Freedown - CertCCIE R&S V4.0 Real Lab and OEQ

The following topics are general guidelines for the content likely to be included on the lab exam. However, other related topics may also appear on any specific delivery of the exam. In order to better reflect the contents of the exam and for clarity purposes, the guidelines below may change at any time without notice.

Exam Sections and Sub-task Objectives

1.00 Implement Layer 2 Technologies ?
1.10 Implement Spanning Tree Protocol (STP)

(a) 802.1d
(b) 802.1w
(c) 801.1s
(d) Loop guard
(e) Root guard
(f) Bridge protocol data unit (BPDU) guard
(g) Storm control
(h) Unicast flooding
(i) Port roles, failure propagation, and loop guard operation
1.20 Implement VLAN and VLAN Trunking Protocol (VTP)
1.30 Implement trunk and trunk protocols, EtherChannel, and load-balance
1.40 Implement Ethernet technologies
(a) Speed and duplex
(b) Ethernet, Fast Ethernet, and Gigabit Ethernet
(c) PPP over Ethernet (PPPoE)
1.50 Implement Switched Port Analyzer (SPAN), Remote Switched Port Analyzer (RSPAN), and flow control
1.60 Implement Frame Relay
(a) Local Management Interface (LMI)
(b) Traffic shaping
(c) Full mesh
(d) Hub and spoke
(e) Discard eligible (DE)
1.70 Implement High-Level Data Link Control (HDLC) and PPP
2.00 Implement IPv4
2.10 Implement IP version 4 (IPv4) addressing, subnetting, and variable-length subnet masking (VLSM)
2.20 Implement IPv4 tunneling and Generic Routing Encapsulation (GRE)
2.30 Implement IPv4 RIP version 2 (RIPv2)
2.40 Implement IPv4 Open Shortest Path First (OSPF)
(a) Standard OSPF areas
(b) Stub area
(c) Totally stubby area
(d) Not-so-stubby-area (NSSA)
(e) Totally NSSA
(f) Link-state advertisement (LSA) types
(g) Adjacency on a point-to-point and on a multi-access network
(h) OSPF graceful restart

2.50 Implement IPv4 Enhanced Interior Gateway Routing Protocol (EIGRP)
(a) Best path
(b) Loop-free paths
(c) EIGRP operations when alternate loop-free paths are available, and when they are not available
(d) EIGRP queries
(e) Manual summarization and autosummarization
(f) EIGRP stubs
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2.60 Implement IPv4 Border Gateway Protocol (BGP)
(a) Next hop
(b) Peering
(c) Internal Border Gateway Protocol (IBGP) and External Border Gateway Protocol (EBGP)

2.70 Implement policy routing
2.80 Implement Performance Routing (PfR) and Cisco Optimized Edge Routing (OER)
2.90 Implement filtering, route redistribution, summarization, synchronization, attributes, and other advanced features
3.00 Implement IPv6
3.10 Implement IP version 6 (IPv6) addressing and different addressing types
3.20 Implement IPv6 neighbor discovery
3.30 Implement basic IPv6 functionality protocols
3.40 Implement tunneling techniques
3.50 Implement OSPF version 3 (OSPFv3)
3.60 Implement EIGRP version 6 (EIGRPv6)
3.70 Implement filtering and route redistribution
4.00 Implement MPLS Layer 3 VPNs
4.10 Implement Multiprotocol Label Switching (MPLS)
4.20 Implement Layer 3 virtual private networks (VPNs) on provider edge (PE), provider (P), and customer edge (CE) routers
4.30 Implement virtual routing and forwarding (VRF) and Multi-VRF Customer Edge (VRF-Lite)

5.00 Implement IP Multicast
5.10 Implement Protocol Independent Multicast (PIM) sparse mode
5.20 Implement Multicast Source Discovery Protocol (MSDP)
5.30 Implement interdomain multicast routing
5.40 Implement PIM Auto-Rendezvous Point (Auto-RP), unicast rendezvous point (RP), and bootstrap router (BSR)
5.50 Implement multicast tools, features, and source-specific multicast
5.60 Implement IPv6 multicast, PIM, and related multicast protocols, such as Multicast Listener Discovery (MLD)

6.00 Implement Network Security
6.01 Implement access lists
6.02 Implement Zone Based Firewall
6.03 Implement Unicast Reverse Path Forwarding (uRPF)
6.04 Implement IP Source Guard
6.05
Implement authentication, authorization, and accounting (AAA) (configuring the AAA server is not

required, only the client-side (IOS) is configured)
6.06 Implement Control Plane Policing (CoPP)
6.07 Implement Cisco IOS Firewall
6.08 Implement Cisco IOS Intrusion Prevention System (IPS)
6.09 Implement Secure Shell (SSH)
6.10 Implement 802.1x
6.11 Implement NAT
6.12 Implement routing protocol authentication
6.13 Implement device access control
6.14 Implement security features

7.00 Implement Network Services
7.10 Implement Hot Standby Router Protocol (HSRP)
7.20 Implement Gateway Load Balancing Protocol (GLBP)
7.30 Implement Virtual Router Redundancy Protocol (VRRP)
7.40 Implement Network Time Protocol (NTP)
7.50 Implement DHCP
7.60 Implement Web Cache Communication Protocol (WCCP)

8.00 Implement Quality of Service (QoS)
8.10 Implement Modular QoS CLI (MQC)
(a) Network-Based Application Recognition (NBAR)
(b) Class-based weighted fair queuing (CBWFQ), modified deficit round robin (MDRR), and low latency queuing (LLQ)
(c) Classification
(d) Policing
(e) Shaping
(f) Marking
(g) Weighted random early detection (WRED) and random early detection (RED)
(h) Compression
8.20 Implement Layer 2 QoS: weighted round robin (WRR), shaped round robin (SRR), and policies
8.30 Implement link fragmentation and interleaving (LFI) for Frame Relay
8.40 Implement generic traffic shaping
8.50 Implement Resource Reservation Protocol (RSVP)
8.60 Implement Cisco AutoQoS
9.00 Troubleshoot a Network
9.10 Troubleshoot complex Layer 2 network issues
9.20 Troubleshoot complex Layer 3 network issues
9.30 Troubleshoot a network in response to application problems
9.40 Troubleshoot network services
9.50 Troubleshoot network security

10.00 Optimize the Network
10.01 Implement syslog and local logging
10.02 Implement IP Service Level Agreement SLA
10.03 Implement NetFlow
10.04 Implement SPAN, RSPAN, and router IP traffic export (RITE)
10.05 Implement Simple Network Management Protocol (SNMP)
10.06 Implement Cisco IOS Embedded Event Manager (EEM)
10.07 Implement Remote Monitoring (RMON)

10.08 Implement FTP
10.09 Implement TFTP
10.10 Implement TFTP server on router
10.11 Implement Switch-module Configuration Protocol (SCP)
10.12 Implement HTTP and HTTPS
10.13 Implement Telnet

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