

VMware vSphere 5 Ultimate Bootcamp

Course Overview

VMware Ultimate Bootcamp vSphere 5.0 teaches advanced virtualization concepts and explores the VMware vSphere 5.0 product suite. This comprehensive class prepares the student to become a certified professional virtualization expert. The course objective is to instill the knowledge required for the student to do their job efficiently and effectively, starting from installation of the product to real-world troubleshooting issues. The course focus is not limited only to learning and harnessing the power of VMware but the entire concept of virtualization, and other 3rd party tools and technologies that will enhance VMware capabilities and increase the student's virtualization expertise.

Course Outline

<u>Course Introduction</u>	6m
Course Introduction	
<u>Chapter 01 - Course Introduction and Methodology</u>	5m
Learn IT! Do IT! Know IT!	
Certified Virtualization Expert (CVE) Certification	
VMTraining's Physical Setup	
VMTraining's Setup Student to Datacenter	
VMTraining's Network IP Setup	
Chapter 01 Review	
<u>Chapter 02 - Virtualization Overview</u>	1h 2m
Why Virtualize?	
Why Virtualize? - Cost Savings	
VMware ROI TCO Calculator v2.0	
Why Virtualize? - Simplified Management!	
What is Virtual Infrastructure?	
What is a Virtual Machine (VM)?	
Type 1 and Type 2 Hypervisors	
Cloud Computing	
VMware vCloud	
VMware Virtualization Products	
VMware Go	
VMware Server 2.0	
VMware Infrastructure 3 (VI3)	
vSphere 4 Features	
vSphere 4.1 - Features Added	
vSphere 4.1 Update 1 (2011/02/10) - New Features	
vSphere 5 Host Features	
vSphere 5 Network Features	
vSphere 5 Storage Features	
vSphere 5 vCenter Features	
vSphere 5 VM HW Ver. 8	
vSphere 5 Misc Features	
VMware vCenter Server	

VMware vCenter Orchestrator
VMware View 4.6 (Virtual Desktop Infrastructure)
VMware Workstation 8
VMware ACE 2.7
VMware Fusion 4.0.1
VMware Player 3.1.4
Windows/Microsoft Virtual PC 2007
Microsoft Virtual Server 2005 R2 SP1
Windows Server Virtualization Hyper-V R2 SP1 (Windows Server 2008 R2)
System Center Virtual Machine Manager 2008 R2 SP1
SCVMM 2008 R2
XenServer Enterprise v5.6 SP2
XenDesktop & Essentials for XenServer
Virtualization Platforms
Chapter 02 Review

Chapter 03 - Planning and Installing ESXi

1h 24m

Topic 1: Planning the ESXi Deployment

Physical Hardware Requirements
vSphere Hypervisor 5 (VMware ESXi)
VMware ESXi 5
Booting ESXi from a SAN LUN (Fibre Channel or iSCSI)
Booting ESXi from a SAN LUN
Linux, Windows & ESX/ESXi

Topic 2: vSphere 5 Deployment Guidelines

Overview of Deployment Planning
ESXi Compatibility Guides
Determining ESX/ESXi Physical Host Size
VMware Capacity Planner
Storage: Capacity and Performance
Memory Overcommitment

Topic 3: vSphere Hypervisor (ESXi) Installation

vSphere Hypervisor 5 Installable
Demo: Installation of ESXi 5
Local Configuration of ESXi 5 using DCUI
Demo - Install ESXi 5
UDA 2.0 Script ESXi/ESX Installation
Demo - ESXi Host Install
vSphere 5 ESXi Image Builder CLI
vSphere 5 Auto Deploy for ESXi Installation
vSphere 5 Auto Deploy Process
vSphere 5 Auto Deploy Architecture

Topic 4: Configuring Hostname Resolution and NTP

Hostname Resolution in ESXi
Configuring DNS Settings
Time Synchronization
Demo - ESXi NTP Information

Topic 5: Troubleshooting ESXi

esx.conf Settings
ESXi/ESX Server Health Check

ESXi Host Boot Process
Resetting root Password ESXi 5
Troubleshooting ESXi CIM Management Agents
Troubleshooting: vmware-hostd
Purple Screen Of Death (PSOD)
Chapter 03 Review

Chapter 04 - Using Tools to Administer a VMware Environment

50m

Topic 1: Overview of 3rd Party Tools

Veeam (veeam.com)
Veeam nworks 5.6
Veeam - FastSCP 3.0.3 (free)
WinSCP 5.0.2 (free)
Datastore Browser (included ESXi 5)
ISO Programs
Novell - PlateSpin Migrate
Novell - PlateSpin Orchestrate
Quest Software (formerly Vizioncore)
PowerGUI (Quest, free)
PHD Virtual (phdvirtual.com)
VKERNEL (vkernel.com)

Topic 2: ESXi Management

ESXi Host & vCenter Server Management Overview
Direct Console User Interface (DCUI)
Managing ESXi with the vSphere Client (VIC)
Demo - vSphere Client
The Management User Interface (MUI) (ESX/ESXi/vCenter)
Managing with the vSphere Web Client
SSH Access: PuTTY, SecureCRT, FastSCP, etc.
Demo - PuTTY Session
Troubleshooting Options: ESXi 5
Configuration of Troubleshooting Options in ESXi 5
vSphere Hypervisor (ESXi) Only Features
CLI Commands Overview
vSphere Command Line Interface (vCLI)
vCLI Commands
Managing ESX/ESXi with the vSphere CLI (vCLI)
vCLI Command Syntax
vSphere SDK for Perl
vSphere Management Assistant (vMA 5.0)
PowerCLI 5.0

Topic 3: Linux Command Review

Windows Commands vs. Linux Commands
Common Command Line Interface (CLI) Options
ESXi 5 Text Editor
Demo - VI Editor
VMkernel System Information Viewing

Topic 4: Troubleshooting the vSphere Client (VIC)

vSphere Client Logs
Cannot Login Using vSphere Client

Chapter 05 - vCenter Server 5 and Licensing

1h 39m

Topic 1: Licensing

vCenter Server 5 and ESXi/ESX Host Licensing Model
Manage vSphere Licenses
vSphere Essentials 5 for Small Business (per 1 Socket)
vSphere 5 License Types and Pricing (per 1 Socket with vRAM Entitlements)
Calculate vSphere 5 Licensing
Windows Licensing Calculator
Microsoft Server Virtualization Validation Program
Novell SUSE Linux Enterprise Server 11 SP1 - Free

Topic 2: vCenter Server Installation

vCenter Server 5 Summary
Managing Multiple Enterprise Locations
vCenter Server 5 Specifications
vCenter Server Database Overview
vCenter Server Virtual Appliance (vCSA) Specifications
Demo - vCenter Appliance
vCenter Server 5 Architecture
vCenter Server 5 and Host Functionality
Order of vCenter Installation

Topic 3: vCenter Server Inventory

vCenter Server Home Page
Hosts and Clusters: Datacenters
Hosts and Clusters: Folders and Clusters
VMs and Templates: Subfolders
vCenter Inventory: VMs Tab
Datastores and Datastore Clusters: Folders and Datastores
Networks: Portgroups & Distributed Switches (vDS)

Topic 4: Managing vCenter Server

Scheduled Tasks
Events
Sessions
System Logs
vCenter Solutions Manager
Client Settings
vCenter Mobile Access (vCMA)

Topic 5: Planning vCenter Server Deployment

vCenter Server 5 Database Sizing
Backup Strategy for vCenter Server
vCenter Server Heartbeat 6.4

Topic 6: Troubleshooting vCenter Server and Database

Refreshing vCenter Server
ESXi Host Agent (hostd) hangs
Demo - vCenter Statistics
vCenter Server Log Files
SQL Recovery Models
vCenter Server Service (vpxd) Errors
vCenter Server Standalone Mode

Reinitializing the vCenter Server Database
vSphere Client Session Errors
Chapter 05 Review

Chapter 06 - Configuring Networking

1h 48m

Topic 1: Creating & Modifying Virtual Networks

Networking Terms
vSphere 5 Virtual Switch Types
Network Connections in ESXi
Add Network Wizard
Standard Virtual Switches – ESXi
Standard Virtual Switches – ESX
Virtual Switch and Connection Type Identification
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: 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 (Source + 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
Demo - Network Configuration

Topic 2: vSphere Distributed Virtual Switches

vSphere Distributed vSwitch (vDS) Overview
vSphere Distributed Switch (vDS) New Features in vSphere 5.0
Creating a vSphere Distributed Switch
Edit dvSwitch Settings
Edit dvSwitch Uplink Policy Settings
Edit dvSwitch Port Group Settings
Port Binding Methods
Private VLANs
Private VLAN (PVLAN) Tagging
Migrating Service Console Port or VMkernel Port to vDS
Network I/O Control (NIOC)
Network I/O Control (NIOC) Best Practices
Create NetFlow
Using Port Mirroring

Demo - Virtual Distributed Switch
Cisco Nexus 1000v Virtual Switch
Nexus 1000v Architecture
Networking Review

Topic 3: Creating & Modifying Virtual Networks Using CLI

Networking CLI Commands
Physical NIC Commands
Configure Physical NICs
Virtual Switch Commands
Configure Virtual Switches
VMkernel Port Commands
Configure the VMkernel Port
Service Console (vswif) Commands
Additional Service Console (vswif) Commands
Adding a Second Service Console
Chapter 06 Review

Chapter 07 - Configuring Storage

2h 16m

Topic 1: Storage Concepts

Storage Terms
SAN vs NAS in vSphere
Device and Path Naming
vSphere's Family of Storage APIs
Multipathing
Storage APIs - Multipathing
Path Selection Considerations
Viewing Multipathing
Storage I/O Control (SIOC)
Storage APIs - Array Integration
Multipathing Commands
Multipathing Commands (vCLI)
Multipathing Command Examples

Topic 2: iSCSI Storage (GUI & 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
Setup Steps - Multipathing with Software iSCSI
iSCSI Software Initiator Networking
Configuring iSCSI
Configure Software Initiator
Bind VMkernel ports to Storage Adapter (GUI)
Bind VMkernel ports to Storage Adapter (CLI)
Discovering iSCSI Targets
Demo - v5 Storage Setup
Jumbo Frames
Configure Software Initiator: CHAP Authentication
iSCSI Session Options (CLI)
iSCSI Software Initiator Troubleshooting

iSCSI Vendors and Products

Topic 3: Fibre Channel Storage

What is Fibre Channel?

Fibre Channel Terms for ESXi

ESX/ESXi and Fibre Channel SAN Environment and Addressing

Scanning Fibre Channel LUNs

Multipathing with Fibre Channel

Fibre Channel Vendors and Products

Network/Storage Architecture Review

Topic 4: VMFS Datastores (GUI & Command Line)

Virtual Machine File System (VMFS-3)

Virtual Machine File System (VMFS-5)

Viewing and Creating a VMFS-3 Datastore

Upgrade VMFS-3 to VMFS-5

Viewing and Creating a VMFS-5 Datastore

Demo - Creating a VMFS-3 Datastore

Demo - Creating a VMFS-5 Datastore

Expanding Your VMFS Datastore Using Extents

Add an Extent to Existing VMFS

Expand an ESX/ESXi 4.1/5 VMFS Volume

Partition Alignment

Disk Defragmentation

VMFS Operations - vmkfstools

Displaying Disk Usage Detail (ESX vdf -h ESXi df -h)

Topic 5: NAS Storage and NFS Datastores (GUI & Command Line)

Network Attached Storage (NAS) and ESX/ESXi

NFS Components, Addressing and Access Control with NFS on Linux

NFS Target on Windows 2003 R2

Mount an NFS Datastore to Host

Demo - NFS Creating

NFS Configuration Options (CLI)

Storage APIs - Array Integration NFS

Topic 6: Raw Device Mapping (RDM)

Raw Device Mapping (RDM)

Raw Device Mapping Benefits

RDM Compatibility Modes

RDM CLI Commands

Solid State Disks (SSD)

Chapter 07 Review

Chapter 08 - VM Creation, Configuration, and Snapshots

2h 40m

Topic 1: Create a VM

VM Virtual Hardware

Types of Virtual NICs (vNIC)

Virtual Machine Files

Virtual Disk

Virtual SCSI Controller Type

VMDirectPath

Virtual Machine Access to Storage

Install Guest OS into VM

VM Console & Menus

VMware Tools

VMware Tools Configurable Features

Demo - Creating a VM

Topic 2: Create Multiple VMs, Templates, & Clones

Clones & Templates

Deploy VM from Template

Customizing the OS in a Virtual Machine

Customization Specification Manager

Deploying Across Datacenters

Demo - Template Provisioning

Topic 3: Virtual Appliances

Virtual Appliances

Import Virtual Appliances

Export VM to OVF Format

Topic 4: VMware Converter (P2V – V2V)

VMware Converter 5

VMware Converter Sources

VMware vCenter Converter 5

Pre Conversion Tasks

Hot Cloning - 4 Step Process

Post Conversion Steps

VMware vCenter Converter 5 Standalone

Troubleshooting VMware Converter

Topic 5: Manage VMs

Hot and Cold VM Migrations

Hot Add Memory and CPUs

VM Properties - Hardware Tab

VM Properties - Options Tab

Demo - New VM Features in vSphere 5

Resize a Virtual Disk

Extend VMDK

Extend Partitions Using gparted

Renaming a Virtual Machine

vmware-cmd.pl (vCLI)

Kill a VM with esxcli

Topic 6: Virtual Machine Startup/Shutdown

Startup/Shutdown of VMs

Enabling VM Startup/Shutdown

VM Startup/Shutdown Override

Demo - VM Startup/Shutdown

Topic 7: Virtual Machine Snapshots

Virtual Machine Snapshots

Files Used by Snapshots

Taking Snapshots

Snapshot Manager

Reverting to a Snapshot

Deleting Snapshots

Demo - Snapshots

Topic 8: vSphere Web Client

vSphere Web Client
vSphere Web Client - Requirements
Log in to Web Access
Demo - v5 Web Client

Topic 9: Virtual Machine Troubleshooting & Best Practices

Troubleshooting VM Problems
Differences Between VMs and Physical Servers (Best Practices)
Chapter 08 Review

Chapter 09 - Security and Permissions

1h 10m

Topic 1: Controlling User Access and Passwords

Types of Users
vCenter/ESXi/ESX Host Security Model
Permissions
Roles
Privileges Explained
ESXi 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
Multiple User Permissions: Explicit vs. Inherited #2
Demo - vSphere Client Permissions

Topic 2: ESXi/ESX Active Directory (AD) Integration

UNIX Authentication Model
UNIX Authentication Flow
AD-ESX/ESXi 4.1/5 Authentication Services
Assign ESX/ESXi 4.1/5 Permissions Directly to AD Users
Demo - Active Directory Integration

Topic 3: Managing Firewalls

TCP & UDP Ports
Certificates and Data Encryption
ESXi 5.0 Firewall
ESXi Firewall Configuration via vSphere Client
ESXi Host Firewall Commands
Demo - Firewall

Topic 4: SSH Access

Secure Shell (SSH)
Controlling SSH Access
SSH/Console Banner Message
Monitoring ESXi Access

Topic 5: The root Account

root Logon
Using substitute user(su) with root
For More Security Information

Topic 6: VMsafe and vShield

VMsafe Overview
Current VMsafe Partners

Chapter 10 - Server and VM Monitoring

Topic 1: Optimizing Resources

Transparent Memory Page Sharing
Balloon-Driver: vmmemctl
VMkernel Swap - Defined
VM Swap Files
VMkernel Swap vm-name.vswp
Memory Compression
Virtual CPUs (vCPUs)
VMkernel CPU Load Balancing
VMs' CPU & Memory Resource Setting Terms
CPU Resource Settings
Demo - Hardware Status
Memory Resource Settings
Memory Overhead
ESXi 5 Resource Allocation per VM
Resource Shares
Monitoring - Hardware Status

Topic 2: 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
Quest Software vFoglight
Demo - Veeam Monitor
VKERNEL CapacityVIEW

Topic 3: Configuring Alarms

vCenter Alarms
Alarm Settings
Default Alarms in vCenter
Configure vCenter Notifications

Topic 4: ESXi and vCenter Logs

ESXi 5 Log Files from DCUI
Using esxtop
Demo - esxtop
Performance Snapshots from CLI
ESXi 5 Log file locations
ESXi 5 Log Files
Collecting vCenter Log Files
Collecting Diagnostics Data
Configuring Syslog on ESXi
Sending Logs to a Syslog Server

Chapter 11 - Advanced ESXi and vCenter Server Management

2h 28m

Topic 1: Storage Views & Topology Maps

vCenter Storage Views
Storage Views - Reports
Storage Views - Maps
vCenter Topology Maps
Host Map View

Topic 2: Storage vMotion

Storage vMotion Migration
Requirements for Storage vMotion
Storage vMotion in vSphere 5
Storage vMotion - Command-Line Interface
(vCLI) Non-interactive Mode: SvMotion Examples
Demo - Storage vMotion

Topic 3: Configuring vMotion

vMotion Migration
How vMotion Works
Demo - vMotion
vMotion: ESX/ESXi Host Requirements
Identifying CPU Characteristics
Enable or Disable Nx/xD
vMotion Errors and Warnings
VM Map View
Advanced vMotion Errors

Topic 4: Distributed Resource Scheduler (DRS) Cluster

Distributed Resource Scheduler (DRS) Overview
DRS Cluster in the vCenter Inventory
vCenter Cluster
Demo - Creating a Cluster
Configure Automation Level
Initial Placement
Dynamic Balancing/History
Demo - DRS Usage
Virtual Machine Rules
Virtual Machine to Host Rules
Virtual Machine Options
Distributed Power Management (DPM)
Enhanced vMotion Compatibility (EVC)
VM Swapfile Location

Topic 5: Datastore Clusters & Storage DRS (SDRS)

vSphere Storage API for Storage Awareness (VASA)
Profile-Driven Storage
Storage Capabilities
VM Storage Profiles
Apply Storage Profiles to VMs
Expert Tip: Known Port Conflict
Datastore Clusters
Create a Datastore Cluster

Storage DRS (SDRS) Overview

Datastore Cluster Information

Demo - Storage DRS

Topic 6: Resource Pools and Monitoring

Resource Pools

Expandable Reservations

Resource Pool Example Summary

Resource Pool Example: CPU Limits

Troubleshooting Memory Resources

Retaining 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 7: Host Profiles

Host Profiles Overview

Create Host Profile

Edit Host Profile

Attach Host Profile

Check Compliance with Host Profile

Per Host Answer Files

Apply Host Profile

Export a Host Profile

Demo - Host Profiles in vSphere 4.x

Demo - Host Profiles in vSphere 5

Topic 8: Linked Mode Group of vCenter Servers

Linked vCenter Servers Overview

Linked Mode Group Prerequisites

Create a Linked Mode Group

Manage Multiple vCenters

Topic 9: vSphere Storage Appliance (VSA)

vSphere Storage Appliance (VSA) - Overview

vSphere Storage Appliance (VSA) - Components

vSphere Storage Appliance (VSA) - Architecture

Chapter 11 Review

Chapter 12 - Patching and Upgrading ESXi

39m

Topic 1: Patching ESXi Standalone Hosts

Planned Downtime: Maintenance Mode

Patch Installation: vihostupdate.pl

Topic 2: Patching with Update Manager

Update Manager 5 Overview

Update Manager Terms

Update Manager vSphere Client Plugin

Update Manager Baselines

Update Manager Remediation Defaults and Configuration Options

Update Manager Events

Update Manager Notifications

Patch Repository

Update Manager Download Service

Update Manager Sizing Estimator

Update Manager Tab

Remediation

Topic 3: Upgrades and Migrations

Upgrade Methodology

Upgrade VirtualCenter/vCenter to a New Version

Upgrade vCenter 4.1 to 5.0

ESX/ESXi Migration to New Hardware 3.x to Any Version

Upgrade Distributed Switch to 5.0

ESXi 4.x/5.0 Migration to New Hardware - Enterprise Plus

ESX/ESXi Upgrade using Update Manager

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 12 Review

Chapter 13 - Disaster Recovery and Backup

1h 26m

Topic 1: Site Recovery Manager (SRM)

VMware Site Recovery Manager (SRM) V5.0

VMware Site Recovery Manager (SRM) V5.0 - New Features

SRM Architecture Overview

SRM - Site Recovery Infrastructure

SRM - Create Recovery Plans

SRM - Test Recovery Plans

SRM - Automate Failover

Topic 2: High Availability (HA)

VMware High Availability

New vSphere 5 HA Features

vSphere 5 HA in Action

Demo - v5 High Availability

Configure HA Cluster

VMware HA: Virtual Machine Options

Host Isolation

Guidelines for Isolation Response Setting

HA VM Monitoring

HA Datastore Heartbeating

Viewing Your HA Cluster

Troubleshooting VMware HA

Topic 3: VM Fault Tolerance

Fault Tolerance Overview

Fault Tolerance Requirements

Configure VMkernel NIC

Turn on Host Certificate Checking

Turn on Fault Tolerance

Topic 4: Microsoft Clustering

Virtualizing Microsoft Clusters

Microsoft Cluster Services

Microsoft Cluster Services Requirements

Topic 5: Backup Strategies

Backup Strategies for VMs

Topic 6: VMware Data Recovery

Data Recovery 2.0 Overview

Demo - Data Recovery Setup

Data Recovery Installation & Features

Configure Network Settings

Configure VMs to Backup

Configure Data Recovery Appliance and Setup Backup Job

Demo - Data Recovery

Topic 7: Third Party Backups

PHD Virtual Backup and Recovery 5.3 for VMware

PHD Virtual Backup v5.1 - vCenter Plugin

Quest vRanger 5.2 (formerly Vizioncore)

vRanger Pro - Screenshots

Veeam Backup & Replication v5.0.2 with vPower

Veeam Backup - Screenshot

Chapter 13 Review

Course Closure

Total Duration: 18hrs 57m