5 Days

CCIE R&S - Lab Version

The CCIE Routing and Switching Lab Version training certifies a network engineer with proven ability to plan, operate and Troubleshooting complex, converged network infrastructure.

The CCIE lab exam is an eight-hour, hands-on exam that validates the potential of the participant to configure and troubleshoot a series of complex networks to given a set of specifications.

Course Details

Course Outline

1.0 Layer 2 Technologies

1.1 LAN switching technologies

- Implementing and Troubleshooting switch administration
- Implementing and Troubleshooting layer 2 protocols
- Implementing and Troubleshooting VLAN
- Implementing and Troubleshooting trunking
- Implementing and Troubleshooting etherchannel
- Implementing and Troubleshooting spanning-tree
- Implementing and Troubleshooting other LAN switching technologies

1.2 Layer 2 Multicast

- Implementing and Troubleshooting IGMP

1.3 Layer 2 WAN circuit technologies

- Implementing and Troubleshooting HDLC
- Implementing and Troubleshooting PPP

1.4 Troubleshooting layer 2 technologies

- Use IOS troubleshooting tools

- Apply troubleshooting methodologies 1
- Interpret packet capture

2.0 Layer 3 Technologies

2.1 Addressing technologies

- Identify, Implementing and Troubleshooting IPv4 addressing and subnetting
- Identify, Implementing and Troubleshooting IPv6 addressing and subnetting

2.2 Layer 3 Multicast

- Troubleshooting reverse path forwarding
- Implementing and Troubleshooting IPv4 protocol independent multicast
- Implementing and Troubleshooting multicast source discovery protocol
- Fundamental routing concepts
- Implementing and Troubleshooting static routing
- Implementing and Troubleshooting default routing
- Compare routing protocol types
- Implementing, optimize and Troubleshooting administrative distance
- Implementing and Troubleshooting passive interface
- Implementing and Troubleshooting VRF lite
- Implementing, optimize and Troubleshooting filtering with any routing protocol
- Implementing, optimize and Troubleshooting redistribution between any routing protocol
- Implementing, optimize and Troubleshooting policy-based routing
- Identify and Troubleshooting sub-optimal routing
- Implementing and Troubleshooting bidirectional forwarding detection
- Implementing and Troubleshooting loop prevention mechanisms
- Implementing and Troubleshooting routing protocol authentication

2.4 RIP v2

- Implementing and Troubleshooting RIPv2

2.5 EIGRP (for IPv4 and IPv6)

- Describing packet types
- Implementing and Troubleshooting neighbor relationship
- Implementing and Troubleshooting Loop free path selection
- Implementing and Troubleshooting operations
- Implementing and Troubleshooting EIGRP stub
- Implementing and Troubleshooting load-balancing
- Implementing EIGRP (multi-address) named mode
- Implementing, Troubleshooting and optimize EIGRP convergence and scalability

2.6 OSPF (v2 and v3)

- Describing packet types
- Implementing and Troubleshooting neighbor relationship
- Implementing and Troubleshooting OSPFv3 address-family support
- Implementing and Troubleshooting network types, area types and router types
- Implementing and Troubleshooting path preference
- Implementing and Troubleshooting operations
- Implementing, Troubleshooting and optimize OSPF convergence and scalability

2.7 BGP

- Describing, Implementing and Troubleshooting peer relationships
- Implementing and Troubleshooting IBGP and EBGP
- Explain attributes and best-path selection
- Implementing, optimize and Troubleshooting routing policies
- Implementing and Troubleshooting scalability
- Implementing and Troubleshooting multi-protocol BGP
- Implementing and Troubleshooting AS path manipulations
- Implementing and Troubleshooting Other Features

2.8 Troubleshooting layer 3 technologies

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

3.0 VPN Technologies

3.1 Tunneling

- Implementing and Troubleshooting MPLS operations
- Implementing and Troubleshooting basic MPLS L3VPN
- Implementing and Troubleshooting encapsulation
- Implementing and Troubleshooting DMVPN (single hub)

3.2 Encryption

- Implementing and Troubleshooting IPsec with pre-shared key

3.3 Troubleshooting VPN technologies

- Use IOS Troubleshooting tools
- Apply Troubleshooting methodologies
- Interpret packet capture 3

4.0 Infrastructure Security

4.1 Device security

- Implementing and Troubleshooting IOS AAA using local database
- Implementing and Troubleshooting device access control
- Implementing and Troubleshooting control plane policing

4.2 Network security

- Implementing and Troubleshooting switch security features
- Implementing and Troubleshooting router security features
- Implementing and Troubleshooting IPv6 first hop security

4.3 Troubleshooting infrastructure security

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

5.0 Infrastructure Services

5.1 System management

- Implementing and Troubleshooting device management
- Implementing and Troubleshooting SNMP 5.1.b (i) v2c, v3
- Implementing and Troubleshooting logging

5.2 Quality of service

- Implementing and Troubleshooting end-to-end
- Implementing, optimize and Troubleshooting QoS using MQC

5.3 Network services

- Implementing and Troubleshooting first-hop redundancy protocols
- Implementing and Troubleshooting network time protocol
- Implementing and Troubleshooting IPv4 and IPv6 DHCP
- Implementing and Troubleshooting IPv4 network address translation

5.4 Network optimization

- Implementing and Troubleshooting IP SLA
- Implementing and Troubleshooting tracking object
- Implementing and Troubleshooting NetFlow
- Implementing and Troubleshooting embedded event manager

5.5 Troubleshooting infrastructure services

- Use IOS Troubleshooting tools
- Apply Troubleshooting methodologies

- Interpret packet capture

Pre Requisite

- There are no specific prerequisites for CCIE certification.
- Instead, candidates must first pass a written exam and then the corresponding hands-on lab exam.
- Candidates should possess three to five years of job experience before attempting certification.

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