CCNP course contents

The Cisco Certified Network Professional (CCNP) certification is a prestigious, advanced-level credential from Cisco, tailored for networking professionals seeking to deepen their expertise in specialized networking fields. It builds on foundational networking knowledge, covering complex technologies and allowing candidates to specialize in areas such as enterprise networking, security, data center, service provider, collaboration, or DevNet. The CCNP certification requires passing a core exam that tests knowledge of fundamental technologies for the chosen track, along with a concentration exam that delves into specific, job-focused skills. This approach makes the CCNP both comprehensive and adaptable, equipping professionals with the in-depth knowledge and hands-on skills needed to design, implement, and manage complex network solutions across various industry scenarios.

Module 1: Architecture

- Enterprise Network
    a. Tier 2 and Tier 3 planning
    b. Fabric Capacity planning
    c. High availability techniques (FHRP, SSO, Redundancy)
- WLAN deployment
    a) Wireless deployment models
    b) Location services in a WLAN design
    c) Difference between on-premises & cloud infrastructure deployments

- Cisco SD-WAN solutions
    a) SD-WAN control plane elements
    b) SD-WAN data plane elements
    c) Traditional WAN
    d) SD-WAN solutions

- Cisco SD-Access solution
    a. SD-Access control plane element
    b. SD-Access data plane elements
    c. Interoperating SD-Access

- ➢ Wireless QoS
  - a. QoS components
  - b. QoS policy
- ➢ Switching mechanisms
  - a. Process and CEF
  - b. MAC address table and TCAM
  - c. FIB vs RIB

Module 2: Virtualization

- ➢ Virtualization technologies
  - a) Hypervisor types 1 and 2
  - b) Virtual machine
  - c) Virtual Switching
- ➢ Path Virtualization technologies
  - a) VRF
  - b) GRE Tunneling
  - c) IPsec Tunneling
- ➢ Virtualization concepts
  - a) LISP
  - b) VXLAN

Module 3: Infrastructure

Layer 2

- ➢ Static and dynamic trucking protocols
- ➢ Static and dynamic EtherChannel's
- ➢ Spanning Tree Protocols (RSTP and MST)

Layer 3

- ➢ Compare EIGRP and OSPF
- ➢ Configure and verify multiple areas
- ➢ Summarization
- ➢ Filtering
- ➢ Best path selection algorithm
- ➢ Neighbor relationship

Wireless

- RF power, RSSI, SNR
- AP modes
- Antenna types
- Interference noise
- Band channels
- Wireless client devices capabilities
- Troubleshoot WLAN configuration

IP Services

- Network Time Protocol (NTP)
- NAT/PAT
- First-hop redundancy protocols (HDRP & VRRP)
- Multicast protocols (PIM & IGMP v2/v3)
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Module 4: Network Assurance

Network Assurance

- Debugs, conditional debugs
- Trace route
- Ping, SNMP, Syslog
- Configure and verify:
  a) SPAN/RSPAN/ERSPA
  b) IPSLA
  c) NETCONF & RESTCONF

Module 5: Security

Configure and verify device access control

- Lines and password protection
- Authentication and authorization using AAA

Configure and verify infrastructure security features

- ACLs
- CoPP

Describe REST API Security

Configure and verify wireless security

- ➢ EAP
- ➢ WebAuth
- ➢ PSK
- ➢ Components of network security
- ➢ Threat defense
- ➢ Endpoint security
- ➢ Next-generation firewall
- ➢ TrustSec
- ➢ MACsec
- ➢ Network access control

Module 6: Automation

Automation

- ➢ Python components &. scripts
- ➢ Construct JSON-encoded file
- ➢ Data modelling language benefits (YANG)
- ➢ APIs
- ➢ Interpret REST API response code
- ➢ Construct EEM applet
- ➢ Compare agent vs Agentless orchestration tools (Chef, Ansible, Puppet)

Module 1: Open Shortest Path First (OSPF)

Basic OSPF Configuration

- ➢ OSPF Overview
- ➢ OSPF – Network Statement
- ➢ OSPF – Interface Mode
- ➢ OSPF – Passive Interface
- ➢ OSPF – Calculating Metric

- ➢ OSPF – DR and BDR
- ➢ OSPF – Help packet parameters
- ➢ OSPF – States
- ➢ OSPF – Cost

OSPF LSAs

- ➢ OSPF LSA Type 1 – Router LSA
- ➢ OSPF LSA Type 2 – Network LSA
- ➢ OSPF LSA Type 3 – Summary LSA
- ➢ OSPF LSA Type 5 – External LSA
- ➢ OSPF LSA Type 4 – ASBR Summary LSA

OSPF Multi-Area and Multi-Domain Functionalities

- ➢ Configuring a Multi-Area-Multi-Domain Network
- ➢ Configuring LSA Type 3 Filtering
- ➢ Configuring ABR Summarization
- ➢ Configuring ASBR Summarization
- ➢ Configuring Clear Text Authentication
- ➢ Configuring MD5-based Authentication

OSPF Area Types

- ➢ Configuring a Stub Area
- ➢ Configuring a Stubby Area
- ➢ Configuring a Not-So-Stubby-Area (NSSA)
- ➢ Configuring an NSSA-Stub Area
- ➢ Configuring an NSSA-Totally Stubby Area

Redistribution in OSPF

- ➢ Configuring the Multi-Domain Topology for Redistribution
- ➢ Redistributing EIGRP & OSPF
- ➢ Redistributing Static Routes
- ➢ Redistributing Connected
- ➢ Redistributing with Route-Filtering

OSPF Advanced

- ➢ Virtual Link

➢ Configuring BFD with OSPF

Module 2: Border Gateway Protocol (BGP)
Basic eBGP Configuration

➢ BGP Overview

➢ Configuring Basic eBGP

➢ Injecting Routes into BGP using Network Statements

➢ Injecting Routes into BGP using Redistribution – Connected

➢ Configuring IGP Redistribution into BGP

➢ BGP Authentication using MD5

➢ BGP Ebgp multi-hop

iBGP Configuration

➢ Configuring Routing Protocol for iBGP

➢ Configuring iBGP using Loopbacks

➢ Configuring iBGP with Next-Hop-Self

➢ Configuring Route-reflectors – Basic

➢ Configuring Peer-Groups

Filtering and Summarization

➢ Access-lists and Prefix-lists

➢ Configuring Route Filtering in BGP – ACL

➢ Configuring Route Filtering in BGP – Prefix-List

➢ Configuring Route Filtering in BGP – AS Path Filter

➢ Configuring Route Aggregation with Filtering

➢ Configuring Route Aggregation with Summary – Only

➢ Configuring Route Aggregation with Suppress- Maps

➢ Configuring Route Aggregation with Unsuppressed Maps

BGP Attributes

➢ BGP Attributes – Overview

➢ BGP Attributes – Local Preference

➢ BGP Attributes – MED

➢ BGP Attributes – Weight

➢ BGP Attributes – AS-Path

- ➢ BGP Attributes-Standard Community – No-Advertise
- ➢ BGP Attributes-Standard Community – No-Export

Module 3: Multi-Protocol Label Switching (MPLS)
MPLS

- ➢ MPLS introduction
- ➢ MPLS Labels
- ➢ MPLS LDP
- ➢ VRF
- ➢ MPLS Layer 3 VPN
- ➢ MPLS Route Distinguisher and Route Targets
- ➢ MPLS with OSPF configuration