

Course Description: In this course, students will learn how to install, support, and troubleshoot a VMware Enterprise environment. Each student will setup their own ESX Server, License Server, VirtualCenter Server, and use a variety of tools to support the VMware Enterprise. Students will build, support, and troubleshoot their own server. We also take a look at 3rd Party tools to help assist in deployment and management of a Virtual Infrastructure.

Who Should Attend: This course is for System Administrators, Engineers, and Operators responsible for setup, support, and troubleshooting of ESX Server and/or VirtualCenter.

Prerequisites: Students should have system administration experience on Microsoft Windows and Linux operating systems.

Benefits of Attendance: Upon completion of this course, students will be able to:

- Install, support, and troubleshoot a VMware Enterprise environment.
- Setup their own ESX Server, License Server, and VirtualCenter Server.
- Use a variety of tools to support the VMware Enterprise.

Course Outline:

The Next Generation of Virtual Infrastructure

VMware ESX Server. Platform for virtualizing servers, storage and networking
 VMware VMFS3. High-performance cluster file system for storage virtualization
 VMware Virtual SMP. Multi-processor support for virtual machines
 VMware VirtualCenter. Centralized management, automation and optimization for I3
 VMware HA. Cost effective high availability for virtual machines
 VMware DRS. Dynamic balancing and allocation of resources for virtual machines
 VMware VMotion. Live migration of virtual machines without service interruption
 VMware VMotion Storage. Live migration of storage files without service interruption
 VMware Update Manager. Patching of ESX hosts and Virtual Machines
 VMware DPS. Distributed Power Service configuration and administration
 VMware Consolidated Backup. Centralized backup software for virtual machines
 VMware Licensing. FlexLM licensing model. Server and Host based

Terms and Concepts

VMware Terms and Concepts
 Host
 Virtual Machine (VM)
 Encapsulation
 Portability
 P2V/V2P/V2V/P2V
 Isolation
 Idealized Hardware
 Virtualization Layer
 Vmnet and Vmnic
 Virtual Switch
 Swap Space
 Root
 Case Sensitive
 Infrastructure Client
 The Service Console

Installation

Pre-installation Tasks
 The ESX Server Build Document
 Performing the Installation
 Installation of ESX Server 3.5
 Graphical Installer
 Installation Process
 Post-installation Tasks
 Log files
 Reporting a Problem
 vm-support

Configuring a Virtual Machine

Gold Builds, and Clones
 Virtual Machine Basics
 Configuring a Virtual Machine
 Loading the Operating System
 Gold Builds and Clones
 Modify Your Master
 Persistent and Nonpersistent Disks
 Shares, Reservations, and Limits
 CPU Affinity

Virtual Networking

Virtual Switches

OSI Module
 Vmnet and Vmnic
 Network Labels
 Creating Virtual Switches
 Physical and Virtual NICs
 The Service Console NIC
 Virtual and Bonded NICs
 MAC Addresses
 Manually Setting MAC Addresses
 Port Groups and VLANs
 Networking Tools
 Service Network Restart
 esxcfg Commands
 ifconfig

Physical-to-Virtual Migrations

P-to-V Terms
 P-to-V for Free
 cat Your Hard Drive
 cat P-to-V Prerequisites
 cat Process
 BartPE
 P-to-V with BartPE
 Creating Your BartPE Disc
 Including Ghost 8.0
 Including Network and Disk Drivers
 for Your Physical Server
 Creating a Share or Swing Virtual Machine
 Network and Mapped Drive Setup
 The Image Source Server
 Image the Target Virtual Server
 Prerequisites
 Hal and Ntoskrnl
 VMware P2V Converter 3.0
 PlateSpin Power2V
 P-to-V Conclusion

Server Consolidation

Server Consolidation and Virtualization Defined
 Adoption and Support of Server Virtualization
 Business Case and Technical Requirements
 Technology Strategy: Technology Refresh and Aging
 Infrastructure
 Cost Performance
 Service Agility
 Simplifying the Environment
 Compliance and Risk Reduction
 High-Level Requirements
 Classification and Estimated Work Hours
 The Financial Model
 Developing Your Project Methodology
 Establishing the Project Best Practices
 Addressing Typical Challenges
 Gathering Data and Application/Server Inventory
 Structured Interviews
 Application Inventory
 Process Documentation
 Application Repository
 Buy In and Collation
 Assessment
 Application Readiness
 Rationalization
 Technical Leadership to Provide Guidance and Structure
 Assessing Processes, Roles, and Responsibilities in Technology Design
 Testing and Validating
 Capacity Planning
 Migration

Cool Tools for a Virtual Infrastructure

Veeam
 Root Access Tools
 VMFS to VMFS Volumes Copy Tools
 Creating ISO Images
 Creating floppy Images
 Patch Management - Command Line and GUI
 PUTTY and NewSID
 PlateSpin's PowerConverter and PowerRecon
 ESXRanger Backup Solutions
 VirtualCenter 2.5 - Vmotion
 VMware Lab Manager
 vmkfstools and vmware-cmd
 vmkfstools Basics
 VMware Tools

Administering your Virtual Infrastructure

VMware Tools for Managing the Virtual Infrastructure
 ESXServer Management Interface and the Service Console
 VMware VirtualCenter
 VMware Remote Console
 Understanding Virtual Center Terms and Managed Components
 Software and Functional Components
 VirtualCenter Organizational Hierarchy
 Installing and Configuring VirtualCenter 2.5
 VirtualCenter Server System Requirements
 VirtualCenter Server and Client
 VirtualCenter Managed Host Requirements
 VirtualCenter Managed Virtual Machine Requirements
 Supported Databases
 Setting Up Microsoft SQL Server for VirtualCenter 2.0
 Creating the Database for VirtualCenter Installation
 VMware VirtualCenter 2.5 Installation Procedures
 Configuring VirtualCenter 2.5
 Logging In to Virtual Center
 Creating Data Center Groups
 Adding a New Host to a Data Center
 Configuring Security Settings in Virtual Center
 Using VirtualCenter to Administer Your Virtual Infrastructure
 Creating Virtual Machine Groups
 Managing Virtual Machine Groups and Virtual Machines
 Creating a New VM in VirtualCenter
 Cloning an Existing VM
 Creating and Customizing a Template
 Deploying the New VM from the Template
 Migrating Virtual Machines
 Hot Migration (VMotion)
 Cold Migration (Migrating Powered Down VMs without VMotion)
 Working with the VM Console in VirtualCenter
 Monitoring Resources and Managing Performance Through VirtualCenter
 Host Alarms
 Host Alarm Actions
 VM Alarms
 VM Alarm Actions
 Creating a New Host Alarm

Reviewing Events
 Viewing Performance Data and Configuring
 Resource Allocations
 Scheduled Tasks in VirtualCenter
 Using the Management Interface and Service Console to Administer the Virtual Infrastructure
 Virtual Machine Security in ESX Server
 Viewing and Editing File Permissions with the Infrastructure Client
 Creating New Users and Groups or Modifying Existing Users and Groups on ESX Server
 Modifying Existing Users or Creating New Users
 Modifying Existing Groups or Creating New Groups
 Configuring HA and DRS
 Setting up DPM (Distributed Power Management)
 Patch Manager - Patching the ESX Host and Virtual Machines
 Consolidation Manager
 Configuration Resource Pools
 Performance Monitoring and Management through ESX Server
 Performance Monitoring and Tuning

Best Practices, Gotchas, and Common Problems

Best Practices
 ESX Server Hardware
 Purchasing Supported Hardware
 Multiple NICs
 Memory
 Documentation
 Server Sizing
 Disks
 ESX Server Software
 Practice, Practice, Practice
 Security
 The Service Console's Swap Space
 VMkernel Swap Space
 Backups
 Modifying or Updating the Linux Kernel on Your ESX Server
 Virtual Machine Builds
 Using Templates
 Defrag
 Virtual Machine Swap, ESX swap and OS Swap
 Guest OS Memory Requirements
 Mixing Your Virtual Machine Workloads
 ISOs and Flop's
 Turning Off the Unnecessary
 Keeping Off the Unnecessary Administrative Tasks
 Licensing
 Gotchas
 Virtual Evolution
 Microsoft Support
 Common Problems
 Being Unable to Boot from Your Operating System ISO
 Sluggish Windows
 Shutting Down the Host

Backup Strategies for ESX Server

Backing Up the Service Console
 Backing Up Virtual Machines
 Backing Up Virtual Machines Like Physical Servers
 Pros and Cons
 Backing Up Virtual Disk Files
 Backing up Virtual Machines (Virtual

Disk) from the Service Console
 Cons and Pros
 Creating a Snapshot for Backups
 Best Practices
 General Recommendations for Backups
 Backups Planning
 Boot Disk Contents
 Backup Schedule
 SAN Snapshots

VMware Under the Covers

Understanding the ESX Server File and Directory Structure
 The Service Console Directory Structure
 Critical ESX Server Configuration Files
 The ESX Server Boot Process
 High-Level Boot Process for ESX Server
 Detailed Boot Process
 The Start-up Process
 Interaction between the Service Console, VMkernel, and Virtual Machines
 Service Console Services
 Virtual Machines Processes
 VMkernel Services

Common and Necessary Command-Line Interface (CLI) Commands

Using the Command-Line Interface
 Connecting to the Service Console
 Virtual Terminal
 Remote Access Card SSH Client
 Telnet
 Man Pages
 Command-Line Shortcuts
 Command History
 Basic Commands for Directories and Files
 Changing Directories
 Moving and Copying Files
 Finding Files and Searching Their Content
 Searching Virtual Machine Configuration Files for Important Information
 Editing Text Files
 Editing with vi and Nano
 Managing Users and Groups
 Managing Directory and File Ownership and Permissions
 Changing Permissions on a File or Directory
 Changing File or Directory Ownership or Group Affiliation
 Archiving and Compressing Files and Directories
 Mounting ISO Images, CD-ROMs, and Virtual Disks in the Service Console
 Configuring and Managing ESX Server Service Console from the Command Line
 Managing Processes, Restarting Services, and Viewing Performance Statistics
 Viewing Service Console Performance Statistics
 Managing Physical and Virtual Disks
 Installing and Managing Software Packages
 Managing Devices and Changing Hardware and Network Settings
 Managing Virtual Machines from the Command Line
 Using vmware-cmd to Manage Virtual Machines
 Viewing Performance

Data for Virtual Machines with esxtop
 Adding a New Virtual Disk, Blank Virtual Disk, and Extending Your Existing Virtual Disk
 Performing Backups and Restores of Virtual Machine Virtual Disks
 vmware-cmd and vmkfstools - Indepth Discussion and Use

Appendix A: Licensing

FlexLM licensing Model
 License Key Functionality
 Server and Host Based Licensing
 Installing the Licensing Server
 Lose of the License Server and VM Functionality
 License Types
 License File

Appendix B: Instructor notes

Setting up a Low Cost SAN
 Miscellaneous Notes
 Diskpart Usage

Appendix C: VMware Security

ESX Security
 Virtual Center Security
 Virtual Machine Security
 SAN Security

Appendix D: Logging

Virtual Center Logs
 ESX Host logs
 VM Logs
 Miscellaneous Logs

Appendix E: ESX Server 3i

What is 3i?
 Configuration 3i
 ESX to 3i Comparison

Appendix F: Module bulletins

Module Highlights

Appendix G: Helpful Websites

Helpful Websites for a Virtual Infrastructure

Appendix H: Test your Knowledge Answers

Answers to test your knowledge
 Questions at End of Modules

Appendix I: Glossary

Virtual Infrastructure Terms and Definitions