CHT A286: VMWARE VSPHERE: INSTALLATION, CONFIGURATION & MANAGEMENT

Item	Value
Curriculum Committee Approval Date	11/03/2021
Top Code	070800 - Computer Infrastructure and Support
Units	3 Total Units
Hours	72 Total Hours (Lecture Hours 45; Lab Hours 27)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)

Course Description

Students will learn the concepts and capabilities of virtual architecture with a focus on the installation, configuration, and management of virtual infrastructure using tools such as VMWare®. This course covers fundamentals of virtual network design and implementation, fundamentals of storage area networks, virtual switching, virtual system management, and engineering for high availability. ADVISORY: CHT A110, IT A110, CIS A110, CHT A191, IT A191, or CIS A191. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Demonstrate in project format the use of the differing technologies, protocols and tools to design and build a virtual infrastructure.
2. Demonstrate in project format the ability to control, deploy and manage virtual resources.

Course Objectives

- 1. Install and configure virtual servers.
- 2. Install and configure virtual server components.
- 3. Configure and manage virtual networking and storage using virtual servers.
- 4. Deploy, manage, and migrate virtual machines.
- 5. Manage user access to the virtual infrastructure.
- 6. Monitor resource usage.
- 7. Increase scalability of virtual computers.
- 8. Apply security and operating system patches to virtual servers.
- 9. Manage higher availability and data protection.

Lecture Content

The content and topics are as follows: 1. Introduction to VMware Virtualizationa. Introduce virtualization, virtual machines, and vSphere® componentsb. Explain the concepts of server, network, and storage virtualizationc. Describe where vSphere® fits into the cloud architectured. Install and use vSphere® user interfaces 2. Create Virtual Machinesa. Introduce virtual machines, virtual machine hardware, and virtual machine filesb. Deploy a single virtual machine 3. VMware vCenter® Servera. Introduce vCenter® Server architectureb. Introduce vCenter® Server appliancec. Configure and manage vCenter® Server applianced. Manage vCenter® Server inventory objects and licenses 4. Configure and Manage Virtual Networksa. Describe, create, and manage a standard virtual switchb. Describe and modify standard virtual switch propertiesc. Configure virtual switch load-balancing algorithms 5. Configure and Manage Virtual Storagea. Introduce storage protocols and device namesb. Configure ESXi with iSCSI, NFS, and Fibre Channel storagec. Create and manage vSphere® datastores d. Deploy and manage the VMware® vSphere® Storage Appliance 6. Virtual Machine Managementa. Deploy virtual machines using templates and cloningb. Modify and manage virtual machinesc. Create and manage virtual machine snapshotsd. Perform VMware® vSphere® vMotion® and Storage vMotion® migrationse. Create a vSphere® vApp® 7. Data Protectiona. Discuss a strategy for backing up ESXi hosts and vCenter® Serverb. Introduce the VMware® Data Recovery appliancec. Discuss solutio ns for backing up virtual machines efficiently 8. Access and Authentication Controla. Control user access through roles and permissionsb. Configure and manage the ESXi firewallc. Configure ESXi lockdown moded. Integrate ESXi with Active Directorye. Introduce VMware® vShield® Zones 9. Resource Management and Monitoringa. Introduce virtual CPU and memory conceptsb. Describe methods for optimizing CPU and memory usagec. Configure and manage resource poolsd. Monitor resource usage using vCenter® Server performance graphs and alarms 10. High Availability and Fault Tolerancea. Introduce new vSphere® High Availability (HA) architectureb. Configure and manage a vSphere® High Availability clusterc. Introduce VMware® Fault Tolerance 11. Scalabilitya. Configure and manage a VMware® Distributed Resource Scheduler (DRS) clusterb. Configure Enhanced vMotion® Compatibilityc. Use vSphere® HA and DRS together 12. Patch Managementa. Manage ESXi patching using vCenter Update Managerb. Install Update Manager and Update Manager plug-inc. Create patch baselinesd. Scan and remediate hosts 13. Installing VMware® Componentsa. Introduce ESXi installationb. Describe boot from SAN requirementsc. Introduce vCenter® Server deployment optionsd. Describe vCenter® Server hardware, software, and database requirementse. Install vCenter® Server (Windows based)

Lab Content

Install ESXi Configure ESXi Host Configure vCenter Appliance Create Standard Virtual Switch Configure iSCSI Datastore Configure NFS Datastore Create and Manage VMFS Datastore Create a Virtual Machine Deploy VM from Template and Clone VM Modify Virtual Machine Hardware Configure Host Profiles Manage vMotion and Storage vMotion Manage Virtual Machines Manage vApps Manage Access Control Manage User Permissions Manage Resource Pools Monitor VM Performance Using Alarms Using vSphere High Availablity Using Distributed Resource Scheduler

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)
- Lab (04)

- DE Live Online Lab (04S)
- DE Online Lab (04X)

Instructional Techniques

Lecture and application of ideas Students will be presented material from several different sources, including, but not limited to study guides, “Web-based” curriculum, in-class demonstrations of systems integration and personal experiences of industry professionals.Individual and paired exercises During the lab portion of the class, students will be required to perform many of the tasks of a network administrator. In order to complete several projects, students will need to work together in teams to build working local area networks.Interactive computer-based assignments Using computer and “Web-based” training tools, students will be working on simulated networks in order to solve problems.

Reading Assignments

Students will access the online curriculum, read the weekly assignments and take a quiz to facilitate the understanding of the material. Minimum of 3 hours per week (45 hours) reading from textbook material.

Writing Assignments

Program and configure a set of routers to create a simulated Wide Area Network (WAN) infrastructure. Given a minimum set of requirements, the student will design a recommended solution accommodating routing technologies using some combination of hardware and software. After the solution is designed, the student will create a presentation describing the results. Minimum of 3 hours per week creating and editing class and software projects.

Out-of-class Assignments

45 hours (3hrs/wk). Student performance on quizzes, tests, including short essays, and laboratory assignments will be used to determine proficiency

Demonstration of Critical Thinking

Reading and writing assignments Web-based research Term or other paper(s) Laboratory reportsProblem solving demonstrations Exams Homework problemsSkill demonstrations Performance exams Case study presentationsObjective examinations, including Multiple-choice True/false Completion

Required Writing, Problem Solving, Skills Demonstration

Program and configure a set of routers to create a simulated Wide Area Network (WAN) infrastructure. Given a minimum set of requirements, the student will design a recommended solution accommodating routing technologies using some combination of hardware and software. After the solution is designed, the student will create a presentation describing the results.

Eligible Disciplines

Computer information systems (computer network installation, microcomputer ...: Any bachelors degree and two years of professional experience, or any associate degree and six years of professional experience. Computer service technology: Any bachelors degree and two years of professional experience, or any associate degree and six years of professional experience.

Textbooks Resources

1. Required Nick Marshall. Mastering VMware vSphere 6.7, ed. Sybex, 2018 Legacy Textbook Transfer Data: Most recent and preferred text.