(v3.0) Exam Topics -
Practical Exam

CCIE
Data Center

2023

CCIE DATA CENTER (V3.0) EXAM TOPICS

PRACTICAL EXAM

EXAM DESCRIPTION:

CCIE Data Center (v3.0) Practical Exam is an eight-hour, hands-on exam that requires a candidate to plan, design, deploy, operate, and optimize complex Data Center networks.

Candidates are expected to program and automate the networkwithin their exam, as per exam topics below.

The following topics are general guidelines for the content likely to be included on the exam. Your knowledge, skills and abilities on these topics will be tested throughout the entire network lifecycle,Operate unless **explicitly specified otherwise within this document**

The exam is closed book and no outside reference materials are allowed.

1. DATA CENTER L2/L3 CONNECTIVITY (20%)

- 1.1 Layer 2 technologies
  - 1.1.a Link Aggregation
    - 1.1.a i vPC
    - 1.1.a ii PortChannel
  - 1.1.b Tagging/Trunking
  - 1.1.c Static Path binding
  - 1.1.d Spanning Tree Protocol
    - 1.1.d i PVST
    - 1.1.d ii MST

NETWORK

1.2 a OSPF (v2 and v3)
- 1.2.a i Authentication
- 1.2.a ii Adjacencies
- 1.2.a iii Network types and Area Types
- 1.2.a iv LSA Types
- 1.2.a v Route Aggregation/Summarization
- 1.2.a vi Route Redistribution

1.2.b ISIS
- 1.2.b i Adjacencies
  - 1.2.b.i.1. Single area, single topology
- 1.2.b ii Network types, Levels and Router types
  - 1.2.b.li.1. NSAP addressing
  - 1.2.b.l.2. Point-to-point, broadcast
- 1.2.c 1.2.c i Path Selection
  - 1.2.c ii External and Internal Peering
  - 1.2.c iii Route reflectors and Route Server
  - 1.2.c iv Peer Templates
  - 1.2.cv Multi-Hop EBGP
  - 1.2.c vi Route Aggregation/Summarization
  - 1.2.c vii Route Redistribution
- 1.2.d BFD
- 1.2.e FHRP

1.3 Multicast protocols
- 1.3.a PIM
  - 1.3.a Sparse Mode
  - 1.3.a i BiDir
  - 1.3.a ili Static RP, BSR, AutoRP, PhantomRP
  - 1.3.a iv IPv4 PIM Anycast
  - 1.3.a v IPv4 Anycast RP using MSDP

1.3.b IGMP
- 1.3.b i IGMPv2, IGMPv3
- 1.3.b ii IGMP Snooping
- 1.3.b iii IGMP Querier

2. DATA CENTER FABRIC INFRASTRUCTURE (15%)

2.1 Physical fabric components
- 2.1.a Fabric Discovery
- 2.1.b Controllers/Network Managers
- 2.1.c Switches

2.2 Fabric policies
- 2.2.a Access Policies
- 2.2.b Multi Tenancy
- 2.2.c Monitoring Policies

2.3 Tenant Policies
- 2.3.a Application profiles and EPGs
- 2.3.b Networking
- 2.3.c Security

2.4 Fabric Monitoring
- 2.4.a Faults
- 2.4.b Events
- 2.4.c Health indicators
- 2.4.d Audit Logs

2.5 Virtual Networking
- 2.5.a vSphere VDS

3. DATA CENTER FABRIC CONNECTIVITY (15%)

3.1 VRF lite

3.2 L3Out

3.2.a OSPF

- 3.2.a i Authentication
- 3.2.a ii Adjacencies
- 3.2.a iii Network types and Area Types
- 3.2.a iv Route Redistribution

3.2.b BGP

- 3.2.b I AS manipulation
- 3.2.b ii External and Internal Peering
- 3.2.b iii Route reflectors
- 3.2.b iv Route Redistribution

3.3 3.2.c Transit Routing

Inter Fabric connectivity

- 3.3.a Multi-Pod
- 3.3.b Multi-Site
- 3.3.c Virtual POD
- 3.3.d remote Leaf

3.4 Overlays

- 3.4.a VXLAN EVPN

4. DATA CENTER COMPUTE (15%)

4.1 Compute Resources
- 4.1.a UCSM Policies, Profiles and Templates
- 4.1.b Hyperflex

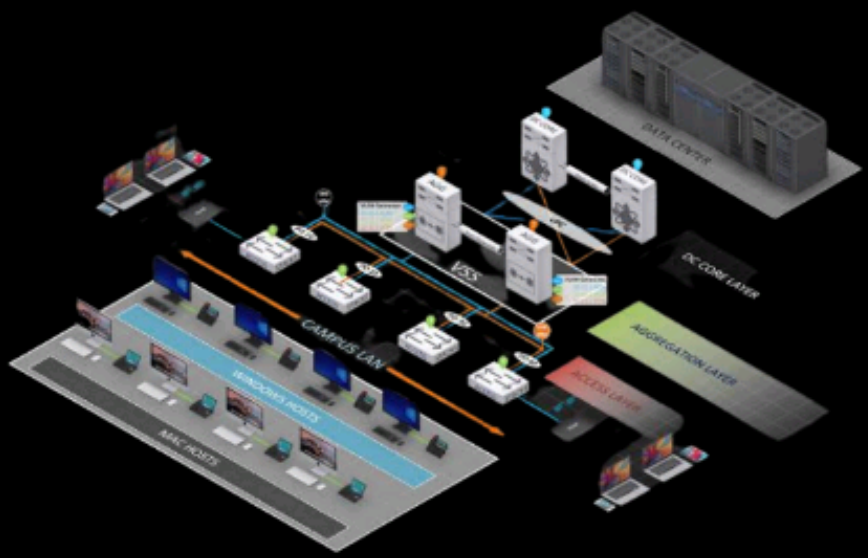
4.2 Compute Connectivity
- 4.2.a SAN/LAN uplinks
- 4.2.b Rack server integration
- 4.2.c Port Modes

5. DATA CENTER STORAGE PROTOCOLS AND FEATURES (10%)

5.1 FC and FCoE
- 5.1.a Zoning
- 5.1.b NPV/NPIV
- 5.1.c Trunking
- 5.1.d Portchannel
- 5.1.e Load Balancing

5.2 iSCSI
- 5.2.a Authentication
- 5.2.b Multipathing

5.3 ROCE v2 over IP Networks



6. DATA CENTER SECURITY AND NETWORK SERVICES (10%)

- 6.1 Security features
  - 6.1.a ACL's
  - 6.1.b First Hop Security
  - 6.1.c Port security
  - 6.1.d Private VLANs
  - 6.1.e Contracts
- 6.2 RBAC
  - 6.2.a Radius
  - 6.2.b TACACS+
  - 6.2.c LDAP
  - 6.2.d AAA
- 6.3 Network Services Insertion and Redirection
  - 6.3.a Policy Based Routing
  - 6.3.b Policy Based Redirection
  - 6.3.c Inter VRF communication
  - 6.3.d Route Targets
  - 6.3.e Prefix Lists
- 6.4 Services
  - 6.4.a Flow/Telemetry Export
  - 6.4.b SPAN
  - 6.4.c SNMP
  - 6.4.d Syslog
  - 6.4.e DHCP
  - 6.4.f NTP/PTP
- 6.5 Traffic management
  - 6.5.a Queueing
  - 6.5.b Policing
  - 6.5.c Classification/Marking
  - 6.5.d Scheduling
  - 6.5.e COPP

7. DATA CENTER AUTOMATION AND ORCHESTRATION (15%)

- 7.1 Data center tasks using scripts (Python and Ansible)
  - 7.1.a Create, Read, Update, Delete using RESTful APIs
  - 7.1.b Deploy and modify configurations
  - 7.1.c Statistics, Data Collection
- 7.2 Data Center Automation and Orchestration using tools
  - 7.2.a DCNM
  - 7.2.b UCSD
    - 7.2.b i Tasks
    - 7.2.b ii Workflows
    - 7.2.b iii Catalog
  - 7.2.c Intersight
  - 7.2.d CloudCenter Suite
    - 7.2.d i Applications
    - 7.2.d ii Deployments
    - 7.2.d iii Action Orchest

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