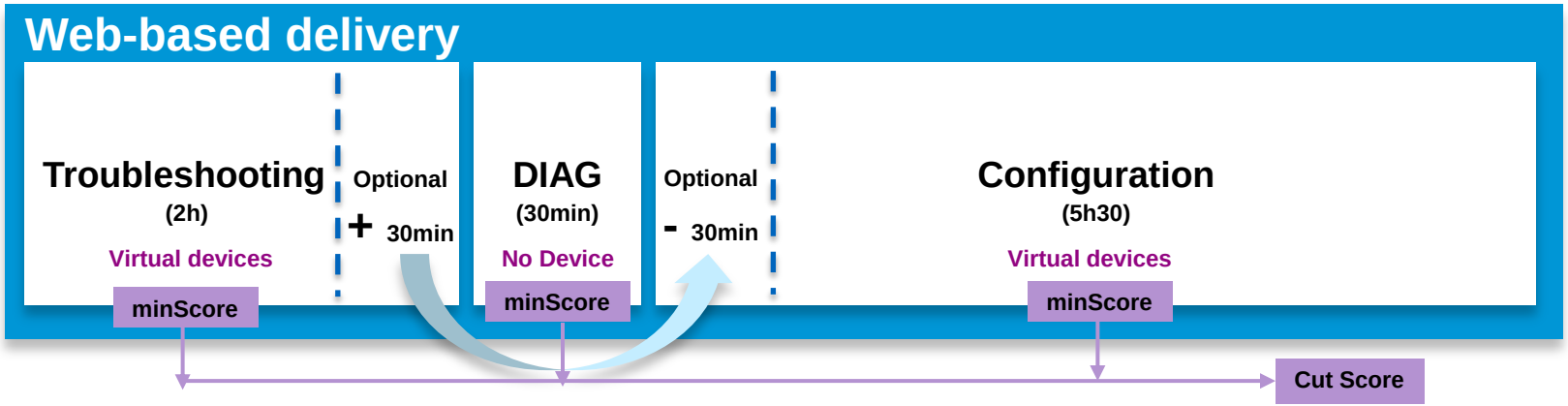
- New Number: 400-101
- 120 minutes, 90 – 110 independent items
  - MC-SA/MA; DnD; Point & Click
- English only
- Pearson VUE
- Closed-book
- Score directly available

CCIE R&Sv5 Lab Exam

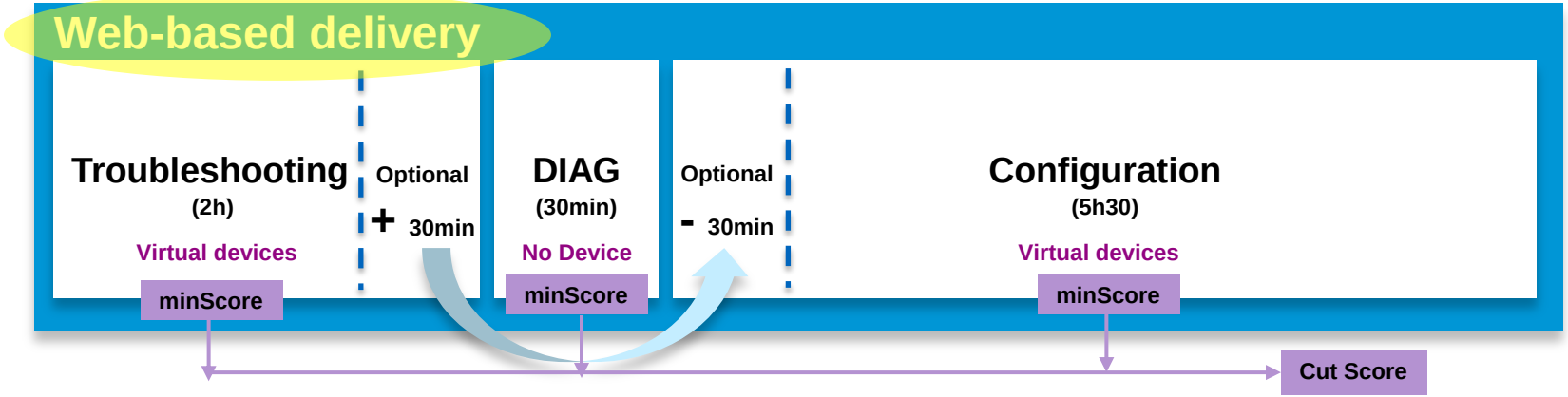
- 480 minutes, multiple exam modules
  - Configure, Troubleshoot scenarios to given specifications
- English only
- Cisco Lab locations
- Open-book (Cisco Documentation)
- Score available within 48h

CCIE R&Sv5 Lab Exam Format

- 100% virtual
- New DIAG module
- Flexible time in TS
- Overall cut-score AND per-module minimum score

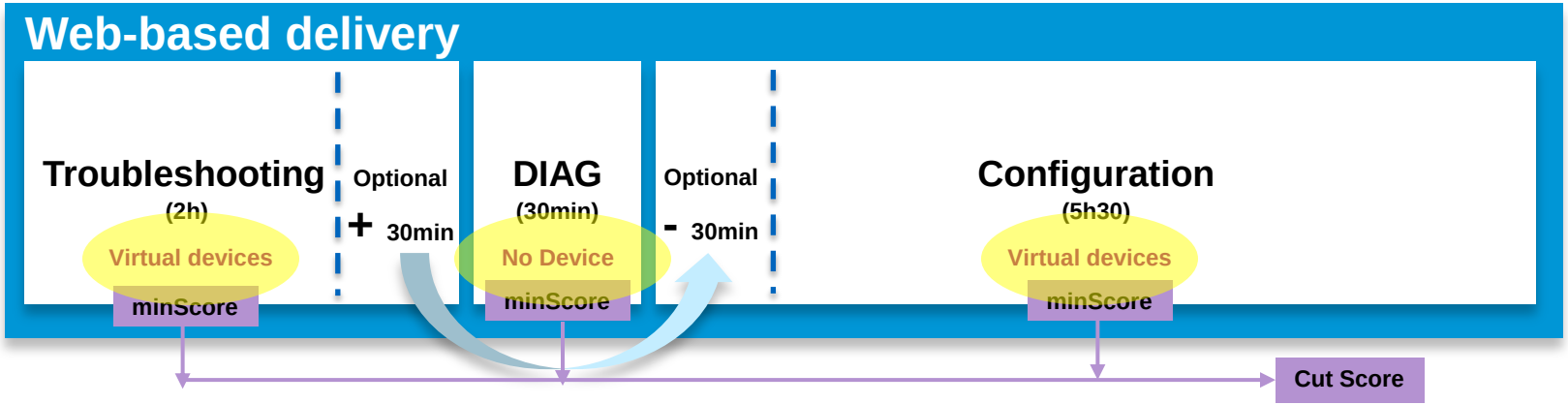


CCIE R&Sv5 Delivery System



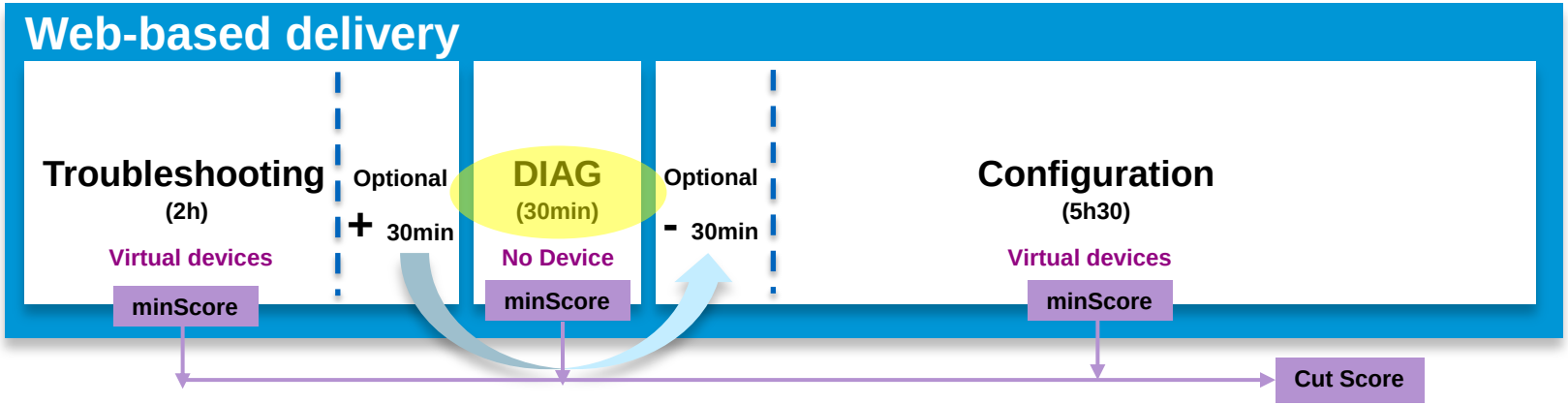
- Identical to CCIE RSv4's
- Separate TS and CFG topologies
- Check the WISP labs in the WoS!
- Try CLL online via CLN' Store
- Stay tuned for the additional demo content

CCIE R&Sv5 Virtual Lab



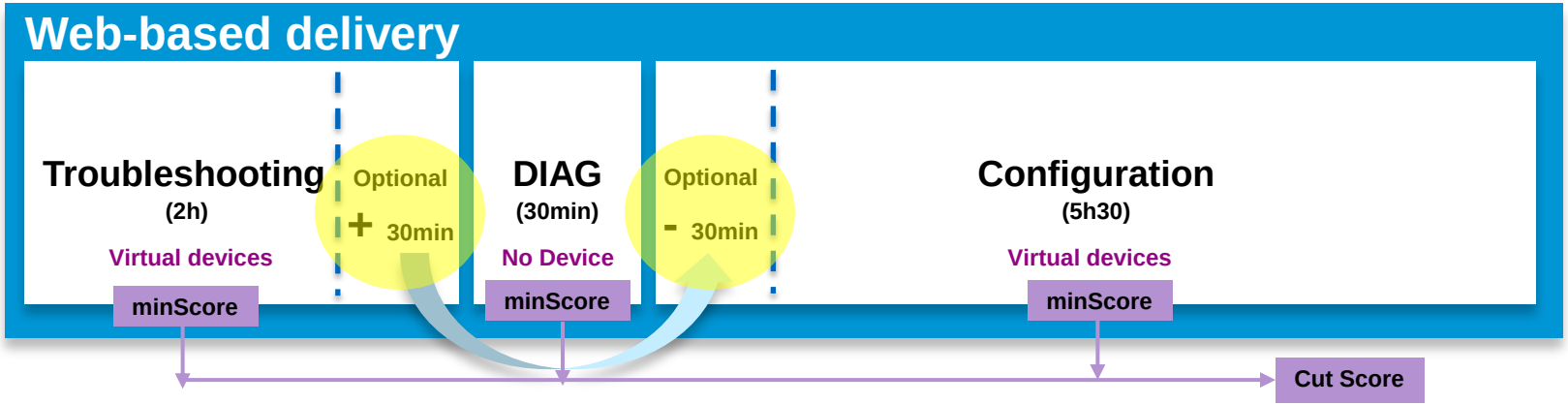
- CFG is now virtual, like TS
- DIAG do not use any device
- Virtual router: IOL (IOS on Linux) & virtual switch: L2IOL (Layer 2 IOL)
- Option to reload initial configuration if needed, very fast reload
- Ethernet and Serial interfaces only, Layer 1 simulation available

CCIE R&Sv5 New Diagnostic Module



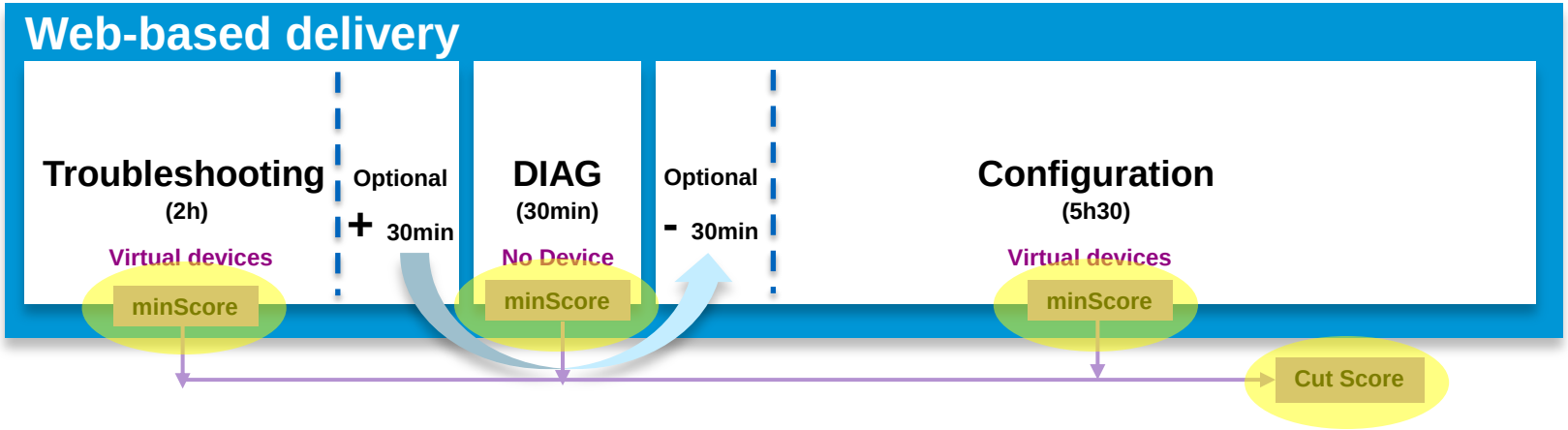
- Assessing new skills
  - Analysing, correlating and discerning multiple sources of documentation
- Support ticket scenario
- Fixed 30 minutes, 100% Web-based, no device needed
- Deterministic grading
  - Item format similar to multiple choices item

CCIE R&Sv5 Flexible TS Time



- Optional time extension of 30 min in TS
- TS designed for 2h
- Any extra time used, up to 30 min is reduced from CFG time credit

CCIE R&Sv5 Scoring Logic



- Module-level minimum score
- Lab-level cut-score

if {[∀mod: (mod_Score ≥ mod_minScore)] && [∑(mod_Score) ≥ Lab_CutScore]};
then PASS

CCIE R&Sv5 Lab Skills Assessment

TS

Skills tested:

- Resolve networking problems
- Use IOS Troubleshooting tools
- Apply Troubleshooting methodologies
- Troubleshoot Network technologies (any topic on the blueprint)
- Implement and verify working solution of networking issues

DIAG

Skills tested:

- Perceive problem areas
- Analyse symptoms of networking issues, identify and describe root cause
- Correlate information from multiple sources
- Discern appropriate solution
- Apply Troubleshooting Methodologies
- Troubleshoot Network technologies (any topic on the blueprint)

CFG

Skills tested:

- Abstract functional element of complex network environment
- Understand how infrastructure components interoperate
- Implement Network technologies (any topic on the blueprint)
- Design appropriate solutions to network infrastructure's challenges within constraints and verify functionality

CCIE R&Sv5 Lab Modules Design

TS

Incident format:

- All incidents visible at start
- Score visible
- Virtual devices
- Single topology/scenario
- Independent incidents
- Troubleshoot, configure and verify solution
- Per-incident constraints

DIAG

Ticket format:

- All tickets visible at start
- Score visible
- No devices
- Multiple scenarios
- Independent tickets
- Analyse & correlate info and make a choice between options

CFG

Item format:

- All tickets visible at start
- Score visible
- Virtual devices
- Single topology/scenario
- Inter-dependent items
- Implement, configure and verify working scenario

CCIE R&Sv5 Lab Modules Design

TS

Incident format:

- All incidents visible at start
- Score visible
- Virtual devices
- Single topology/scenario
- Independent incidents
- Troubleshoot, configure and verify solution
- Per-incident constraints

DIAG

Ticket format:

- All tickets visible at start
- Score visible
- No devices
- Multiple scenarios
- Independent tickets
- Analyse & correlate info and make a choice between options

CFG

Item format:

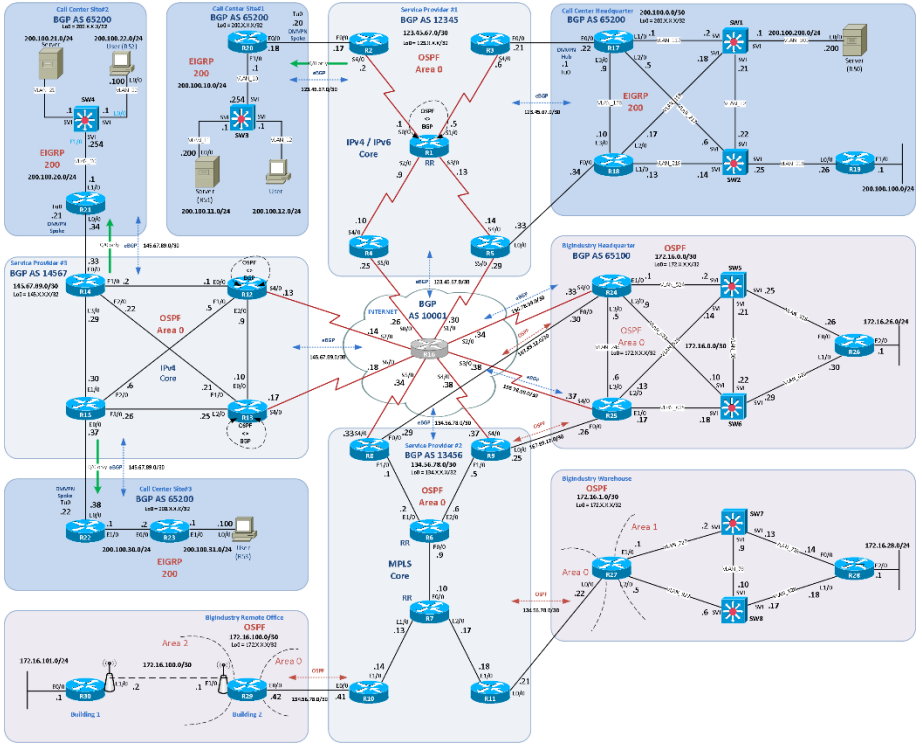
- All tickets visible at start
- Score visible
- Virtual devices
- Single topology/scenario
- Inter-dependent items
- Implement, configure and verify working scenario

CCIE R&Sv5 Troubleshooting Module's Format

- Network topology of ~30 virtual routers and switches
- Scenario is fully preconfigured but contains faults
- 2h30 maximum (visible countdown timer + 30 min warning after 2h)
- Content designed to be doable within 2h
- Incidents' stem are "symptom-based"
- Verifications are "result-based" + constraints
- No partial scoring

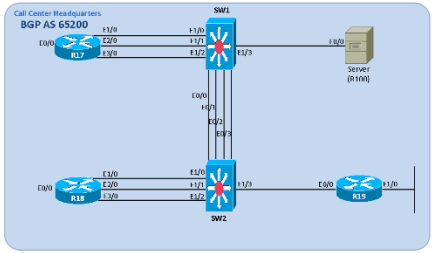
CCIE R&Sv5 Troubleshooting Module's Format

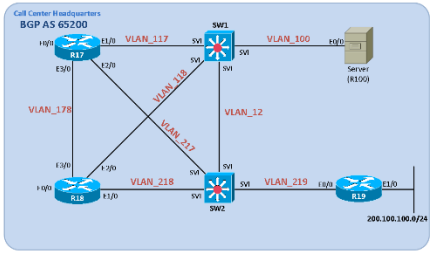
- Main IGP topology diagram (high res)
  - Two+ enterprises with remote sites
  - Three+ Service Providers
  - Host/Server simulated by IOS
  - Preconfigured scenario
  - Multiple faults injected
- Console access via
  - Main diagram
  - Device manager (menu)

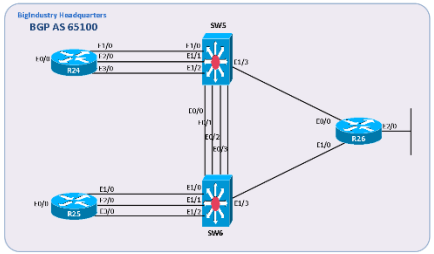


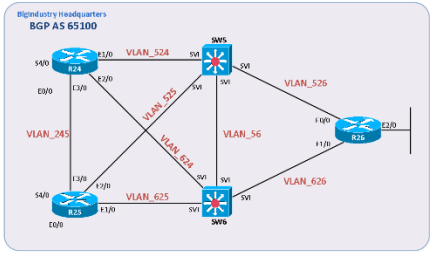
CCIE R&Sv5 Troubleshooting Module's Format

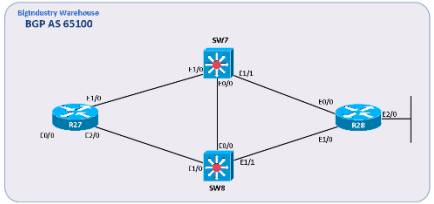
- Layer 2 diagrams
  - Any region/AS with switches
  - Mixing L2 and L3 links

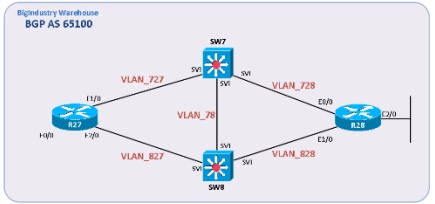






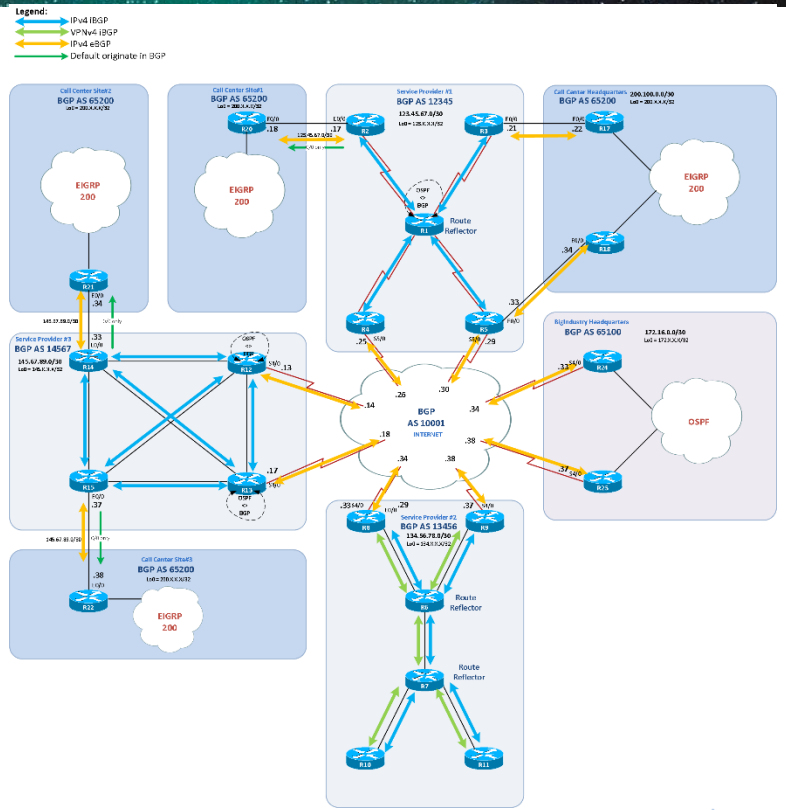






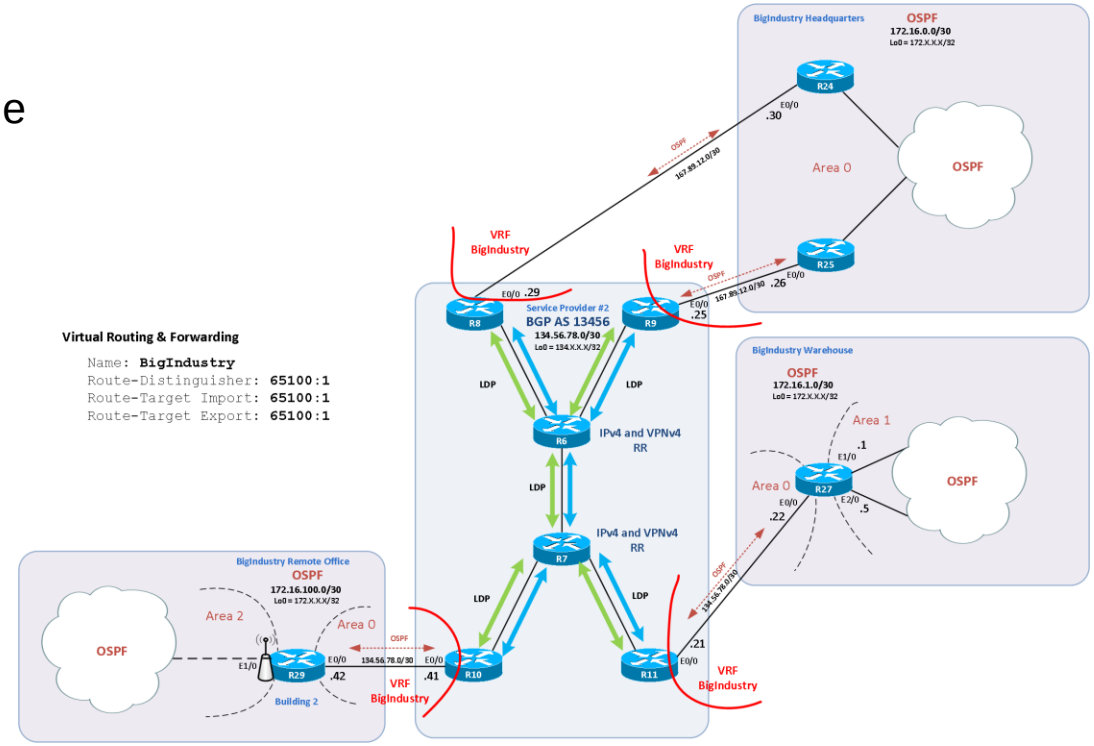
CCIE R&Sv5 Troubleshooting Module's Format

- BGP diagram
  - Only the BGP speakers
  - iBGP, eBGP, MP-BGP
  - Default originate



CCIE R&Sv5 Troubleshooting Module's Format

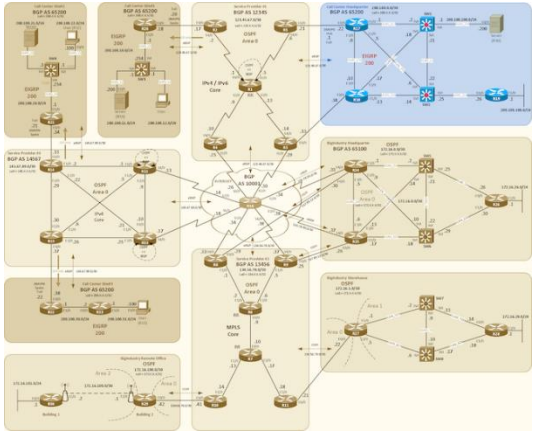
- MPLS VPN diagram
  - Only the VPN sites and backbone
  - VRF RD, RT, Interfaces
  - PE-CE RP



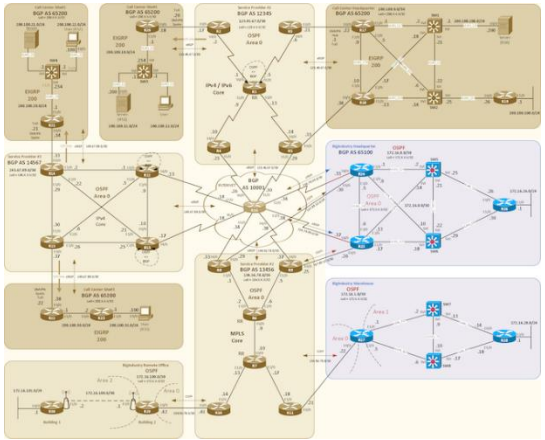
CCIE R&Sv5 Troubleshooting Module's Format

- Mostly independent incidents
  - Isolated in one domain/region of the topology
  - Most incidents do not depend on resolution of another one
  - Mini-diagrams help locate which domain(s) is impacted in each incident (low res)

Incident#1



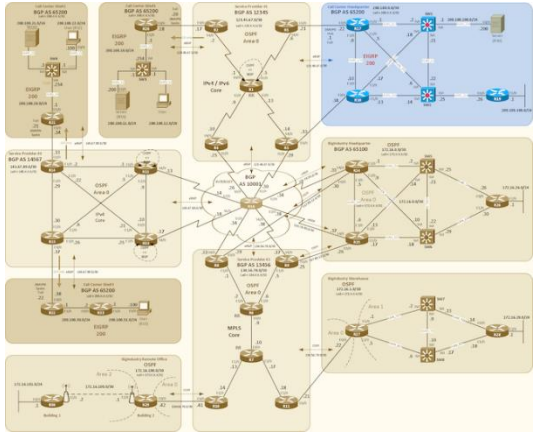
Incident#2



CCIE R&Sv5 Troubleshooting Incident's Format

- Incident#1

Hosts that are connected to the interface E1/0 of R19 are not able to use Telnet to connect to the server R50, which is located in VLAN_100.



Fix the problem so that the following Telnet session establishes:

```
R19#telnet 200.100.200.200 /so e1/0
Trying 200.100.200.200 ... Open
User Access Verification
Password:
R50>
```

While resolving this issue, you are not allowed to create any new interface.

Refer to the Troubleshooting guidelines to determine if your solution is appropriate.

Make sure that you disconnect the telnet session after verification.

CCIE R&Sv5 Troubleshooting Incident's Format

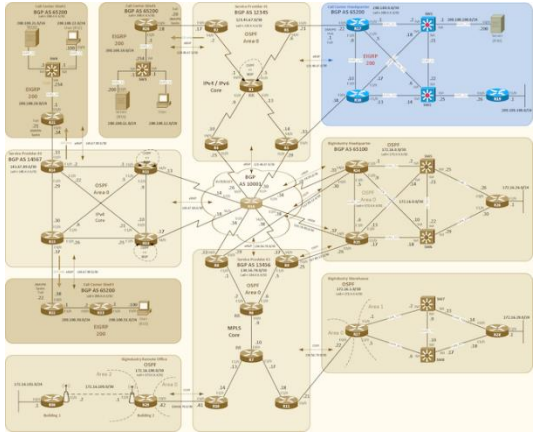
- Incident#1

Hosts that are connected to the interface E1/0 of R19 are not able to use Telnet to connect to the server R50, which is located in VLAN_100.

Fix the problem so that the following Telnet session establishes:

```
R19#telnet 200.100.200.200 /so e1/0
Trying 200.100.200.200 ... Open
User Access Verification
Password:
R50>
```

Mini Diagram



While resolving this issue, you are not allowed to create any new interface.

Refer to the Troubleshooting guidelines to determine if your solution is appropriate.

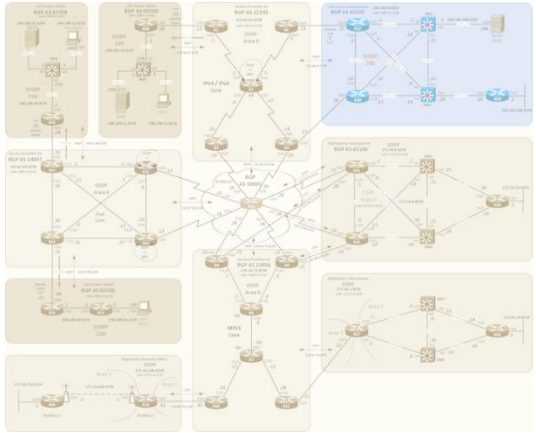
Make sure that you disconnect the telnet session after verification.

CCIE R&Sv5 Troubleshooting Incident's Format

- Incident#1

Symptoms

Hosts that are connected to the interface E1/0 of R19 are not able to use Telnet to connect to the server R50, which is located in VLAN_100.



Fix the problem so that the following Telnet session establishes:

```
R19#telnet 200.100.200.200 /so e1/0
Trying 200.100.200.200 ... Open
User Access Verification
Password:
R50>
```

While resolving this issue, you are not allowed to create any new interface.

Refer to the Troubleshooting guidelines to determine if your solution is appropriate.

Make sure that you disconnect the telnet session after verification.

CCIE R&Sv5 Troubleshooting Incident's Format

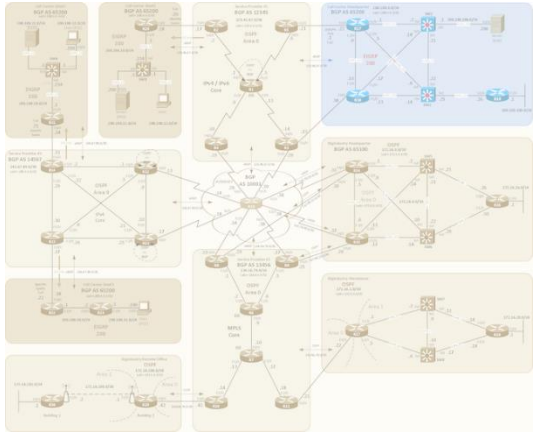
- Incident#1

Hosts that are connected to the interface E1/0 of R19 are not able to use Telnet to connect to the server R50, which is located in VLAN_100.

Validation test

Fix the problem so that the following Telnet session establishes:

```
R19#telnet 200.100.200.200 /so e1/0
Trying 200.100.200.200 ... Open
User Access Verification
Password:
R50>
```



While resolving this issue, you are not allowed to create any new interface.

Refer to the Troubleshooting guidelines to determine if your solution is appropriate.

Make sure that you disconnect the telnet session after verification.

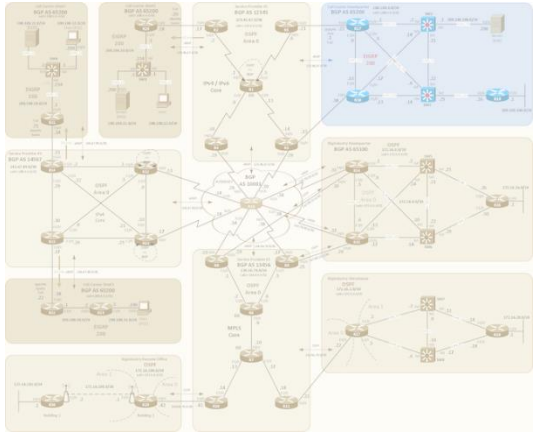
CCIE R&Sv5 Troubleshooting Incident's Format

- Incident#1

Hosts that are connected to the interface E1/0 of R19 are not able to use Telnet to connect to the server R50, which is located in VLAN_100.

Fix the problem so that the following Telnet session establishes:

```
R19#telnet 200.100.200.200 /so e1/0
Trying 200.100.200.200 ... Open
User Access Verification
Password:
R50>
```



Additional guidelines and constraints

While resolving this issue, you are not allowed to create any new interface.

Refer to the Troubleshooting guidelines to determine if your solution is appropriate.

Make sure that you disconnect the telnet session after verification.

CCIE R&Sv5 Lab Modules Design

TS

Incident format:

- All incidents visible at start
- Score visible
- Virtual devices
- Single topology/scenario
- Independent incidents
- Troubleshoot, configure and verify solution
- Per-incident constraints

DIAG

Ticket format:

- All tickets visible at start
- Score visible
- No devices
- Multiple scenarios
- Independent tickets
- Analyse & correlate info and make a choice between options

CFG

Item format:

- All tickets visible at start
- Score visible
- Virtual devices
- Single topology/scenario
- Inter-dependent items
- Implement, configure and verify working scenario

CCIE R&Sv5 New Diagnostic Module

- **Independent** scenarios putting candidate into the role of a Network Support engineer who **diagnoses** networking issues
  - Analyse, identify, locate and explain the root cause
  - Recommend optimal troubleshooting procedures leading to the root cause
  - Recommend network changes isolating the issue without causing more harm
  - Etc…

- **Analysing**, **correlating** and **discerning** multiple sources of documentation
  - Email threads
  - Network topology diagrams
  - Console sessions log
  - Syslogs, Monitoring charts, …
  - Network traffic captures

CCIE R&Sv5 New Diagnostic Module

- Format similar to written exam items (MC-MA) with huge exhibits ☺
  - Deterministic grading
  - No living devices
  - MC-SA (Radio buttons) and MC-MA (Checkboxes)
  - Drop-down(s)
  - Drag and Drop
  - Point and Click / Hotspot
- Designed to be doable within 30 minutes
- Tickets stem are very generic
- Scenarios provided by additional documentation
- Verifications are “deterministic”
- No partial scoring

CCIE R&Sv5 Format of New Diagnostic Module

Multiple Choice – Single Answer

Task #1: Multiple Choice - Single Answer

A new service request was escalated to you and the following information was provided to help you understand, diagnose and help resolve the issue:

- Email thread between customer and helpdesk
- Network topology diagram
- Router configuration
- EIRGP Topology
- Google

Some post-resources waffle

Considering all information provided, which one of the following options is the only possible cause of this issue?

Select an answer:

- Access-list Configuration mistake on R15 or R16
- Access-list Configuration mistake on R9
- EIGRP Configuration mistake on R9
- Local Policy based routing configuration mistake on R17
- Policy based routing configuration mistake on R9
- EIGRP Configuration mistake on R15 or R16
- Local Policy based routing configuration mistake on R9
- Local Policy based routing configuration mistake on R15 or R16
- EIGRP Configuration mistake on R17
- Policy based routing configuration mistake on R15 or R16
- Policy based routing configuration mistake on R17
- Access-list Configuration mistake on R17

CCIE R&Sv5 Format of New Diagnostic Module

Multiple Choice – Multiple Answers

2 points

Task #2: Multiple Choice - Multiple Answer

A new **service request** was escalated to you and the following information was provided to help you understand, diagnose and help resolve the issue:

- Network topology of RandomOffice.org
- Email thread between customer and helpdesk
- Google

Considering all information provided, which two of the following options are the only possible causes of this issue?

Select 2 answers:

- [ ] Wrong access-list configuration on R20
- [ ] Too many users on the network
- [ ] Not enough memory on the R20
- [ ] Wrong NAT configuration on R20
- [ ] Virus on a user's workstation opening too many connections
- [ ] Routing issue on the ISP network
- [ ] Peer-to-peer traffic on a user's workstation
- [ ] Slow uplink to the ISP

CCIE R&Sv5 Format of New Diagnostic Module

Dropdown(s)

Task #3: MC-SA With Dropdown

A new service request was escalated to you and the following information was provided to help you understand, diagnose and help resolve the issue:

- Email thread between customer and helpdesk
- Network topology diagram
- Syslog from the Monitoring station
- Traffic Capture

Considering all information provided, select the ***ID of the frame*** as well as the ***field*** of the packet that indicate the root cause of this issue.

Fields of the IP Header: Select answer ...

Frame ID: Select answer ...

CCIE R&Sv5 Format of New Diagnostic Module

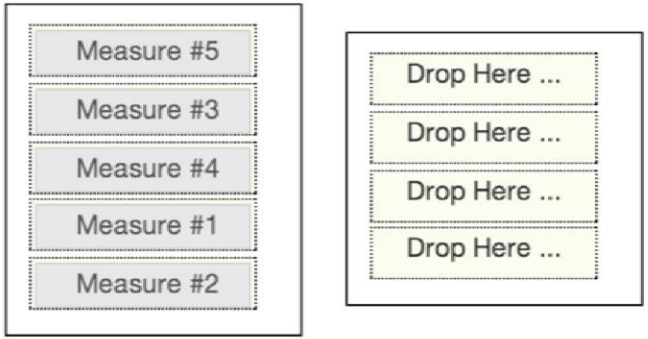
Drag and Drop

Task #4: Drag And Drop

A new service request was escalated to you and the following information was provided to help you understand, diagnose and help resolve the issue:

- Email thread between customer and helpdesk
- Network topology diagram
- Syslog from the Monitoring station

Considering all information provided, which sequence of five actions should be recommended to the customer? Select and drag four measures on the left to the appropriate steps on the right:



CCIE R&Sv5 Format of New Diagnostic Module

Documentation

Task #1: Multiple Choice - Single Answer

A new service request was escalated to you and the following information was provided to help you understand, diagnose and help resolve the issue:

Email thread between customer and helpdesk

Ticket#2: Email thread between customer and helpdesk

Initial Email request from the customer

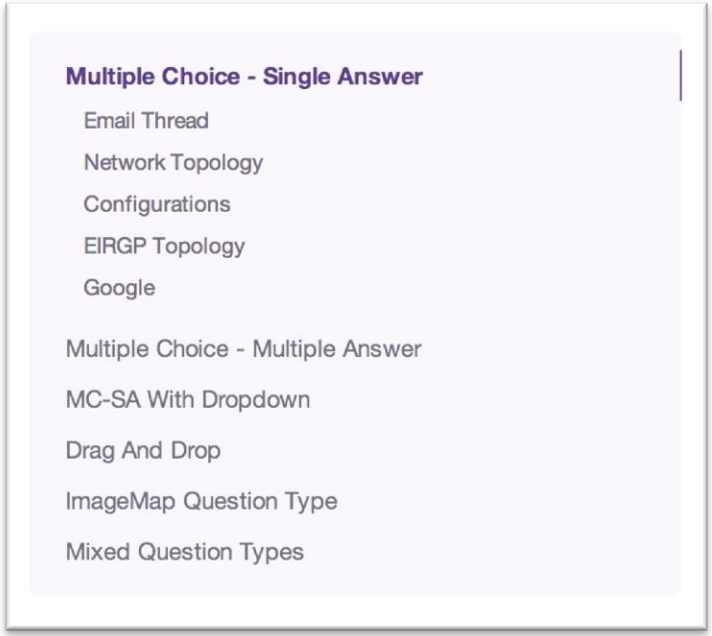
From: Bob <bob@iptables.org>
To: Support <help@support.org>
Subject: Hosts can't ping Internet

Hi,
We just configured EIGRP and the EIGRP routes appear in the routing table of our gateway router R17.
The router can ping the Internet but the hosts connected behind the router can not get passed the router to get to the Internet.
When pinging from the Internet the pings can not get passed the router either to the hosts.
Please help!
Thanks!
Bob.

CCIE R&Sv5 Format of New Diagnostic Module

Navigation aids

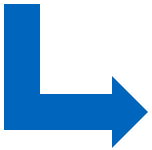
- Enables candidate to focus on content (not on navigation!)
- Left menu always visible
  - Easy back'n forth between multiple doc sources
- Updating dynamically (depending on cursor location)
- Development still ongoing
  - More features coming in soon!



CCIE R&Sv5 Format of New Diagnostic Module

Input validation

Submit Answers



Considering all information provided, which two of the following options are the only possible causes of this issue?

Select 2 answers:

2 choices are required for this question!

- [ ] Routing issue on the ISP network
- [ ] Too many users on the network
- [ ] Peer-to-peer traffic on a user's workstation

CCIE R&Sv5 Lab Modules Design

TS

Incident format:

- All incidents visible at start
- Score visible
- Virtual devices
- Single topology/scenario
- Independent incidents
- Troubleshoot, configure and verify solution
- Per-incident constraints

DIAG

Ticket format:

- All tickets visible at start
- Score visible
- No devices
- Multiple scenarios
- Independent tickets
- Analyse & correlate info and make a choice between options

CFG

Item format:

- All tickets visible at start
- Score visible
- Virtual devices
- Single topology/scenario
- Inter-dependent items
- Implement, configure and verify working scenario

CCIE R&Sv5 Configuration Module's Format

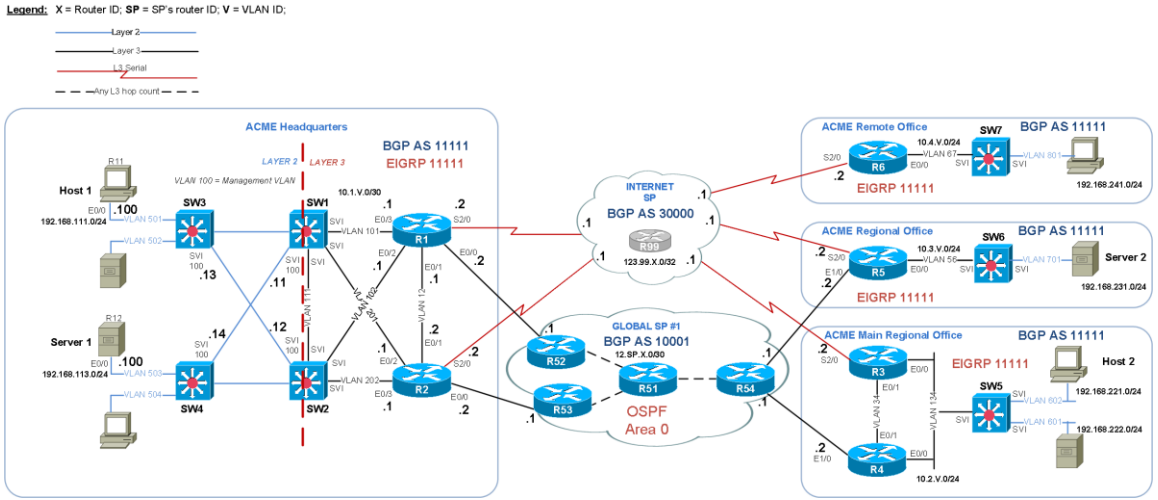
- Network topology with virtual routers and switches
- Scenario is partly preconfigured and items are **inter-dependent**!
  - Item#10 may require Item#1 to be completed! And Vice versa!!
  - Sequence of items is not aligned to the implementation sequence!!
  - May include implicit troubleshooting

- 5h30 maximum (no visible countdown timer, refer to proctor's clock)
- Items' stem are based on **requirements** and constraints
- Verification rules check for **functionalities**, not specific configurations
  - Validate alternate solution configurations

- No partial scoring

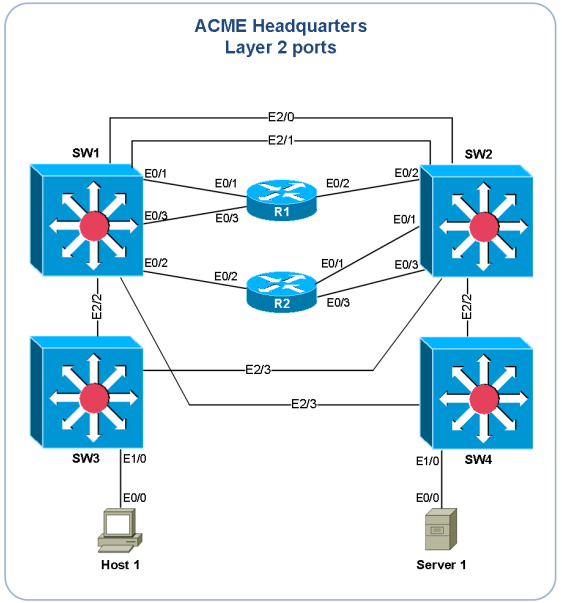
CCIE R&Sv5 Configuration Module's Format

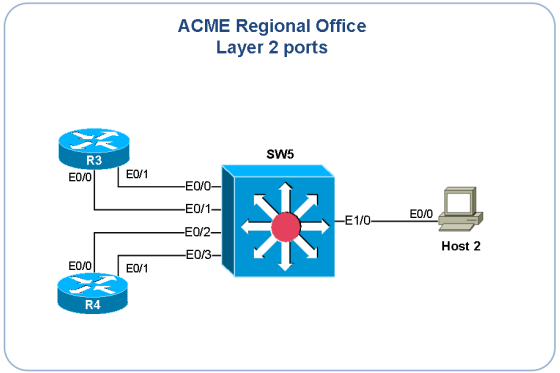
- Main IGP topology diagram
  - One enterprise/corporation
  - Multiple remote sites
  - Multiple Service Providers
  - Host/Server simulated by IOS
- Console access via
  - Main diagram
  - Device manager (menu)



CCIE R&Sv5 Configuration Module's Format

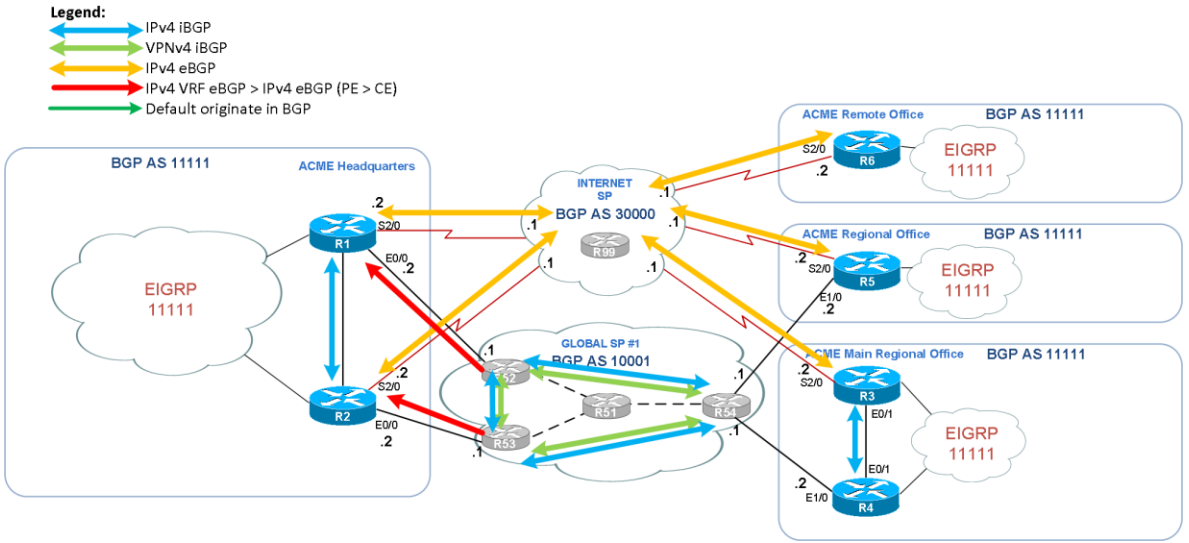
- Layer 2 diagram
  - Any region/AS with switches
  - Mixing L2 and L3 links





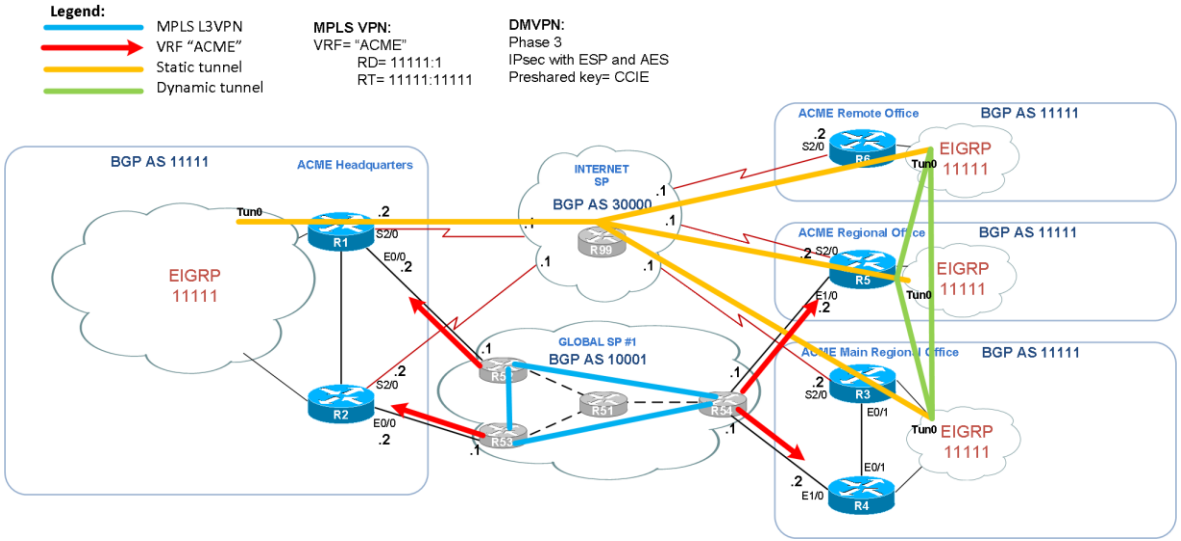
CCIE R&Sv5 Configuration Module's Format

- BGP diagram
  - Any region/AS with switches
  - Mixing L2 and L3 links



CCIE R&Sv5 Configuration Module's Format

- VPN diagram
  - Any region/AS with switches
  - Mixing L2 and L3 links



Agenda

- Overall CCIE Program
- New CCIE R&Sv5 Curriculum
- New CCIE R&Sv5 Exam Format
- **Sample Questions**
- Preparation Materials
- Questions & Answers

CCIE R&Sv5 Written Exam Sample MC-SA Item

- Multiple-choice Single-Answer

Which statement is true about IS-IS?

a) IS-IS provides direct support for NBMA networks.
b) IS-IS has a “virtual-link” concept similar to OSPF.
c) IS-IS packets are directly encapsulated in the data-link layer.
d) IS-IS is a hybrid between distance-vector protocol and link-state protocol.

CCIE R&Sv5 Written Exam Sample MC-MA Item

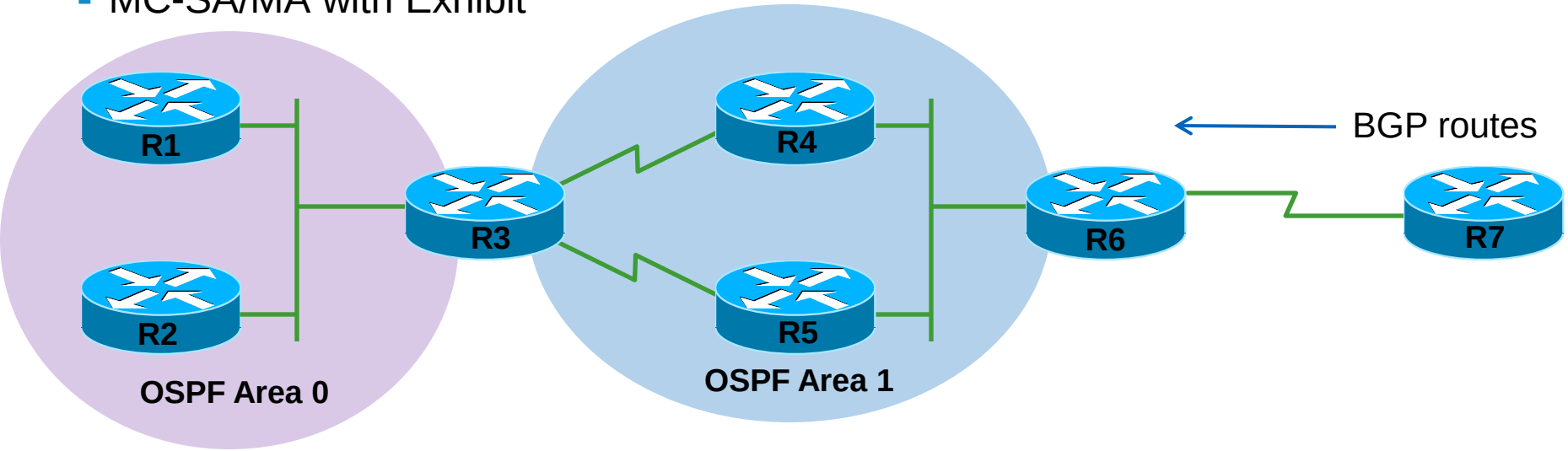
- Multiple-choice Multiple-Answer

Which two of these statements about CBWFQ are correct? (Choose two)

a) The CBWFQ scheduler provides a guaranteed minimum amount of bandwidth to each class.
b) CBWFQ services each class queue using a strict priority scheduler.
c) The class-default queue only supports WFQ.
d) Inside a class queue, processing is always FIFO, except for the class-default queue.
e) Each CBWFQ traffic class is policed using a congestion-aware policer.

CCIE R&Sv5 Written Exam Sample Item Exhibit

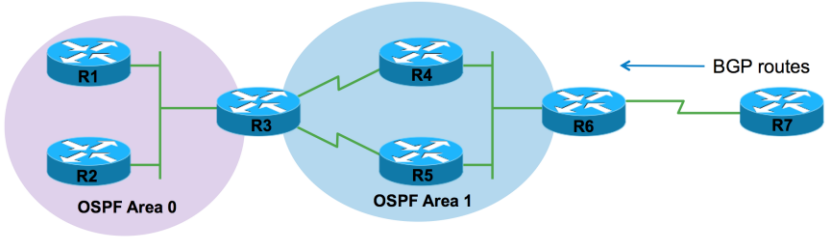
- MC-SA/MA with Exhibit



Refer to the exhibit. R6 (in Area 1) is redistributing routes learned from BGP into the OSPF process. Area 1 is a normal area and R3 doesn't filter anything.

Which three OSPF LSA types will R3 advertise into Area 0? (Choose three)

CCIE R&Sv5 Written Exam Sample Item



Refer to the exhibit. R6 (in Area 1) is redistributing routes learned from BGP into the OSPF process. Area 1 is a normal area and R3 doesn't filter anything.

Which three OSPF LSA types will R3 advertise into Area 0? (Choose three)

a) Type 1 - Router LSAs
b) Type 2 - Network LSAs
c) Type 3 - Network summary LSAs
d) Type 4 - ASBR Summary LSAs
e) Type 5 - AS external LSAs
f) Type 7 - NSSA external LSAs

CCIE R&Sv5 Written Exam Sample DnD Item

- Drag and Drop

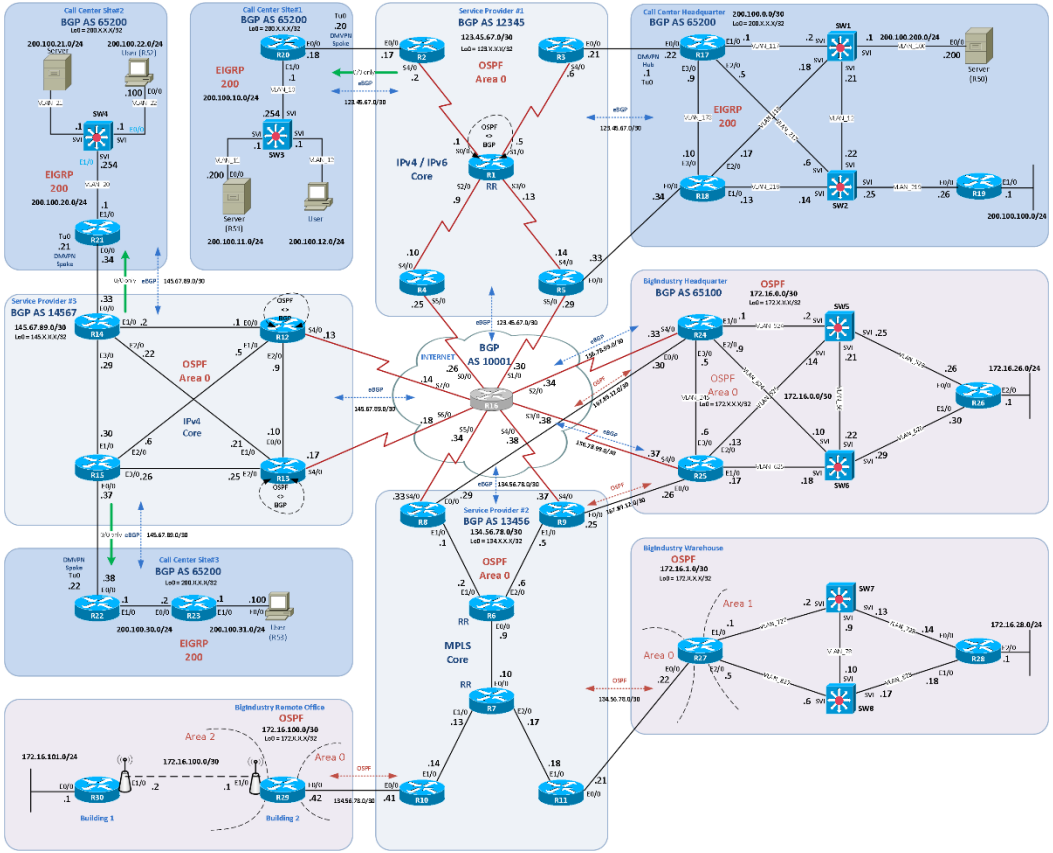
Drag the options on the left to the correct order on the right:

Output ACLs are checked on the outbound interface.	Step 1
CEF table (FIB) lookup is carried out for packet forwarding.	Step 2
The packet is forwarded.	Step 3
Unicast RPF checks to see if the packet has arrived on the best return path to the source; it does this by doing a reverse lookup in the FIB table.	Step 4
Input ACLs configured on the inbound interface are checked.	Step 5

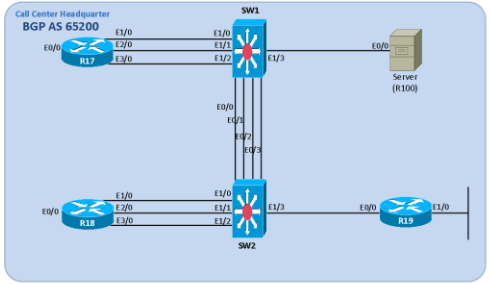
CCIE R&Sv5 Lab Exam Sample Items

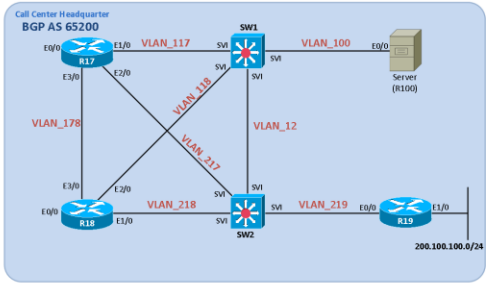
- Troubleshooting
- Diagnostic
- Configuration

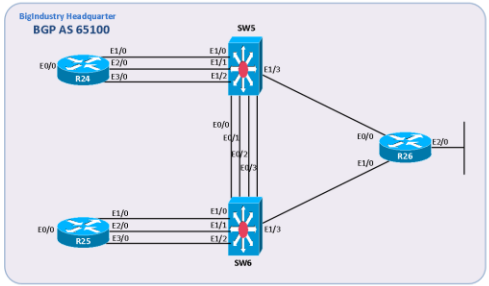
CCIE R&Sv5 Lab Exam' TS Sample Topology

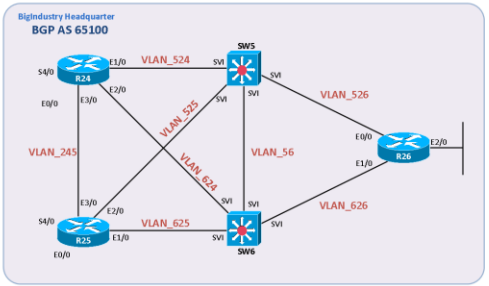


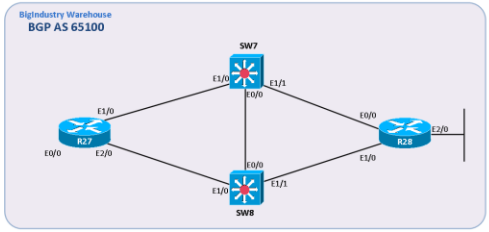
CCIE R&Sv5 Lab Exam' TS Sample Layer 2 Diagram

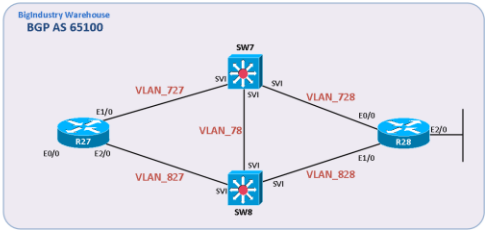




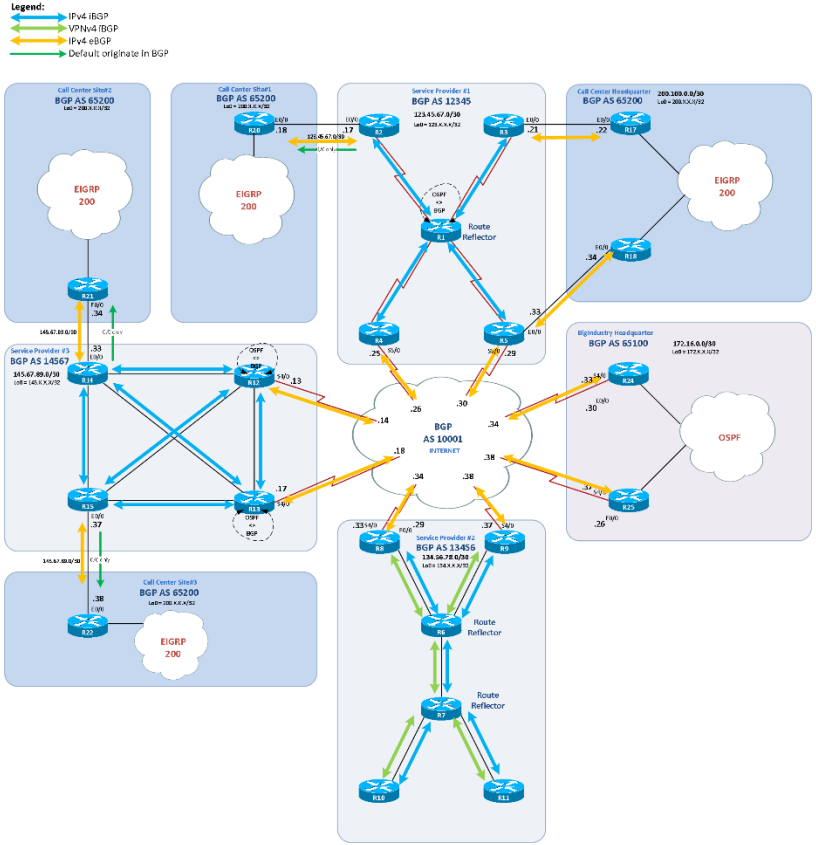




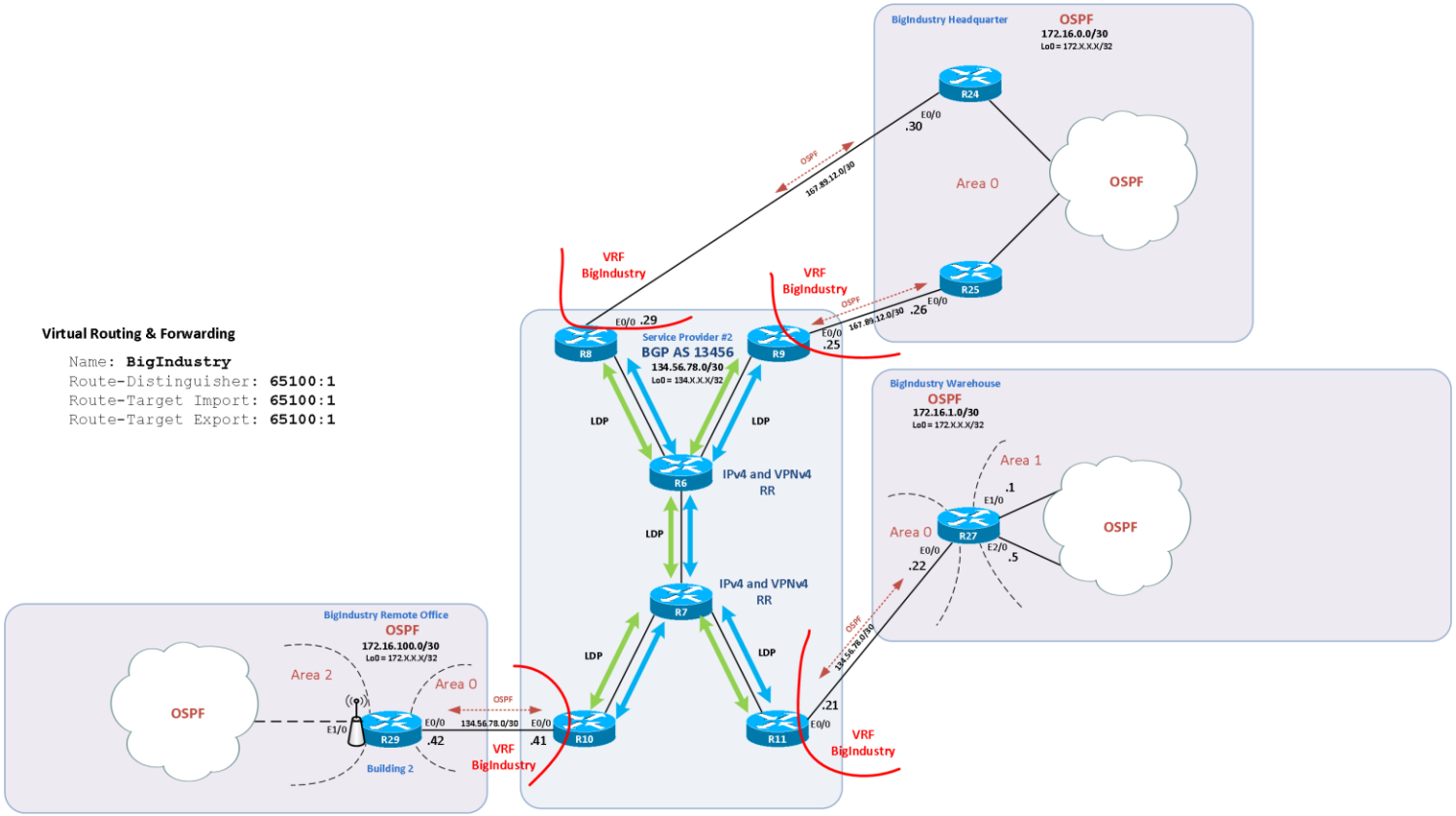




CCIE R&Sv5 Lab Exam' TS Sample BGP Topology



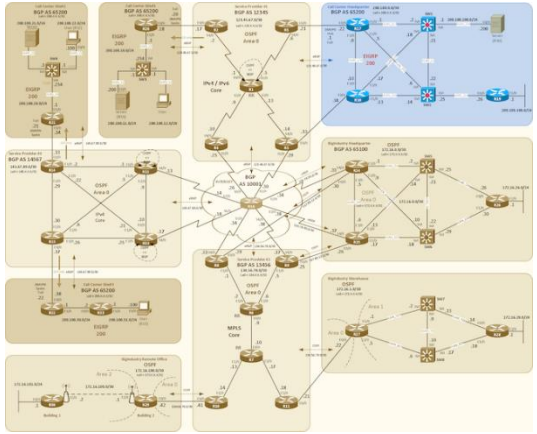
CCIE R&Sv5 Lab Exam' TS Sample MPLS Topology



CCIE R&Sv5 Lab Exam' TS Sample Incident#1

- Incident#1

Hosts that are connected to the interface E1/0 of R19 are not able to use Telnet to connect to the server R50, which is located in VLAN_100.



Fix the problem so that the following Telnet session establishes:

R19#**telnet 200.100.200.200 /so e1/0**

Trying 200.100.200.200 ... Open

User Access Verification

Password:

R50>

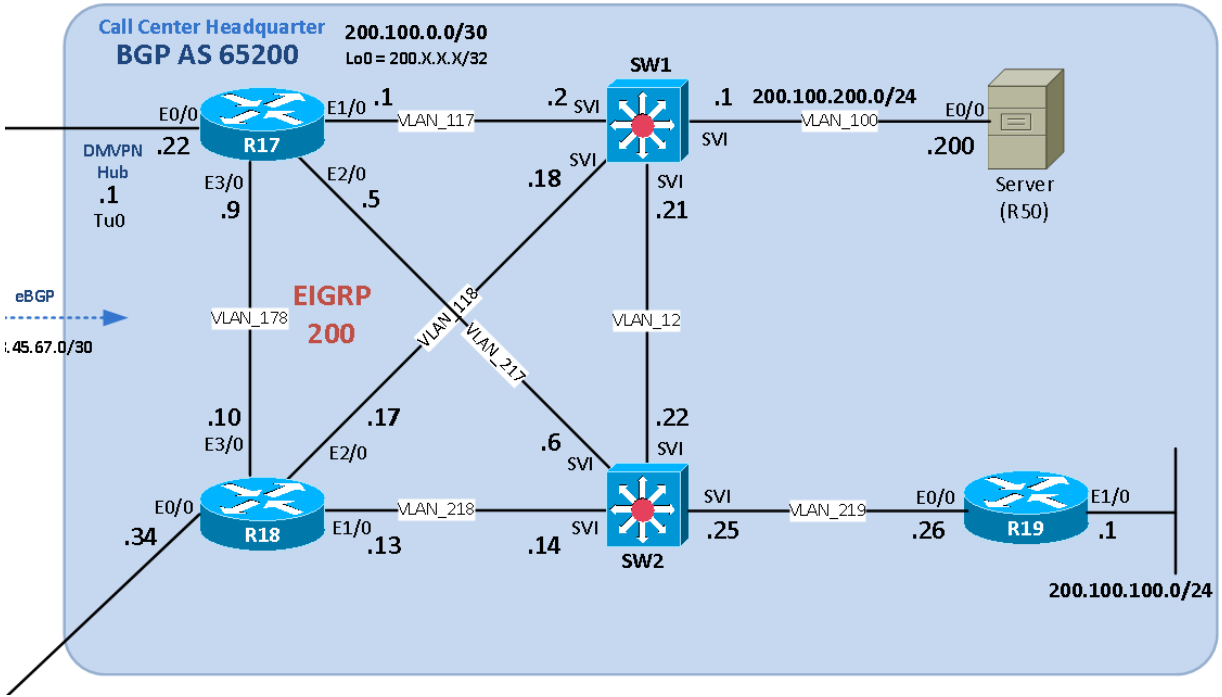
While resolving this issue, you are not allowed to create any new interface.

Refer to the Troubleshooting guidelines to determine if your solution is appropriate.

Make sure that you disconnect the telnet session after verification.

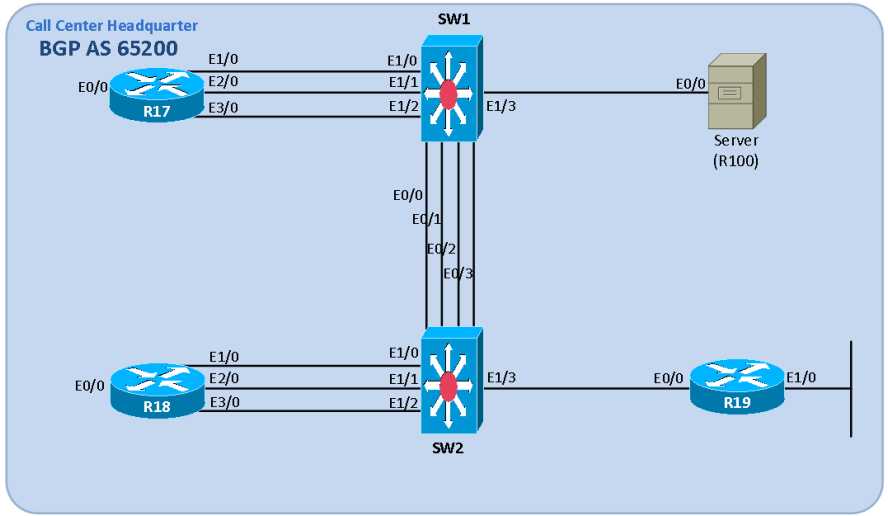
CCIE R&Sv5 Lab Exam' TS Sample Incident#1

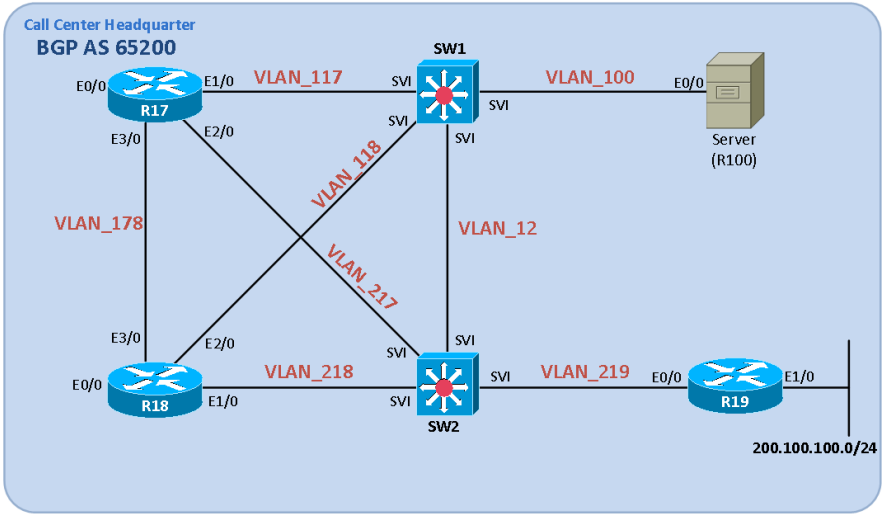
- Zoom on Logical Diagram



CCIE R&Sv5 Lab Exam' TS Sample Incident#1

- Layer 2 Diagram





CCIE R&Sv5 Lab Exam' DIAG Sample Ticket#1

MC-MA (Dropdowns)

- A new service request was escalated to you and the following information was provided to help you understand, diagnose and help resolve the issue:
  - *Email thread between the first-line support and the customer*
  - *Network topology*
  - *Router configurations*

- Considering all information provided:
  1. Identify the device and command that provides the most relevant output leading to the root cause.

  2. Identify the option and device that is the only effective solution to this issue.

CCIE R&Sv5 Lab Exam' DIAG Sample Ticket#1

1. Identify the device and command that provides the most relevant output leading to the root cause.

Device	Command
SW1	sh cdp n
SW2	sh vlan br
SW3	sh int trunk
SW4	sh span vlan 501
	sh ip ro 192.168.111.0
	sh ip ro 192.168.113.0

CCIE R&Sv5 Lab Exam' DIAG Sample Ticket#1

2. Identify the option and device that is the only effective solution to this issue.

Device	Solution
SW1	Configure as root switch for VLAN 501
SW2	Configure as root switch for VLAN 503
SW3	Configure interface E1/0 as access switchport in VLAN 501
SW4	Configure interface E1/0 as access switchport in VLAN 503
	Configure HSRP in VLAN 501 with the virtual IP address as 192.168.111.1
	Configure HSRP in VLAN 503 with the virtual IP address as 192.168.113.1
	Configure two default routes pointing to 192.168.111.11 and 192.168.113.12
	Configure interfaces E2/0 and E2/1 as dot1q trunks
	Configure interfaces E2/2 and E2/3 as dot1q trunks

CCIE R&Sv5 Lab Exam' DIAG Case Study: Ticket#2

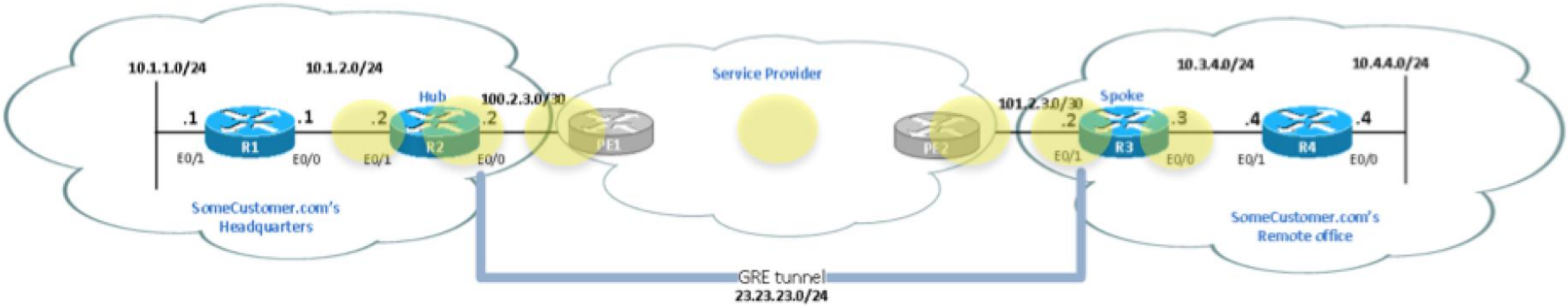
Point & Click (Hotspot)

- A new service request was escalated to you and the following information was provided to help you understand, diagnose and help resolve the issue:
  - *Email thread between the first-line support and the customer*
  - *Syslogs*
  - *Network topology*
  - *Router configurations*
  - *Debugs*

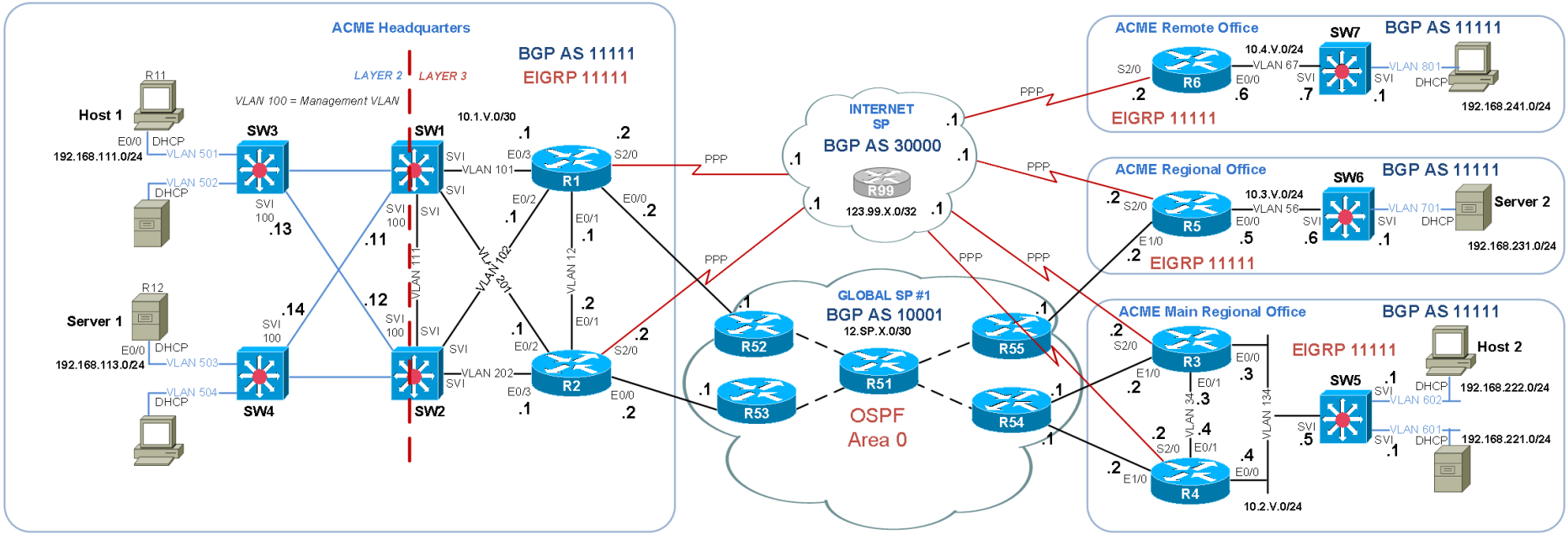
- Considering all information provided, point and click on the location in the topology that is causing the reported symptoms.

CCIE R&Sv5 Lab Exam' DIAG Case Study: Ticket#2

- Considering all information provided, point and click on the location in the topology that is causing the reported symptoms.



CCIE R&Sv5 Lab Exam' CFG Sample IGP Topology



Legend: X = Router ID; **SP** = SP's router ID; **V** = VLAN ID;

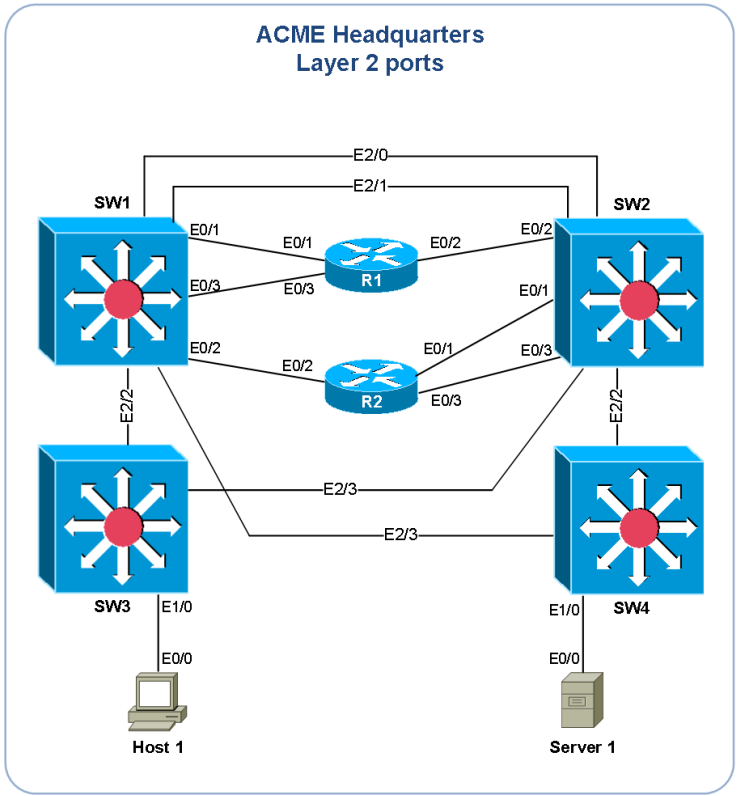
Layer 2

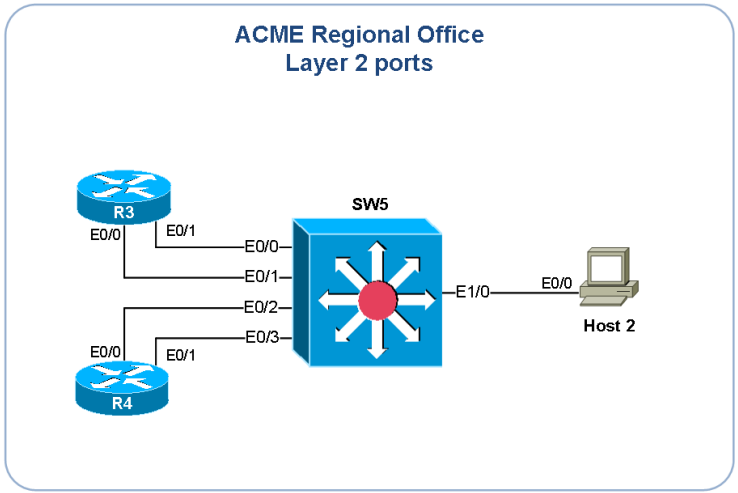
Layer 3

L3 Serial

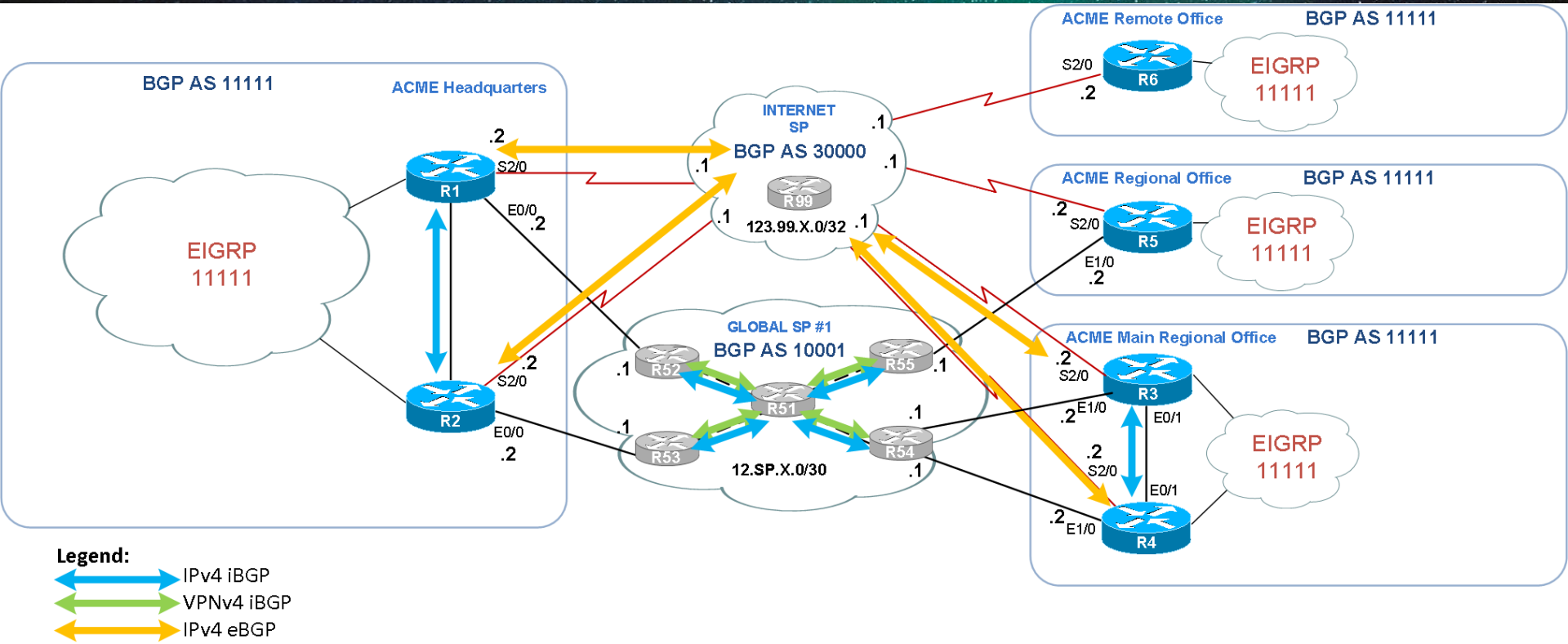
Any L3 hop count

CCIE R&Sv5 Lab Exam' CFG Sample L2 Diagram

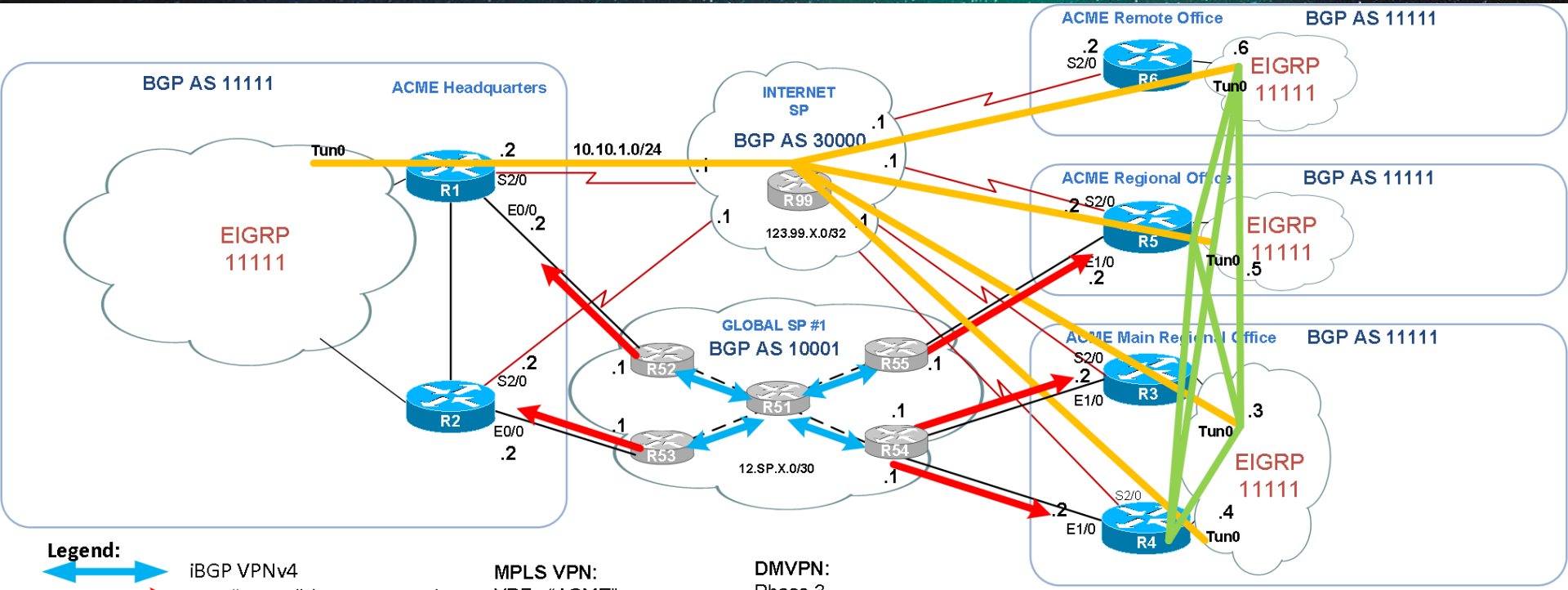




CCIE R&Sv5 Lab Exam' CFG Sample BGP Topology



CCIE R&Sv5 Lab Exam' CFG Sample VPN Topology



Legend:

- iBGP VPNv4
- VRF "ACME" (PE-CE=EIGRP)
- Static tunnel
- Dynamic tunnel

MPLS VPN:
VRF= "ACME"
RD= 11111:1
RT= 11111:11111

DMVPN:
Phase 3
IPsec with ESP and AES
Preshared key= CCIE
Tunnel0= 10.10.1.0/24

CFG Sample Item: Layer 2 Technologies

Spanning-Tree (part 1)

- Configure the ACME Headquarters network as per the following requirements:
  - Configure SW1 as the root switch for VLANs 501 and 502 and as the backup switch for VLANs 503 and 504.
  - Configure SW2 as the root switch for VLANs 503 and 504 and as the backup switch for VLANs 501 and 502.
  - Ensure that all four switches are running the IEEE 802.1w Spanning Tree.
  - Configure SW1 so that the port E2/1 is forwarding for VLAN 504 but blocking for VLAN 503.

(…)

CFG Sample Item: Layer 2 Technologies

Spanning-Tree (part 2)

(…)

- Configure the ACME Main Regional Office network as per the following requirements:
  - SW5 must be the root switch for the whole range of possible VLANs.
  - SW5 must have the best chance of being elected the root switch in case a new switch was added to the network in the future.
  - SW5 must run the IEEE 802.1w Spanning Tree.

4 points

CFG Sample Item: Layer 3 Technologies

Part 1

EIGRP

- Refer to “Diagram 2: IGP Routing”.
- Configure the ACME network as per the following requirements:
  - Configure a static default route on R1 pointing to 123.99.1.1.
  - Configure a static default route on R2 pointing to 123.99.2.1.
  - Configure a static default route on R5 pointing to 123.99.5.1.
  - Configure a static default route on R6 pointing to 123.99.6.1.
  - SW5 must install two equal-cost external default routes into its routing table.
  - SW6 must receive only an internal default route from R5, no other EIGRP prefix must be propagated to SW6.
  - SW7 must receive only an internal default route from R6, no other EIGRP prefix must be propagated to SW7.

CFG Sample Item: Layer 3 Technologies

Part 2

EIGRP

- Configure the ACME network as per the following requirements:
  - (…)
  - R1 and R2 must propagate a default route into the EIGRP domain as an external route.
  - R3 and R4 must receive the external default route from R1 and R2.
  - The headquarters must have reachability to all access VLANs of all remote sites (VLAN 601, 602, 701 and 801) via either the DMVPN cloud or via the MPLS VPN.

4 points

CFG Sample Item: VPN Technologies

3.1 Tunnelling

- Deploy DMVPN phase 3 in the ACME network as per the following requirements:
  - R1 must be the hub. R3, R4, R5 and R6 must be the spokes.
  - Configure the following parameters for the interface Tunnel0 of all five routers:
    - IP MTU is 1400, TCP adjust-MSS is 1360.
    - Authenticate NHRP using the key 11111.
    - Set the NHRP holdtime to 5 minutes.
  - Ensure that spoke-to-spoke tunnels are dynamically provisioned when needed.
  - All three spokes must establish an EIGRP peering with the hub and via the interface Tunnel0.

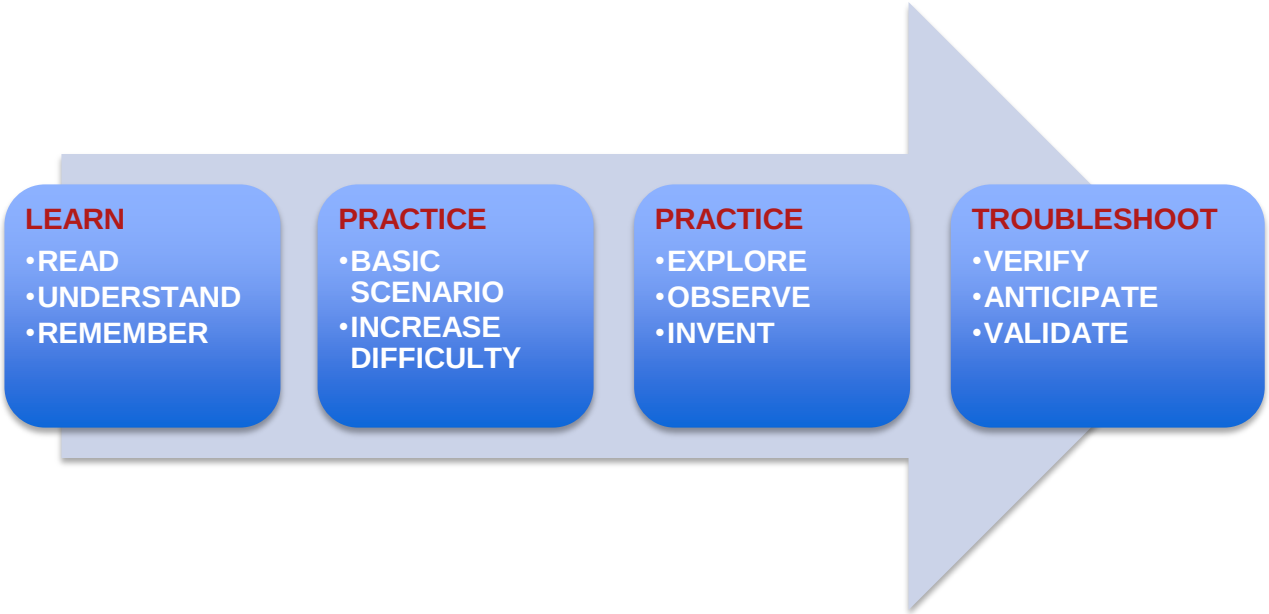
4 points

Agenda

- Overall CCIE Program
- New CCIE R&Sv5 Curriculum
- New CCIE R&Sv5 Exam Format
- Sample Questions
- **Preparation Materials**
- Questions & Answers

CCIE Exam Preparation, General

- Expert-level knowledge requires **ACTIVE LEARNING**
  - Researching, Reading, Analysing, Correlating, Practicing, Repeating



CCIE R&Sv5 Preparation Materials

- Cisco Learning Network (CLN)
- Cisco Expert-level Training Program for CCIE RS
- New Ciscopress titles
- Cisco.com Products and Technology documentation
- Cisco.com Whitepapers, Design Zone, …
- Cisco Forums (supportforums.cisco.com)
- Cisco Tools
- External Resources

Cisco Learning Network – Official Resources

- **Cisco Learning Network**
  - https://learningnetwork.cisco.com

- Community
- Topics (Blueprints)
  - Written exam
  - Lab exam
- Equipment List
- Study Group

Cisco Expert-level Training Program for CCIE RS

- Revised “Cisco 360 Learning Program for CCIE RS”
  - https://learningnetwork.cisco.com/docs/DOC-7998
- The only Cisco-authorised learning program
- Features Cisco IOS on Linux (IOL) and offers virtual rack rental
- Support Cisco IOS Software Release 15 M and T
- Updated content for v5.0 exam topics
- Workbook with 10 full-scale (TS & CFG) labs
- 11 performance assessment labs (full-scale CCIE labs)
- Offers grading report, detailed answer key, interactive mentor

New Ciscopress titles for CCIE RSv5

- CCIE RSv5.0 Configuration Practice Labs (2/21)
- CCIE RSv5.0 Troubleshooting Practice Labs (3/31)
- CCIE RSv5.0 Configuration and Troubleshooting Practice Labs Bundle (3/31)
- CCIE RSv5.0 Official Cert Guide, Volume 1 (5/9)
- CCIE RSv5.0 Official Cert Guide, Volume 2 (5/9)
- CCIE RSv5.0 Official Cert Guide Library (5/16)

- CCIE page on Ciscopress.com
  - http://www.ciscopress.com/markets/detail.asp?st=44718

Cisco.com Products and Technology Documentation

- Cisco documentation
  - http://www.cisco.com/go/documentation
  - http://www.cisco.com/cisco/web/psa/default.html

- IOS 15.3M&T Configuration Guides
  - http://www.cisco.com/en/US/products/ps12745/products_installation_and_configuration_guides_list.html

Cisco.com Whitepapers, Design Zone …

- White papers on (m)any technologies
  - http://tools.cisco.com/search/results/en/us/get#q=white+papers
- Cisco Validated Design
  - http://www.cisco.com/go/cvd
- Enterprise Design Zone
  - http://www.cisco.com/en/US/netsol/ns1063/networking_solutions_program_home.html

Cisco Forums and Wiki

- Cisco Support Community
  - https://supportforums.cisco.com
- CLN Study Group for CCIE RS
  - https://learningnetwork.cisco.com/groups/ccie-routing-and-switching-study-group
- Doc Wiki
  - http://docwiki.cisco.com

Cisco Tools

- Cisco Feature Navigator
  - www.cisco.com/go/fn
- Command Lookup Tool
  - https://tools.cisco.com/Support/CLILookup/cltSearchAction.do
- Error Message Decoder
  - https://www.cisco.com/cgi-bin/Support/Errordecoder/index.cgi
- Output Interpreter
  - https://www.cisco.com/pcgi-bin/Support/OutputInterpreter/home.pl
- Bug Search Tool
  - https://tools.cisco.com/bugsearch
- Cisco Notification Service, Software Advisor
  - http://www.cisco.com/cisco/support/notifications.html
  - http://tools.cisco.com/Support/Fusion/FusionHome.do

Agenda

- Overall CCIE Program
- New CCIE R&Sv5 Curriculum
- New CCIE R&Sv5 Exam Format
- Sample Questions
- Preparation Materials
- **Questions & Answers**

External Resources

- Standard documentation (IETF's RFC, ISO, …)
- WWW (Wikipedia, Blogs, …)
- Search engines (Google, Bing, …)
- Academic sources (Research papers, Thesis, …)
- Etc…

Got a question after the session?

- Join the CCIE R&S Study Group on CLN
  - Ask technical questions
  - Find study partner(s)

- Open a CertSupport case at http://www.cisco.com/go/certsupport

- Send me an email at brunov@cisco.com

Cisco Certifications SME* Recruitment Program

Apply Now!

http://www.cisco.com/go/certsme

- Directly influence Cisco Career Certifications (Design, Author, Review)
- Give back to community
- Experience with assessment techniques
- Join creativity with experience, knowledge and skills
- Use and sharpen technical expertise
- Collaborate and network with other engineers

SME= Subject Matter Expert

Q&A

- What questions do you have about the new CCIE R&S v5 exams?
  - Exam Curriculum ?
  - Exam Format ?
  - Exam Deliveries ?
  - Sample Questions ?
  - Preparation Materials ?
  - Exam Strategy ?
  - Anything else ?

“Questions are never indiscreet, answers sometimes are.”

Oscar Wilde




Q & A

Complete Your Online Session Evaluation

Give us your feedback and receive a Cisco Live 2014 Polo Shirt!

Complete your Overall Event Survey and 5 Session Evaluations.

- Directly from your mobile device on the Cisco Live Mobile App
- By visiting the Cisco Live Mobile Site www.ciscoliveaustralia.com/mobile
- Visit any Cisco Live Internet Station located throughout the venue

Polo Shirts can be collected in the World of Solutions on Friday 21 March 12:00pm - 2:00pm

Learn online with Cisco Live!

Visit us online after the conference for full access to session videos and presentations.
www.CiscoLiveAPAC.com


CISCO
TM