Course Agenda

CCIE Enterprise Wireless Certification Training

Qualifying Exam - Implementing Cisco Enterprise Network Core Technologies v1.0 (350-401)

Architecture - 15%

1.1 Explain the different design principles used in an enterprise network

1.1.a Enterprise network design such as Tier 2, Tier 3, and Fabric Capacity planning

1.1.b High availability techniques such as redundancy, FHRP, and SSO

1.2 Analyze design principles of a WLAN deployment

1.2.a Wireless deployment models (centralized, distributed, controller-less, controller based, cloud, remote branch)

1.2.b Location services in a WLAN design

1.3 Differentiate between on-premises and cloud infrastructure deployments

1.4 Explain the working principles of the Cisco SD-WAN solution

1.4.a SD-WAN control and data planes elements

1.4.b Traditional WAN and SD-WAN solutions

1.5 Explain the working principles of the Cisco SD-Access solution

1.5.a SD-Access control and data planes elements

1.5.b Traditional campus interoperating with SD-Access

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1.6 Describe concepts of wired and wireless QoS

1.6.a QoS components

1.6.b QoS policy

1.7 Differentiate hardware and software switching mechanisms

1.7.a Process and CEF

1.7.b MAC address table and TCAM

1.7.c FIB vs. RIB

Virtualization – 10%

2.1 Describe device virtualization technologies

2.1.a Hypervisor type 1 and 2

2.1.b Virtual machine

2.1.c Virtual switching

2.2 Configure and verify data path virtualization technologies

2.2.a VRF

2.2.b GRE and IPsec tunneling

2.3 Describe network virtualization concepts

2.3.a LISP

2.3.b VXLAN

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Infrastructure – 30%

3.1 Layer 2

3.1.a Troubleshoot static and dynamic 802.1q trunking protocols

3.1.b Troubleshoot static and dynamic EtherChannels

3.1.c Configure and verify common Spanning Tree Protocols (RSTP and MST)

3.2 Layer 3

3.2.a Compare routing concepts of EIGRP and OSPF (advanced distance vector vs. link state, load balancing, path selection, path operations, metrics)

3.2.b Configure and verify simple OSPF environments, including multiple normal areas, summarization, and filtering (neighbor adjacency, point-to-point and broadcast network types, and passive interface)

3.2.c Configure and verify eBGP between directly connected neighbors (best path selection algorithm and neighbor relationships)

3.3 Wireless

3.3.a Describe Layer 1 concepts, such as RF power, RSSI, SNR, interference noise, band and channels, and wireless client devices capabilities

3.3.b Describe AP modes and antenna types

3.3.c Describe access point discovery and join process (discovery algorithms, WLC selection process)

3.3.d Describe the main principles and use cases for Layer 2 and Layer 3 roaming

3.3.e Troubleshoot WLAN configuration and wireless client connectivity issues

3.4 IP Services

3.4.a Describe Network Time Protocol (NTP)

3.4.b Configure and verify NAT/PAT

3.4.c Configure first hop redundancy protocols, such as HSRP and VRRP

3.4.d Describe multicast protocols, such as PIM and IGMP v2/v3

Network Assurance – 10%

4.1 Diagnose network problems using tools such as debugs, conditional debugs, trace route, ping, SNMP, and syslog

4.2 Configure and verify device monitoring using syslog for remote logging Cisco Systems, Inc. This document is Cisco Page

4.3 Configure and verify NetFlow and Flexible NetFlow

4.4 Configure and verify SPAN/RSPAN/ERSPAN

4.5 Configure and verify IPSLA

4.6 Describe Cisco DNA Center workflows to apply network configuration, monitoring, and management

4.7 Configure and verify NETCONF and RESTCONF

Security – 20%

5.1 Configure and verify device access control

5.1.a Lines and password protection

5.1.b Authentication and authorization using AAA

5.2 Configure and verify infrastructure security features

5.2.a ACLs

5.2.b CoPP

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5.3 Describe REST API security

5.4 Configure and verify wireless security features

5.4.a EAP

5.4.b WebAuth

5.4.c PSK

5.5 Describe the components of network security design

5.5.a Threat defense

5.5.b Endpoint security

5.5.c Next-generation firewall

5.5.d TrustSec, MACsec

5.5.e Network access control with 802.1X, MAB, and WebAuth

Automation – 15%

6.1 Interpret basic Python components and scripts

6.2 Construct valid JSON encoded file

6.3 Describe the high-level principles and benefits of a data modeling language, such as YANG

6.4 Describe APIs for Cisco DNA Center and vManage

6.5 Interpret REST API response codes and results in payload using Cisco DNA Center and RESTCONF

6.6 Construct EEM applet to automate configuration, troubleshooting, or data collection

6.7 Compare agent vs. agentless orchestration tools, such as Chef, Puppet, Ansible, and SaltStack

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1. Radio Frequency and Standards (15%)

1.1 IEEE 802.11 standards and protocols

1.2 RF Design / Site survey

1.2.a Define the tasks/goals for a preliminary site survey

1.2.b Conduct the site survey

1.2.c Determine AP quantity, placement and antenna type

1.3 Indoor and outdoor RF deployments

1.3.a Coverage

1.3.b Throughput

1.3.c Voice

1.3.d Location

1.3.e High Density / Very High Density

1.4 RF operational models

1.4.a Radio resource management (Auto-RF, manual, hybrid, Flexible Radio Assignment, TPC and DCA, CHD)

1.4.b Channel use (Co-channel, radar, non-WiFi interference, Dynamic Bandwidth Selection)

1.4.c Power level, overlap

1.4.d RF profiles

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1.4.e Data rates

1.4.f RX-SOP

1.4.g CleanAir and EDRRM

1.4.h Air Time Fairness (ATF)

2. Enterprise Wired Campus (10%)

2.1 Layer 2 technologies to support wireless deployments

2.1.a VLANs

2.1.b STP

2.1.c Etherchannel

2.1.d CDP, LLDP

2.2 Data/Control plane technologies to support a SD-Access wireless deployment

2.2.a VXLAN and LISP

2.2.b VRFs

2.3 AP powering options

2.4 IPv4 and IPv6 connectivity

2.4.a Subnetting

2.4.b Static and inter-VLAN routing

2.5 Multicast on the switching infrastructure

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2.5.a PIM

2.5.b Basic IGMP (including IGMP snooping)

2.5.c MLD

2.6 QoS on the switching infrastructure

2.6.a MQC

2.6.b MLS QoS

2.7 Services to support a wireless deployment

2.7.a DNS

2.7.b DHCPv4 / DHCPv6

2.7.c NTP, SNTP

2.7.d SYSLOG

2.7.e SNMP

3. Enterprise Wireless Network (25%)

3.1 WLC interfaces and ports

3.2 Lightweight APs

3.2.a AP modes

3.2.b AP Logging

3.2.c AP CLI troubleshooting

3.2.d AP level configuration settings

3.2.e WLC discovery and AP join process

3.2.f AP join profile

3.3 High availability, redundancy, and resilience

3.3.a SSO

3.3.b N+1, N+N

3.3.c Patching and rolling upgrades for IOS-XE

3.3.d ISSU

3.4 Wireless segmentation with profiles and groups

3.4.a RF profiles

3.4.b AP groups

3.4.c Flex groups

3.4.d Site tag

3.4.e RF tag

3.4.f Policy tag

3.5 FlexConnect and Office Extend

3.6 All controller deployment models

3.7 Mesh

3.8 WGB on IOS and on COS APs

3.9 Controller Mobility

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3.9.a L2/L3 roaming

3.9.b Multicast optimization

3.9.c Mobility group scaling

3.9.d Inter-OS controller mobility

3.9.e Mobility anchoring

3.9.f Mobility encryption

4. Wireless Security and Identity Management (20%)

4.1 Secure management access and control plane

4.1.a Device administration with TACACS+/RADIUS

4.1.b CPU ACLs

4.1.c Management via wireless and dynamic interface

4.1.d Password policies

4.1.e AP authorization

4.2 Identity management

4.2.a Basic PKI for dot1X and WebAuth

4.2.b Internal and external identity sources

4.2.c Identity PSK

4.3 Wireless security and Network access policies

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4.3.a Client authentication and authorization

4.3.b Client profiling and provisioning

4.3.c RADIUS attributes

4.3.d CoA

4.3.e ACLs

4.3.f L2/L3 security

4.3.g Certificates

4.3.h Local policies

4.4 Guest management

4.4.a Local web authentication

4.4.b Central web authentication

4.4.c Basic sponsor policy

4.5 Access Point switchport authentication

4.5.a MAB

4.5.b 802.1X

4.5.c NEAT

4.5.d Switchport macros

4.6 TrustSec for SD-Access Wireless

4.6.a SGTs

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4.6.b SGACLs

4.7 Intrusion detection and prevention features

4.7.a Rogue policies

4.7.b MFP

4.7.c Standards and custom signatures

4.7.d Client exclusion policies

4.7.e Switchport tracing

5. Wireless business applications and services (20%)

5.1 QoS policies

5.1.a QoS profiles

5.1.b EDCA

5.1.c WMM

5.1.d Bi-Directional Rate Limitting

5.1.e Admission control

5.1.f QoS maps

5.1.g FastLane

5.2 AVC and netflow

5.3 Client roaming optimization

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5.3.a Band Select

5.3.b Load Balancing

5.3.c 802.11r and Adaptive Fast Transition

5.3.d 802.11k/v

5.4 Wireless Multicast

5.4.a Multicast modes in the controllers

5.4.b Multicast snooping

5.4.c Multicast direct

5.4.d Mulitcast VLAN

5.5 mDNS

5.5.a mDNS proxy

5.5.b Service discovery

5.5.c Service filtering

6. Automation, Analytics, and Assurance (10%)

6.1 Prime Infrastructure

6.1.a Basic operations

6.1.a i Create and deploy templates

6.1.a ii Operate maps

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6.1.a iii Import infrastructure devices

6.1.a iv Audits

6.1.a v Client troubleshooting

6.1.a vi Notification receivers

6.1.a vii Reports

6.1.a viii Monitoring policies

6.1.a ix Prime Infrastructure jobs

6.1.b WLAN Security management

6.1.b i Configure rogue management

6.1.b ii Manage alarms and events

6.2 Cisco CMX/DNA Spaces

6.2.a Management access

6.2.b Network services

6.2.b i Analytics & Metrics

6.2.b ii Location

6.2.b iii Profiles

6.2.b iv Engage

6.2.c Operational Insights

6.2.d API calls using python scripts

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6.3 Cisco DNA Center

6.3.a Wireless Automation

6.3.a i Day 0 - Provisioning

6.3.a ii SWIM

6.3.a iii Application policies

6.3.a iv Security policies

6.3.a v Operate Maps

6.3.b Assurance

6.3.b i Network health and WLC/AP 360

6.3.b ii Client health and client 360

6.3.b iii Application experience

6.3.b iv Sensors

6.3.b v iPCAP and on demand captures

6.3.b vi Network telemetry

6.3.c SD Access

6.3.c i Fabric enabled wireless

6.3.c ii SDA policy and segmentation

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