VMware Bootcamp vSphere 4

Course Introduction 6m

Chapter 01 - Course Introduction and Methodology 14m

Course Introduction and Methodology
Learn IT! Do IT! Know IT!
Course Methodology
Certified Virtualization Expert (CVE) Certification 4
Demo - Certification Info - Exam Purchase Process
VMTraining's Physical Setup
VMTraining's Setup Student to Datacenter
Demo - Accessing the Student FTP Site
Demo - RDP Connection for Labs
Chapter 01 Review

Chapter 02 - Virtualization Overview 38m

Virtualization Overview
Why Virtualize? - Cost Savings
VMware TCO/ROI Calculator
Why Virtualize? - Simplified Management!
What is Virtual Infrastructure?
What is a Virtual Machine (VM)?
Type 1 and Type 2 Hypervisors
VMware Virtualization Products
vSphere 4
VMware Infrastructure 3
VMware Server 2.0
VMware vCenter Server
vCenter Update Manager
VMware vCenter Server Heartbeat
vCenter Site Recovery Manager (SRM)
VMware vCenter Chargeback
VMware Data Recovery
vCenter Lifecycle Manager
vCenter Lab Manager
VMware Converter
VMware vCenter AppSpeed
VMware vCenter Orchestrator
VMware Capacity Planner
VMmark
VMware View 4 (Virtual Desktop Infrastructure, VDI)
VMware View 4 Pricing and Packaging
VMware Workstation 7
VMware ACE 2.5
VMware Fusion 2.0
VMware Player 2.5
Microsoft Virtual Server 2005 R2 SP1
Microsoft Virtual PC 2007
Windows Server Virtualization (Hyper-V) Windows Server 2008 R2
Hyper-V Screenshot
System Center Virtual Machine Manager 2008
SCVMM 2008
SCVMM 2008 Architecture
XenServer Enterprise v5.5

Virtualization Platforms
Chapter 02 Review

Chapter 03 - Planning and Installing ESX 1hr 17m

Topic: Planning the ESX Deployment
Physical Hardware Requirements
Linux, Windows and ESX
ESX / ESXi Architecture Overview
VMware ESX Server
Service Console (SC or COS)
Service Console Resources
Default and Suggested Partition Scheme
VMware ESXi 4
Booting ESX / ESXi from a SAN LUN (Fibre Channel or iSCSI)
Booting ESX / ESXi Server from a SAN LUN
Topic: vSphere 4 Deployment Guidelines
Overview of Deployment Planning
ESX / ESXi Compatibility Guides
Determining ESX Physical Server Size
VMware Capacity Planner
Guided Consolidation (Mini Capacity Planner)
Storage: Capacity and Performance
Memory Overcommitment
Dell Virtualization Advisor
Demo - Conventions Used in the Lab Manual
Demo - DRAC 4 for Labs
Demo - DRAC 5 for Labs
Topic: ESX Installation
ESX Server Installation
ESX 4.0 Installation
Topic: ESX Management
Physical ESX Server Console
The Management User Interface (MUI)
ESX Host Management Overview
Managing ESX with the vSphere Client (VIC)
Managing VMs with the Web Client
Managing ESX with PuTTY
Topic: Configuring Hostname Resolution and NTP
Hostname Resolution
Configuring DNS Settings
Time Synchronization
Troubleshooting NTP
Topic: Troubleshooting ESX Server
ESX Server Health Check
esx.conf Settings
ESX Server Boot Process
Boot Procedure - GRUB Boot Menu Choices
What if Something Goes Wrong During Boot?
Troubleshooting Boot Process
Resetting Root Password
Troubleshooting: vmware-hostd
Purple Screen of Death (PSOD)
Chapter 03 Review

Chapter 04 - Tools to Administer ESX 59m

Topic: Overview of 3rd Party Tools
Veeam (veeam.com)
Veeam nworks 4.5
Veeam - FastSCP 3.0
WinSCP
ISO Programs
Novell - PlateSpin Migrate
Novell - PlateSpin Orchestrate
Vizioncore Tools (Quest Software)
PHD Virtual (phdvirtual.com)
VKERNEL (vkernel.com)
Demo - Third Party Tools
Topic: ESX Configuration Commands
PuTTY
Nano and VI Editor
Windows Commands vs. Linux Commands
Sample ESX Commands
Service Console Linux Commands
Common Command Line Interface (CLI) Options
Datastore Browser
Demo - Command Line Commands and Usage
Chapter 04 Review

Chapter 05 - Configuring Networking 55m

Topic: Creating and Modifying Virtual Networks
Networking Terms
vSphere 4 Virtual Switch Types
Network Connections
Add Network Wizard
Virtual Switches
Virtual Switch and Connection Type Identification
Virtual Switch and Connection - Details
VMware Assigned MAC Addresses
Virtual Switch Physical NIC Configurations
Ports Used by VMkernel
NIC Teaming
Cisco Discovery Protocol
Modifying vSwitch Properties (Ports Tab)
Modifying vSwitch Properties (Network Adapters Tab)
VLAN Overview
Standard vSwitch VLAN Configuration
VLAN Planning
Standard vSwitch Protection and VLANs
Standard vSwitch and Port Group Policy Exceptions Overview
Standard vSwitch and Port Group Policy Exceptions: Security
Standard vSwitch and Port Group Policy Exceptions: Traffic Shaping
Standard vSwitch and Port Group Policy Exceptions: NIC Teaming
Network Failure and NIC Teaming Options
Load Balancing Method: Route Based on the Originating Virtual Port ID (Default)
Load Balancing Method: Route Based on IP Hash (Destination)
Load Balancing Method: Route Based on Source MAC Hash
Port Group: Override vSwitch Failover Order
Multiple Policies Applied to a Single Team

Physical Switch Configuration
Topic: Creating and Modifying Virtual Networks Using CLI
Physical NIC Commands
Virtual Switch Commands
Configure Virtual Switches
Configure the VMkernel Port
Service Console (vswif) Commands
Additional Service Console (vswif) Commands
Adding a Second Service Console
Chapter 05 Review

Chapter 06 - Configuring Storage 1hr 19m

Topic: Storage Concepts
Storage Terms
SAN vs. NAS in vSphere
Multipathing
Path and Device Naming
Pluggable Storage Architecture - PSA
Native Multipathing Plugin (NMP)
Path Selection Considerations
Viewing Multipathing
Multipathing Commands
PSA Commands
Multipathing Command Examples
Topic: iSCSI Storage (GUI and Command Line)
Internet Small Computers Systems Interface (iSCSI) Overview
iSCSI Terms for ESX / ESXi
ESX / ESXi and iSCSI SAN Environment and Addressing
Hardware vs. Software Initiators
Multipathing with iSCSI
iSCSI Software Initiator Networking
Configuring iSCSI
Configure Software Initiator
Bind VMkernel ports to Storage Adapter
Discovering iSCSI Targets
Enable Jumbo Frames
Configure Software Initiator: CHAP Authentication
iSCSI Firewall Access - ESX 3.5
iSCSI Firewall Settings (CLI) ESX 3.5
Software iSCSI Configuration Options (CLI)
Software iSCSI Adapter Enable/Disable/Scan
iSCSI Configuration Options (CLI)
View and Configure iSCSI Adapter (CLI)
iSCSI Software Initiator Troubleshooting
iSCSI Vendors and Products
HP/LeftHand Networks Virtual Storage Appliance (VSA)
Stonefly Hybrid Storage Concentrator (HSC)
Stonefly (HSC) LUN Creation and Volume Management
Topic: Fibre Channel Storage
What is Fibre Channel?
Fibre Channel Terms for ESX / ESXi
ESX / ESXi and Fibre Channel SAN Environment and Addressing
Scanning Fibre Channel LUNs
Multipathing with Fibre Channel
Configuring Multipathing with Fibre Channel
Fibre Channel Vendors and Products

Topic: VMFS Datastores (GUI and Command Line)
Virtual Machine File System (VMFS-3)
Viewing and Creating a VMFS Datastore
Expanding Your VMFS Datastore Using Extents
Add an Extent to Your Existing VMFS
Expanding Your SAN LUN
LUN Identification using esxcfg-scsidevs
Partition Alignment Using fdisk
Demo – Disk Partitioning
VMFS Operations - vmkfstools
Displaying Disk Usage Detail (vdf -h)
Topic: NAS Storage and NFS Datastores (GUI and Command Line)
Network Attached Storage (NAS) and ESX Server
NFS Components, Addressing and Access Control with NFS on Linux
NFS Target on Windows 2003 R2
Demo - Windows NFS Server Setup
Create an NFS Datastore
NFS Configuration Options (CLI)
NFS Configuration Options (CLI) Examples
Topic: Raw Device Mapping (RDM)
Raw Device Mapping (RDM)
Raw Device Mapping Benefits
RDM Compatibility Modes
RDM CLI Commands
Chapter 06 Review

Chapter 07 - vCenter Server and Licensing 55m

Topic: Licensing
vCenter Server and ESX Server Licensing Model
Manage vSphere Licenses
VI3 License Types and Pricing (per 2 Sockets)
vSphere Essentials for Small Business
vSphere 4 License Types and Pricing (per 1 Socket)
Windows Licensing Calculator 1
Windows Licensing Calculator 2
Topic: vCenter Server Installation
vCenter Server 4 Summary
Managing Multiple Enterprise Locations
vCenter Server Architecture
ESX Host and vCenter Server 4 Functionality
vCenter Server 4 Minimum Requirements
Order of Installation
vCenter Server Database Overview
Topic: vCenter Server Inventory
Hosts and Clusters: Datacenters
Hosts and Clusters: Folders and Subfolders
Hosts and Clusters: Clusters
vCenter Inventory: VMs and Hosts
Virtual Machines and Templates: Subfolders
Topic: Managing vCenter Server
Scheduled Tasks
Events
Sessions
Demo - vCenter Tasks Events & Sessions
System Logs
Guided Consolidation

Client Settings
Topic: Planning vCenter Server Deployment
Virtualcenter Database Sizing VC 2.5
vCenter Server 4 Database Sizing
Demo - vCenter Database Sizing
Backup Strategy for vCenter Server
vCenter Server Heartbeat
Topic: Troubleshooting vCenter Server and Database
Refreshing vCenter Server
ESX Host Agent Hangs
vCenter Server Installation Logs
vCenter Server Log Files
SQL Recovery Models
vCenter Server Service (vpxd) Errors
vCenter Server Standalone Mode
Reinitializing the vCenter Server Database
Topic: Troubleshooting the vSphere Client
vSphere Client Logs
Cannot Login Using vSphere Client
vSphere Client Session Errors
Chapter 07 Review

Chapter 08 - VM Creation Configuration and Snapshots 1hr 57m

Topic: Create a VM
VM Virtual Hardware
Types of Virtual NICs (vNIC)
Virtual Machine Files
Virtual Disk
Virtual SCSI Controller Type
Demo – Paravirtualized SCSI Install
VMDirectPath
Virtual Machine Access to Storage
Install Guest OS into VM
VM Console and Menus
VMware Tools
VMware Tools Configurable Features
Topic: Create Multiple VMs, Templates and Clones
Clones and Templates
Deploy VM from Template
Customizing the OS in a Virtual Machine
Customization Specification Manager
Demo – Customization Specification
Deploying Across Datacenters
Topic: Virtual Appliances
Virtual Appliances
Import Virtual Appliances
Export VM to OVF Format
Topic VMware Converter (P2V - V2V)
VMware Converter 4.01
VMware vCenter Converter 4.01 Versions Comparison
Pre Conversion Tasks
Hot/Cold Cloning - 4 Step Process
Post Conversion Steps
Enterprise Converter Usage
VMware Converter Standalone
Troubleshooting VMware Converter

Topic: Manage VMs
Hot and Cold VM Migrations
Hot Add Memory and CPUs
VM Properties - Hardware Tab
VM Properties - Options Tab
Resize a Virtual Disk
Extend VMDK
Renaming a Virtual Machine
vmware-cmd
Topic: VM Startup / Shutdown
Startup/Shutdown of VMs
Enabling VM Startup/Shutdown
VM Startup/Shutdown Override
Topic: VM Snapshots
Virtual Machine Snapshots
Files Used by Snapshots
Taking Snapshots
Snapshot Manager
Reverting to a Snapshot
Deleting Snapshots
Topic: Web Access
Web Access Management
Enable Web Access in ESX
Log in to Web Access
Web Access Tasks
Generate Virtual Machine Shortcut
Demo - MUI and Web Access
Topic: VM Troubleshooting and Best Practices
Troubleshooting VM Problems
Differences Between VMs and Physical Servers (Best Practices)
Chapter 08 Review

Chapter 09 - Security and Permissions 51m

Topic: Controlling User Access and Passwords
Types of Users
vCenter/ESX Host Security Model
Permissions
Roles
Privileges Explained
ESX Host Permissions
vCenter Permissions
Multiple Group Permissions No Conflicts - Groups Only
Multiple Group Permissions No Conflicts - Users and Groups
Multiple Group Permissions Conflicting Permissions
Multiple Group Permissions User Overrides and Unions
Multiple User Permissions Explicit vs. Inherited
ESX/Linux User and Group Management Tools
ESX/Linux User Authentication
Configuring ESX Authentication
ESX Authentication Settings
Reusing Passwords
Configuring Password Complexity
Topic: ESX / Active Directory (AD) Integration
AD-ESX Authentication Integration
UNIX Authentication Model
Authentication Flow

Topic: Managing Firewalls
Firewall Configurations
TCP and UDP Ports
Default Service Console Security
Certificates and Data Encryption
Firewall Configuration in the vSphere Client
Firewall Commands
Service Console Security Levels
Service Console Firewall
Topic: SSH Access
Secure Shell (SSH)
Controlling SSH Access
SSH/Console Banner Message
Monitoring Service Console Access
last Command
fuser Command
Topic: Running Elevated Commands (su, sudo, setuid/setgid)
root Logon
Restricting substitute user (su)
Configure the Wheel Group
sudo
sudo Usage
Topic: VMsafe and vShield Zones
VMsafe Overview
Current VMsafe Partners
vShield Zones Overview
vShield VM Wall Features
vShield VM Flow Features
Chapter 09 Review

Chapter 10 - Advanced ESX and vCenter Management 1hr 13m

Topic: Configuring VMotion
VMotion Migration
How VMotion Works
VMotion: ESX Host Requirements
Identifying CPU Characteristics
Enable or Disable Nx/xD
VMotion Errors and Warnings
vCenter Topology Maps
Cluster Map View
VM Map View
Advanced VMotion Errors
Topic: Storage VMotion
Storage VMotion Migration
Requirements for Storage VMotion
Remote Command-Line (RCLI)
(RCLI/vCLI) Non-interactive Mode: SVMotion Examples
Storage VMotion Plug-in for vCenter 2.5
Storage VMotion in vSphere 4
Topic: Distributed Resource Scheduler (DRS) Cluster
Distributed Resource Scheduler (DRS) Overview
DRS Cluster in the vCenter Inventory
vCenter Cluster
Initial Placement
Dynamic Balancing / History
Configure Automation Level

Affinity / Anti-Affinity Rules
Virtual Machine Options
Distributed Power Management (DPM)
Enhanced VMotion Compatibility (EVC)
VM Swapfile location
Topic: Resource Pools and Monitoring
VMs CPU and Memory Resource Setting Terms
CPU Resource Settings
Memory Resource Settings
Memory Overhead
Resource Shares
Resource Pools
Expandable Reservations
Resource Pool Example Summary
Resource Pool Example: CPU Limits
Troubleshooting Memory Resources
Retaining ESX Host Resource Pools
Best Practices for VM Resources
Monitoring the DRS Cluster - Resource Allocation
Monitoring the DRS Cluster - DRS Resource Distribution Graph
Monitor Cluster Usage
Topic: vNetwork Distributed Virtual Switches
Distributed vSwitch Overview
Creating a Distributed Virtual Switch
Edit dvSwitch Settings
Edit dvSwitch Policy Settings
Edit dvSwitch Port Group Settings
Cisco Nexus 1000v Virtual Switch
Nexus 1000v Architecture
Topic: Host Profiles
Host Profiles Overview
Create Host Profile
Edit Host Profile
Attach Host Profile
Check Compliance with Host Profile
Apply Host Profile
Export a Host Profile
Topic: Linked Mode Group of vCenter Servers
Linked vCenter Servers Overview
Linked Mode Group Prerequisites
Create a Linked Mode Group
Manage Multiple vCenters
Chapter 10 Review

Chapter 11 - Patching and Upgrading ESX 32m

Topic: Patching ESX Server
Planned Downtime: Maintenance Mode
Patch Installation: esxupdate
Scripted Patch Installation
GUI Patch Installation - VMTS Patch Manager (VMTS.net, FREE)
Topic: Patching with Update Manager
Update Manager Overview
Update Manager vSphere Client Plugin
Update Manager Baselines
Update Manager Tab
Update Manager Remediation Defaults and Configuration Options

Update Manager Downloads
Update Manager Download Service
Remediation
Update Manager Events
Topic: Upgrades and Migrations
Upgrade Methodology
Upgrade VirtualCenter to a New Version
ESX Migration to New Hardware 3.x to Any Version
ESX 4.x Migration to New Hardware ESX Enterprise Plus Environment
ESX Upgrade Using Update Manager
ESX Upgrade Using vSphere Host Update Utility
Overview of Scripted Upgrade
Upgrade the Virtual Machines
Use the vSphere Client to Upgrade the VMware Tools
Use vSphere Client to Upgrade Virtual Machine Hardware
Use Update Manager to Upgrade Virtual Machines
Chapter 11 Review

Chapter 12 - Disaster Recovery and Backup 57m

Topic: Site Recovery Manager (SRM)
VMware Site Recovery Manager (SRM) v4.0.0
SRM Architecture Overview
SRM - Site Recovery Infrastructure
SRM - Create Recovery Plans
SRM - Test Recovery Plans
SRM - Automate Failover
Topic: High Availability (HA)
VMware High Availability
VMware HA in Action
Configure HA Cluster
VMware HA: Virtual Machine Options
Host Isolation
Guidelines for Isolation Response Setting
HA VM Monitoring
Viewing your HA Cluster
Allowable Host Failure Tolerance
Troubleshooting VMware HA
Demo - HA in Action
Topic: VM Fault Tolerance
Fault Tolerance Overview
Fault Tolerance Requirements
Configure VMkernel NIC
Turn on Host Certificate Checking
Turn on Fault Tolerance
Topic: Microsoft Clustering
Virtualizing Microsoft Clusters
Microsoft Cluster Services
Microsoft Cluster Services Requirements
Topic: Backup Strategies
Backup Strategies for VMs
VMware Consolidated Backup (VCB) Features
VM File-Level Backup Using Backup Agent
Recommendations for Backups
VCB Components
Centralized Restore
Per-Department Restore

Self-Service Restore
Best Practices
Best Practices - Proxy Performance
Service Console Backup and Restore
Topic: Using VCB Command Line Utilities
Using VCB Command-Line Utilities
Full VM Identification and Backup
Files that Make Up a Full VM Backup
Back Up and Restore Individual Virtual Disks from Service Console
Restore a Full VM Backup (Any VM Operating System)
Restore Single Files from Full Windows VM Backup
Topic: VMware Data Recovery
What is Data Recovery?
Configure Data Recovery
Configure Virtual Appliance
Configure VMs to Backup
Configure Data Recovery Appliance and Setup Backup Job
Topic: Third Party Backups
esXpress v3.6.1
esXpress v3.6.1 - vCenter Plugin
Vizioncore - vRanger Pro 4.0 DPP
Vizioncore - vRanger Pro 3.3
vRanger Pro - Screenshot
Veeam Backup and Replication v4
Veeam Backup - Screenshot
Symantec Netbackup
Veritas Netbackup - Screenshots
Chapter 12 Review

Chapter 13 - Server and VM Monitoring 1hr 4m

Topic: Tools for Optimization
Balloon-Driver: vmmemctl
VMkernel Swap - Defined
VMkernel Swap (vm-name.vswp)
Transparent Memory Page Sharing
Demo – Memory and CPU Utilization
Virtual CPUs (vCPUs)
VMkernel CPU Load Balancing
Topic: VM Performance Monitoring
Performance Monitoring
Customize Performance Chart
Troubleshooting Performance
Problem: High CPU Utilization
Problem: High Memory Utilization
Problem: High Disk Utilization
Problem: High Network Utilization
Veeam Monitor
Veeam Monitor Demo
Vizioncore vFoglight
Vizioncore vFoglight - Monitoring
Topic: Configuring Alarms
vCenter Alarms
Alarm Settings
Default Alarms in vCenter
Configure vCenter Notifications
Topic: ESX and vCenter Logs

Using esxtop
Performance Snapshots from CLI
ESX Log File Locations
ESX Log Files
vCenter Log Files and Rotation
Collecting vCenter Log Files
Collecting Diagnostics Data
Demo – Log Dump
Sending Logs to a Syslog Server
Chapter 13 Review

Chapter 14 - Installing and Configuring ESXi 24m

Topic: ESXi Overview
ESXi 4.0 Server Overview
Topic: ESXi Installation
Installing ESXi 4.0 Server
Installation of ESXi 4.0
Local Configuration of ESXi 4.0
Topic: ESXi Management
vSphere Command Line Interface (vCLI)
vCLI Commands
Managing ESXi 4.0 Directly from vSphere Client (VIC)
ESXi 4.0 Management
Managing ESXi 4.0 from vCenter
Managing ESXi 4.0 in a DRS Cluster
Chapter 14 Review
Course Closure

Total Duration: 13h 19m