# CCIE Data Center Lab Exam version 1.0

**Exam Description:** The Cisco CCIE® Data Center Lab Exam version 1.0 is an 8-hour hands-on test that will validate that a data center engineer has expert knowledge about planning, designing, implementing, operating, and troubleshooting Cisco data center technologies.

The following topics are general guidelines for the content likely to be included on the 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.

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<th><strong>Cisco Data Center Infrastructure—Cisco NX-OS</strong></th>
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<td><strong>Implement Cisco NX-OS L2 functionality</strong></td>
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<td>1.1.a Implement VLANs and PVLANs</td>
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<td>1.1.b Implement Spanning Tree Protocols</td>
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<td>1.1.d Implement UDLD</td>
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<td>1.1.e Implement fabric extension via the Cisco Nexus family</td>
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<td><strong>Implement Cisco NX-OS L3 functionality</strong></td>
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<td>1.2.a Implement basic EIGRP in a data center environment</td>
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<td>1.2.c Implement BFD for dynamic routing protocols</td>
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<td>1.2.e Implement Cisco FabricPath</td>
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<td><strong>Implement basic Cisco NX-OS security features</strong></td>
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<td>1.3.a Implement AAA services</td>
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<td>1.3.b Implement SNMPv3</td>
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<td>1.3.d Configure IP ACLs, MAC ACLs, and VLAN ACLs</td>
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<td>1.3.i Configure Cisco TrustSec</td>
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<td><strong>Implement Cisco NX-OS high-availability features</strong></td>
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<td>1.4.a Implement first-hop routing protocols</td>
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<td>1.4.e Implement vPC and vPC+</td>
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<td>1.4.f Implement Overlay Transport Protocol (OTV)</td>
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1.5 Implement Cisco NX-OS management
1.5.a Implement SPAN and ERSPAN
1.5.b Implement NetFlow
1.5.c Implement Smart Call Home
1.5.d Manage system files
1.5.e Implement NTP and PTP
1.5.f Configure and verify Cisco DCNM functionality

1.6 Cisco NX-OS troubleshooting
1.6.a Utilize SPAN, ERSPAN, and Ethanalyzer to troubleshoot a Cisco Nexus problem
1.6.b Utilize NetFlow to troubleshoot a Cisco Nexus problem
1.6.c Given an OTV problem, identify the problem and potential fix
1.6.d Given a VDC problem, identify the problem and potential fix
1.6.e Given a vPC problem, identify the problem and potential fix
1.6.f Given a Layer 2 problem, identify the problem and potential fix
1.6.g Given a Layer 3 problem, identify the problem and potential fix
1.6.h Given a multicast problem, identify the problem and potential fix
1.6.i Given a Cisco FabricPath problem, identify the problem and potential fix
1.6.j Given a Cisco Unified Fabric problem, identify the problem and potential fix

20% 2.0 Cisco Storage Networking
2.1 Implement Fibre Channel protocols features
2.1.a Implement port channel, Cisco ISL, and trunking
2.1.b Implement VSANs
2.1.c Implement basic and enhanced zoning
2.1.d Implement FC domain parameters
2.1.e Implement Fibre Channel security features
2.1.f Implement proper oversubscription in a FC environment

2.2 Implement IP storage-based solution
2.2.a Implement IP features, including high availability
2.2.b Implement iSCSI, including advanced features
2.2.c Implement SAN extension tuner
2.2.d Implement FCIP and security features
2.2.e Implement iSCSI security features
2.2.f Validate proper configuration of IP storage-based solutions

2.3 Implement Cisco NX-OS Unified Fabric features
2.3.a Implement basic FC in a Cisco NX-OS environment
2.3.b Implement FCoE
2.3.c Implement NPV and NPIV features
2.3.d Implement Cisco Unified Fabric Switch different modes of operation
2.3.e Implement QoS features
2.3.f Implement FCoE NPV features
2.3.g Implement multihop FCoE
2.3.h Validate configurations and troubleshoot problems and failures using command line, show, and debug commands
10%  3.0  Cisco Data Center Virtualization

3.1  Manage data center virtualization with Cisco Nexus 1000V
3.1.a  Implement QoS, traffic flow, and IGMP snooping
3.1.b  Implement network monitoring on Cisco Nexus 1000V
3.1.c  Implement Cisco Nexus 1000V port channels
3.1.d  Troubleshoot Cisco Nexus 1000V in a virtual environment
3.1.e  Configure VLANs
3.1.f  Configure port profiles

3.2  Implement Cisco Nexus 1000V security features
3.2.a  DHCP snooping
3.2.b  Dynamic ARP inspection
3.2.c  IP source guard
3.2.d  Port security
3.2.e  ACLs
3.2.f  Private VLANs
3.2.g  Configure private VLANs

30%  4.0  Cisco Unified Computing System

4.1  Implement LAN connectivity in a Cisco UCS environment
4.1.a  Configure different port types
4.1.b  Implement Ethernet end-host mode
4.1.c  Implement VLANs and port channels
4.1.d  Implement pinning and PIN groups
4.1.e  Implement disjoint Layer 2

4.2  Implement SAN connectivity in a Cisco UCS environment
4.2.a  Implement FC ports for SAN connectivity
4.2.b  Implement VSANs
4.2.c  Implement FC port channels
4.2.d  Implement FC trunking and SAN pinning

4.3  Implement Cisco UCS server resources
4.3.a  Create and implement service profiles
4.3.b  Create and implement policies
4.3.c  Create and implement server resource pools
4.3.d  Implement updating and initial templates
4.3.e  Implement boot from remote storage
4.3.f  Implement fabric failover

4.4  Implement Cisco UCS management tasks
4.4.a  Implement Cisco UCS management hierarchy using ORG (Organisation) and RBAC (Role Based Access Control)
4.4.b  Configure RBAC groups
4.4.c  Configure remote RBAC configuration
4.4.d  Configure roles and privileges
4.4.e  Create and configure users
4.4.f Implement backup and restore procedures in a Cisco UCS environment
4.4.g Implement system-wide policies

4.5 Cisco UCS troubleshooting and maintenance
4.5.a Manage high availability in a Cisco UCS environment
4.5.b Configure monitoring and analysis of system events
4.5.c Implement external management protocols
4.5.d Collect statistical information
4.5.e Firmware management
4.5.f Collect TAC-specific information
4.5.g Implement server recovery tasks

10% 5.0 Cisco Application Networking Services
5.1 Implement data center application high availability and load balancing
   5.1.a Implement standard ACE features for load balancing
   5.1.b Configure server load-balancing algorithm
   5.1.c Configure different SLB deployment modes
   5.1.d Implement health monitoring
   5.1.e Configure sticky connections
   5.1.f Implement server load balancing in HA mode