Data Center Unified Computing Implementation (DCUCI 5.0)

Course Summary

Description

Implementing Cisco Data Center Unified Computing (DCUCI) is designed to serve the needs of engineers and technicians who implement Cisco Unified Computing System (UCS) B-Series Blade Servers and Cisco UCS C-Series Rack-Mount Servers.

DCUCI v5.0 guides learners through rack installation and provisioning of server hardware, operating systems, hypervisors, and applications. Much of the content is devoted to management and maintenance. DCUCI v5.0 covers the implementation and operation of Cisco UCS in the data center.

Objectives
At the end of this course, students will be able to:

- Implement Cisco UCS C-Series rack servers in standalone mode. Boot from the local hard drive and mount the Fibre Channel SAN LUN for shared storage
- Install Cisco R-Series rack enclosures in the data center
- Install components in the Cisco UCS C-Series rack server prior to rack mounting
- Install Cisco UCS C-Series rack servers in a Cisco R-Series rack
- Use the Cisco UCS Host Upgrade Utility to upgrade or downgrade C-Series firmware to the correct version
- Provision SNMP and syslog, and use C-Series monitoring tools
- Use the Cisco Integrated Management Controller to provision LAN and SAN connectivity for the C-Series server
- Use the LSI MegaRAID web user interface to provision local hard drives into a RAID 5 array
- Install VMware ESXi in the C-Series server local hard drives
- Implement system management, maintenance, and high-availability services for Cisco UCS B-Series
- Implement local and remote authentication services to restrict privileges and delegate management authority in Cisco UCS Manager
- List the processes for managing the firmware repository and upgrade or downgrade Cisco UCS firmware components using Cisco UCS Manager
- Implement backup and restore capabilities in Cisco UCS Manager
- Implement syslog, Smart Call Home, and SPAN
- Maintain Cisco UCS in a high-availability configuration
- Implement generation 1 and generation 2 connectivity
- Differentiate between physical connections on the IOM and the redundant connections for management and data plane over the I/O MUX and midplane
- Install and power up Cisco UCS B-Series hardware
- Implement LAN connectivity for Cisco UCS B-Series hardware
- Implement SAN connectivity for Cisco UCS B-Series hardware
- Provision servers by leveraging reusable pools, policies, and templates that allow for rapid provisioning and consistency of policy
- Perform initial Cisco UCS cluster setup and provide management IP addresses for blade servers
- Provision VLANs and fabric interconnect uplinks for server connectivity to the Layer 3 data center cloud
- Provision VSANs and fabric interconnect Fibre Channel uplinks for server connectivity to the data center storage cloud
- Provision resource pools for servers, UUIDs, MAC addresses, WWNN, WWPN, and iSCSI
- Configure reusable server policies in Cisco UCS Manager
- Provision service profiles with initial and updating templates
- Implement virtualization features unique to Cisco UCS that improve performance and manageability
- Describe Cisco VM-FEX and Cisco VM-FEX universal passthrough technologies
- Provision Cisco VM-FEX in Cisco UCS Manager and the VMware vCenter Server
- Provision Cisco VM-FEX universal passthrough in Cisco UCS Manager and the VMware vCenter Server

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Course Summary (cont'd)

Topics

- Implement Cisco UCS C-Series Rack Servers
- Manage the Cisco UCS B-Series
- Implement Cisco UCS B-Series Connectivity
- Provision Cisco UCS Compute Resources
- Implement Cisco UCS Server Virtualization Features

Audience

Primary: Cisco Integrators and Partners, Consulting Systems Engineer, Network Designer, Network Engineer, Server Administrator, Systems Engineer, Technical Solutions Architect.

Secondary: Network Administrator, Network Manager, Storage Administrator, Program Manager, Project Manager

Prerequisites

- The knowledge and skills that a learner must have before attending this course are as follows:
- CCNA and DCUFI knowledge and experience until cutover to CCNA DC
- CCNA DC equivalent knowledge and experience
- Server operating systems, hypervisor and virtualization familiarity
- Implementing Cisco Storage Networking Solutions (ICSNS)
- Attendance of the following Cisco learning offerings is recommended to fully benefit from this course:
- Implementing Cisco Data Center Unified Fabric (DCUFI)
- Implementing Cisco Storage Networking Solutions (ICSNS)

Duration

Five days

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I. Module 1: Implement Cisco UCS C-Series Rack Servers

A. Lesson 1: Implementing Cisco R-Series Rack Enclosures
1. Unpack the Cisco R42610 rack enclosure
2. Remove the Cisco R-Series rack from the pallet
3. Secure the Cisco R-Series rack to the floor
4. Join Cisco R42610 racks into a suite
5. Install a Cisco RP208-30-U-1 PDU
6. Remove and install side panels
7. Remove and install Cisco R-Series rack doors
8. Use cabling portholes

B. Lesson 2: Installing Cisco UCS C-Series Server Hardware
1. Review ESD precautions
2. Review how to open Cisco UCS C-Series cases
3. Compare PCIe riser cards across Cisco UCS C-Series models
4. Describe CPU population rules for dual- and quad-socket servers
5. Describe the importance of color coding internal Cisco UCS C-Series components
6. Describe DRAM installation and population rules
7. Describe fan replacement
8. Describe power supply replacement

C. Lesson 3: Installing Cisco UCS C-Series Servers in a Cisco R-Series Rack Enclosure
1. Install the slide-rail assembly into the Cisco R42610 rack enclosure
2. Attach the mounting brackets to the server
3. Insert the server into the slide rail
4. Attach the cable management arm
5. Connect the Cisco UCS C-Series server to the PDU
6. Connect management and data cables

D. Lesson 4: Updating Cisco UCS C-Series Firmware with the Host Upgrade Utility
1. Download the Cisco UCS Host Upgrade Utility from Cisco.com
2. Enable KVM and virtual media in Cisco Integrated Management Controller
3. Describe the session options that are available in the KVM
4. Launch virtual media and map the Cisco UCS Host Upgrade Utility ISO image
5. Perform an upgrade of all components

E. Lesson 5: Provisioning Monitoring and Logging on the Cisco UCS C-Series Server
1. Provision SNMP
2. Provision syslog destinations for server logging data
3. Access data from the system event log
4. Export technical support information

F. Lesson 6: Provisioning LAN and SAN Connectivity in the Cisco Integrated Management Controller
1. Provision the Cisco UCS P81E VIC to allow FCoE
2. Provision a locally administered MAC address for the A- and B-side 10 Gigabit Ethernet interfaces
3. Enable RSS on Ethernet adapters
4. Provision locally administered addresses for the Fibre Channel interface WWPN and WWNN
5. Provision the Fibre Channel boot target for the A- and B-side Fibre Channel interfaces

G. Lesson 7: Provisioning RAID on the Cisco UCS C-Series Server
1. Describe the characteristics of RAID levels 0, 1, 5, 6, and 10
2. Boot the server in the KVM and access the LSI MegaRAID web user interface
3. Add all local hard drives to a RAID 5 array and save the configuration

H. Lesson 8: Installing VMware ESXi on the Cisco UCS C-Series Server Local RAID Array
1. Open a KVM session to the Cisco UCS C-Series server
2. Map virtual media to the ESXi installer ISO image
3. Install ESXi on the local RAID array

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4. Boot ESXi from the local RAID array
5. Configure a management IP address for the ESXi server
6. Connect to the ESXi server with the VMware vSphere Client utility and connect to the VMware File System shared storage LUN on the Fibre Channel storage system

II. Module 2: Manage the Cisco UCS B-Series

A. Lesson 1: Implementing RBAC
1. Describe the overall framework of RBAC in the Cisco UCS B-Series
2. Implement local users, roles, and privileges
3. Implement organizations and locales
4. Describe the effective rights of a user as an intersection of roles and locales mapped to a user
5. Implement LDAP providers and provider groups
6. Implement LDAP (Microsoft Active Directory) as an external authentication and authorization service
7. Implement Cisco UCS roles mapping to LDAP (Active Directory) attributes with LDAP provider maps

B. Lesson 2: Managing and Upgrading Cisco UCS B-Series Firmware
1. Describe where to find Cisco UCS firmware packages on Cisco.com
2. Update Cisco UCS firmware
3. Direct upgrade of mezzanine adapter, Cisco Integrated Management Controller, and IOM firmware
4. Describe software updates on the fabric interconnect
5. Describe the requirement for firmware updates via host firmware packages in the service profile
6. Describe the differences between the firmware processes of Cisco UCS fabric interconnect and IOM, Cisco Integrated Management Controller, and adapter
7. Describe how to update and activate the hardware capability catalog

C. Lesson 3: Implementing Backup, Import, and Restore of the Cisco UCS Manager Database
1. Differentiate between the supported backup types and the database objects to which they map in the Cisco UCS Manager database
2. Differentiate between an import operation and a disaster recovery restore operation
3. Implement a backup job
4. Implement backup jobs to preserve abstracted identities
5. Verify that the backup is created and executed
6. Implement an import job to restore the AAA user database
7. Verify that the AAA user database is restored
8. Configure the Cisco UCS 6100/6200 Series Fabric Interconnect for disaster recovery restore

D. Lesson 4: Implementing Logging and Monitoring
1. Describe Cisco UCS Manager management interfaces
2. Describe the fault management system and evaluate fault severity levels
3. Use the audit log to track administrative changes to the Cisco UCS Manager database
4. Describe Cisco UCS Manager operations subject to FSM validation and how to interpret FSM output
5. Implement logging options including local buffer, console, and external syslog servers
6. Use system event log and system event log policies
7. Implement the Smart Call Home feature
8. Validate the Smart Call Home feature
9. Configure settings for logs, events, and faults
10. Configure SPAN to allow protocol analysis

E. Lesson 5: Implementing High Availability
1. Describe high-availability cluster connection requirements for Cisco UCS B-Series
2. Describe intercluster communications and Cisco UCS Manager database synchronization
3. Differentiate between cluster partition-in-time and partition-in-space split-brain conditions
4. Describe how the Cisco UCS 5108 Blade Server Chassis SEEPROM resolves a split-brain issue in the high-availability cluster
5. Modify cluster IP addressing from the Cisco UCS Manager GUI and CLI

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III. Module 3: Implement Cisco UCS B-Series Connectivity

A. Lesson 1: Implementing Cisco UCS B-Series Physical Connectivity
   1. Describe the relationship between I/O uplinks and bandwidth oversubscription with generation 2 hardware
   2. Describe the Cisco UCS 2204/2208XP IOM architecture including CMC, I/O MUX, and chassis management switch
   3. Describe the relationship between I/O uplinks and bandwidth oversubscription with generation 1 hardware
   4. Describe the Cisco UCS 2104XP IO module architecture including CMC, I/O MUX, and chassis management switch
   5. Describe the features of the Cisco UCS VIC 1280 and VIC 1240
   6. Compare the number of virtual interfaces available on the Cisco UCS M81KR VIC and the VIC 1280
   7. Describe new mezzanine cards including M51, M61, and M72
   8. Describe the Cisco Integrated Management Controller management component of the BSeries blades
   9. Describe the creation of port channels from the Cisco UCS 6200 Series Fabric Interconnect to the 2204/2208XP IOM
   10. Describe the difference between server and uplink port personalities in the fabric interconnect
   11. Describe the chassis discovery process and monitor using the FSM
   12. Configure the chassis discovery policy

B. Lesson 2: Installing Cisco UCS B-Series Hardware
   1. Describe the ESD precautions that are necessary when installing Cisco UCS B-Series components
   2. List the steps for opening the case of half- and full-slot blade servers
   3. List the steps for physical installation of rack-mount slides in the enclosure and on the Cisco UCS 5108 chassis
   4. List the steps for installation and removal of CPU, RAM, and mezzanine cards in Cisco UCS B-Series blade servers
   5. List the steps for physical installation and removal of local hard drives
   6. List the steps for physical installation of half- and full-slot blade servers
   7. List the steps for physical installation of IOMs and power supplies in the Cisco UCS 5108 chassis
   8. List the steps for physical installation and removal of fan units
   9. List the steps for physical installation and removal of SFP+ copper twinax and optical modules

C. Lesson 3: Implementing Cisco UCS B-Series LAN Connectivity
   1. Differentiate between uplink, server, appliance, FCoE storage, and monitoring Ethernet port personalities of 10 Gigabit Ethernet interfaces on the Cisco UCS fabric interconnect
   2. Describe the requirements and configuration of port channels from the Cisco UCS fabric interconnect to a northbound switch
   3. Describe end-host mode and its importance in forwarding over multiple Layer 2 links and maintaining a loop-free topology
   4. Differentiate end-host mode with switched mode
   5. Describe the requirements to configure VLANs in Cisco UCS Manager
   6. Describe the role of vNICs to abstract MAC addresses into a service profile
   7. Describe the automatic pinning process and recovery from failure
   8. Describe the configuration of manual pinning and recovery from failure
   9. Describe the configuration of disjoint Layer 2 domains

D. Lesson 4: Implementing Cisco UCS B-Series SAN Connectivity
   1. Describe Fibre Channel switching
   2. Describe NPV
   3. Differentiate between Fibre Channel uplink, Fibre Channel storage, and Fibre Channel monitoring port personalities of 10 Gigabit Ethernet interfaces on the Cisco UCS fabric interconnect
   4. Differentiate between benefits and drawbacks of Fibre Channel switching and NPV
   5. Describe how NPIV allows a single N Port to be associated with multiple FCIDs
   6. Describe the requirements and configuration of VSANs in Cisco UCS Manager
   7. Describe the role of the vHBA to abstract WWNNs and WWPNs into a service profile
   8. Describe the automatic pinning process and recovery from failure

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9. Describe the configuration of manual pinning and recovery from failure
10. Differentiate Ethernet failover from Fibre Channel multipath I/O recovery

IV. Module 4: Provision Cisco UCS Compute Resources

A. Lesson 1: Provisioning the Cisco UCS Cluster
1. Configure the primary cluster peer from the fabric interconnect console
2. Configure the secondary cluster peer from the fabric interconnect console and join to the cluster
3. Log into the Cisco UCS Manager GUI and assign a pool of management IP addresses for server management

B. Lesson 2: Provisioning LAN Networking
1. Provision VLANs for single fabric, both fabrics, and both fabrics configured differently
2. Provision VLAN ranges
3. Provision private VLANs
4. Provision Ethernet uplinks
5. Provision Ethernet uplink port channels
6. Provision fabric port channels from the Cisco UCS Fabric Interconnect to a Cisco 2204/2208 IOM
7. Provision FCoE storage ports
8. Provision appliance ports and prune VLANs

C. Lesson 3: Provisioning SAN Networking
1. Provision VSANs for single fabric, both fabrics, and both fabrics configured differently
2. Provision Fibre Channel uplinks and VSAN trunking
3. Provision Fibre Channel port channels
4. Provision direct-attach Fibre Channel storage ports and default zoning

D. Lesson 4: Provisioning Resource Pools in Cisco UCS Manager
1. Provision server pools
2. Provision server pool autoplacement
3. Provision UUID pools
4. Provision MAC pools
5. Provision WWNN pools
6. Provision WWPN pools
7. Provision iSCSI initiator pools

E. Lesson 5: Provisioning Server Policies in Cisco UCS Manager
1. Provision a service profile using the expert service profile wizard
2. Implement pools and policies in the service profile
3. Associate a service profile to a server
4. Describe the Cisco UCS Utility Operating System
5. Observe the association process using the

F. Lesson 6: Provisioning Service Profiles from Templates in Cisco UCS Manager
1. Describe the requirements of service profile templates
2. Describe the difference between initial templates and updating templates, including operational caveats
3. Provision a vNIC template using the template wizard
4. Provision a vHBA template using the template wizard
5. Provision a service profile template using the template wizard
6. Provision multiple servers from a service profile template
7. Clone a service profile

G. Lesson 7: Provisioning Cisco UCS C-Series Server Integration in Cisco UCS Manager
1. Describe the benefits of C-Series integration
2. Describe the physical connectivity requirements for C-Series integration
3. Install version 1.2 C-Series server firmware to allow integration with Cisco UCS prior to version 2.0(2xx)
4. Describe the C-Series discovery process

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V. Module 5: Implement Cisco UCS Server Virtualization Features

A. Lesson 1: Provisioning
   1. Describe VMware vSwitch and vDS
   2. Describe Cisco Nexus 1000V switching
   3. Describe Cisco VM-FEX
   4. Describe Cisco VM-FEX universal pass-through

B. Lesson 2: Provisioning Cisco VM-FEX
   1. Provision VMware ESXi servers with a Cisco VEM
   2. Provision the secure connection from Cisco UCS Manager to VMware vCenter Server
   3. Provision port profiles and push to vCenter as port groups
   4. Provision a dynamic vNIC connection policy and BIOS policy for Cisco VM-FEX
   5. Join ESXi hosts to the DVS
   6. Provision VMs to consume port groups on the DVS

C. Lesson 3: Provisioning Cisco VM-FEX Universal Pass-Through
   1. Describe VMware requirements for universal pass-through mode
   2. Provision a dynamic vNIC connection policy for Cisco VM-FEX universal pass-through
   3. Provision a BIOS policy for Cisco VM-FEX universal pass-through
   4. Associate universal pass-through policies to a service profile
   5. Provision a port profile for universal pass-through mode
   6. Provision VMs to connect to DirectPath I/O interfaces
   7. Verify universal pass-through mode

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