

# vSphere

## Course Description

This intensive, extended-hours training course focuses on installing, configuring, managing, and troubleshooting VMware® vSphere™, including advanced command line operations and scripting.

This course combines the complete content of the VMware vSphere 4: Install, Configure, Manage, VMware vSphere 4: Manage Availability, and VMware vSphere 4: Manage Scalability courses with advanced tasks and skills for configuring a highly available and scalable virtual infrastructure.

Upon completion, you can use the voucher included with this course to take the VMware Certified Professional exam.

This course is based on ESXi 4.0, ESX 4.0, and vCenter Server 4.0.

## Who Should Attend

Systems administrators and systems integrators who are responsible for deploying and supporting VMware.

## Required Prerequisites

- Basic knowledge of operating system administration (Windows, Unix, Linux, or others) is strongly recommended

## Related Training

- VMware vSphere 4: Install, Configure, Manage
- VMware vSphere 4: What's New

## Learning Objectives

After you complete this course, you will be able to:

- Install and configure VMware ESX/ESXi, vCenter Server, and the vSphere Management Assistant
- Configure, manage, and troubleshoot ESX/ESXi networking and storage
- Create, configure, migrate, manage, convert, and monitor virtual machines and virtual appliances
- Scale the vSphere virtual infrastructure
- Implement business continuity solutions
- Manage changes to the vSphere environments

# VMware vSphere 4 Fast Track

## Module 1. Introduction to VMware Virtualization

- Virtualization and vSphere components
- What virtualization is and how it works
- Benefits of using a virtual machine
- vSphere components
- Scenarios for using virtualization

## Module 2. Configuring VMware ESX/ESXi

- Overview of ESX/ESXi
  - Features and versions
  - ESX/ESXi architecture
- Configuring ESX/ESXi
  - Accessing ESX/ESXi
  - Configuring ESX/ESXi settings
  - Processor and memory configuration
  - Licensing
  - NTP client
  - DNS and routing
  - User account best practices
  - Viewing ESX/ESXi system logs

## Module 3. Installing and Using VMware vCenter Server

- Installing vCenter Server
  - vSphere Server architecture
  - Installing vSphere Server
  - Installing vSphere Client
  - Installing a vSphere Server additional module
- Using vCenter Server
  - Using the vSphere Client
  - vSphere Server inventory objects
  - Adding license keys to vCenter Server
  - Viewing logs and events
  - Creating a vCenter administrator
- Installing vSphere Management Assistant
  - Accessing vCLI)
  - Installing vCLI or vMA
  - Commands and authentication parameters

## Module 4. Networking

- vNetwork Standard Switches
  - Components of a vNetwork standard switch
  - vNetwork connection types
  - vNetwork standard switch configuration
- vSphere CLI Network Management
  - Using vCLI to configure networking for an ESX/ESXi host
  - Using the command line to configure networking for an ESX/ESXi host
- vNetwork Distributed Switches
  - Benefits of using vNetwork distributed switches
  - vNetwork distributed switch architecture
  - Creating a vNetwork distributed switch
  - Managing a vNetwork distributed switch using the vSphere Client
- Modifying Virtual Switch Properties
  - Properties of a distributed switch
  - Properties and policies of a distributed port group

## Module 5. Storage

- Storage Concepts
  - vSphere storage technologies and datastores
  - Various ways to view storage information
  - Storage device naming convention
- Fibre Channel SAN Storage
  - Uses of Fibre Channel with ESX/ESXi
  - Fibre Channel components and addressing
  - Accessing Fibre Channel storage
  - Viewing Fibre Channel storage information

# VMware vSphere 4 Fast Track

## Module 5 (continued)

- iSCSI Storage
  - Uses of iSCSI storage with ESX/ESXi
  - iSCSI components and addressing
  - Configuring iSCSI initiators
  - Viewing iSCSI storage information
- VMFS Datastores
  - Creating, growing, and deleting a VMFS datastore
- NAS Storage and NFS Datastores
  - NFS components and addressing
  - Creating an NFS datastore
  - Viewing the contents of a datastore
  - Unmounting an NFS Datastore
- vSphere CLI Storage Management
  - Using the command line to configure storage for an ESX/ESXi host

## Module 6. Virtual Machines

- Virtual Machine Concepts
  - What is a virtual machine?
  - Virtual machine hardware and files
- Creating a Virtual Machine
  - Positioning a virtual machine
  - Importing a virtual appliance
- Creating Templates and Clones
  - Creating a template and deploying a virtual machine
  - Cloning a virtual machine
  - Allowing guest operating system customization by vCenter Server
- VMware vCenter Converter
  - Capabilities of vCenter Converter
  - Importing a system into vCenter Server
  - Hot and cold cloning

## Module 6 (continued)

- Modifying Virtual Machines
  - Virtual machine settings and options
  - Adding a hot-pluggable device
  - Increasing the size of a virtual disk using hot extend feature
  - Adding an RDM
- Managing Virtual Machines
  - Virtual Machine snapshots
  - Removing a virtual machine
  - Different types of migration
  - Migration using VMware Storage VMotion

## Module 7. Access Control

- Roles and Permissions
  - Define and create a permission
  - Rules for applying permissions
  - Creating a custom role
  - Benefits of using VMware vSphere Web Access
  - Tasks that can be performed in vSphere Web Access

## Module 8. Resource Monitoring

- Virtual CPU and Memory Concepts
  - Optimizing CPU and memory
- Monitoring Resource Usage
  - CPU
  - Memory
  - Disk
  - Network bandwidth
- Resource Monitoring with vSphere CLI
  - Retrieve performance data for an ESX/ESXi host
  - Using commands: resxtop and vm-support
- Using Alarms
  - Creating alarms with condition-based triggers
  - Creating alarms with event-based triggers
  - Viewing and acknowledging triggered alarms

# VMware vSphere 4 Fast Track

## Module 9. Scalability

- Scaling CPU and Memory Management
  - CPU and memory resource allocation settings
  - What is a resource pool?
  - Creating a resource pool
  - Viewing resource allocation
- Scaling VMFS Datastore Usage
  - Thin provisioning
  - Creating thin-provisioned virtual machines
  - Virtual machine disk format
  - Converting thin-provisioned disks to thick
  - Virtual disk storage allocation and usage
  - Risks associated with thin provisioning
  - Monitoring VMware vStorage VMFS datastore usage
  - Disk usage and disk over allocation alarms
- Managing Multiple vCenter Server Inventories
  - VMware vCenter Linked Mode components and operation
  - Benefits and requirements of vCenter Linked Mode
  - Joining a vCenter Server system to a Linked Mode group
  - vCenter Server inventories in a Linked Mode group
  - Isolating a vCenter Server system from a Linked Mode group
- VMware VMotion Migration
  - Importance of VMware VMotion
  - VMotion requirements: Virtual machine and host
  - Performing a VMotion migration

- VMware Distributed Resource Scheduler
  - Functions of a DRS cluster
  - Benefits of EVC
  - Creating and viewing a DRS cluster
  - Removing a host from a DRS cluster
- VMware Distributed Power Management
  - VMware DPM operation
  - Comparing Intel SpeedStep and AMD PowerNow! to VMware DPM
  - Wake protocols
  - Configuring VMware DPM

## Module 10. High Availability and Data Protection

- High Availability (HA)
  - vSphere features that support HA
  - VMware HA functionality
  - Enabling VMware HA in a VMware Distributed Resource Scheduler (DRS) cluster
  - Configuring VMware HA settings
  - Admission control policies
- Troubleshooting VMware HA
  - Operation of VMware HA with redundant networks
  - Configuring redundant heartbeat networks and isolation test addresses
  - Testing redundant HA networks
  - Troubleshooting common VMware HA configuration issues
  - Best practices when configuring VMware HA clusters

# VMware vSphere 4 Fast Track

## Module 10 (Continued)

- Fault Tolerance
  - Benefits of VMware FT
  - FT prerequisites
  - FT operation and interoperability
  - FT best practices
  - Configuring logging
  - Configuring, monitoring, and testing a fault-tolerant virtual machine
- VMware vCenter Server Heartbeat
  - Benefits and components of vCenter Server Heartbeat
  - vCenter Server Heartbeat operation
  - Installing, configuring, and monitoring a vCenter Server Heartbeat
  - Performing a vCenter Server switchover
- Data Protection
  - Backing up ESX/ESXi hosts and virtual machines
  - VMware data-protection solutions: VCB and data recovery
  - Backing up a virtual machine using Data Recovery

## Module 11. Configuration Management

- Host Profiles
  - Host Profiles components and operation
  - Host Profiles benefits
  - Managing ESX/ESXi configuration compliance using a host profile
- VMware vCenter Update Manager
  - Update Manager capabilities and components
  - Installing Update Manager
  - Using Update Manager to create, attach, and remediate baselines

## Module 12. Installing VMware ESX and ESXi

- ESX and ESXi Installation
  - Choosing between ESX & ESXi
  - Installing ESXi
  - Installing ESX
- ESX Scripted Installation
  - ESX host installation methods
  - Benefits of scripted installation
  - Scripted installation components and operation
  - Creating a kickstart file
  - Performing a scripted installation

### Lab 1: Configuring ESX

- Log in to the ESX host using the vSphere client
- View information about your host's hardware
- View information about your virtual machine
- Configure the ESX host as an NTP client
- Add DNS server and default gateway information to an ESX host
- Export the host's system logs

### Lab 2: Installing VMware vCenter Server

- Access your vCenter Server system
- Configure a SQL Server ODBC connection to a preconfigured database
- Install vCenter Server
- Install the vCenter Client
- Check the vCenter Server installation
- Install an additional vCenter Server module: vCenter Converter
- Install and enable a plug-in: Converter plug-in

# VMware vSphere 4 Fast Track

## Lab 3: Using VMware vCenter Server

- Add container objects to the Host and Clusters inventory view
- Add your ESX host to the Hosts and Clusters inventory view and display general host information
- Add folder objects to the VMs and Templates inventory view
- Add vCenter Server and ESX host license keys

## Lab 4: Installing vSphere Management Assistant

- Import the vMA
- Run the vMA virtual machine and log in to vMA
- Verify that the vMA can connect to your ESX host

## Lab 5: Configuring Network Using the Command Line

- Log in to vMA and create a session file
- Create a virtual switch
- Add a port group to an existing virtual switch
- Edit the VLAN settings
- Delete a port group
- Delete a virtual switch
- Log out of vMA

## Lab 6: Standard and Distributed Switches

- Identify the capabilities of distributed and standard switches
- View the default vNetwork standard switch configuration
- Create a vNetwork distributed switch for the virtual machine network
- Verify that your virtual machine has proper access to the Production Network
- Create a distributed switch for the VMotion network
- Identify uplink abstraction

## Lab 7: Designing a Network Configuration

- Analyze the requirements
- Design virtual switches and physical connections

## Lab 8: iSCSI Datastore

- Create a VMkernel port on the standard switch, vSwitch0
- Configure the iSCSI software adapter
- View iSCSI storage information

## Lab 9: VMFS Datastores

- Display information about shared storage
- View information about existing VMFS datastores
- Change the name of a local datastore
- Create a VMFS database
- Grow an existing VMFS datastore
- Add an extent to a VMFS datastore
- Remove and extent by removing the entire VMFS datastore
- Recreate the VMFS datastore without the additional extent

## Lab 10: NFS Datastore

- Verify that a VMkernel port exists for NFS access
- Create an NFS datastore

## Lab 11: (Optional) Configuring Storage Using the Command Line

- Log in to vMA and create a session file
- Configure NFS (Optional)
- Configure the iSCSI software initiator (Optional)
- Use the vSphere Client to examine storage devices on an ESX host
- Use the command line to examine storage devices on an ESX host
- Log out of vMA

# VMware vSphere 4 Fast Track

## Lab 12: Creating a Virtual Machine

- Create a virtual machine
- Install a guest operating system in a virtual machine
- Create a virtual machine on an iSCSI VMFS datastore
- Import a virtual machine into the inventory
- Install VMware Tools into a Windows guest operating system
- Enable time synchronization between the virtual machine and the host
- Copy files to a virtual machine

## Lab 13: Using Templates and Clones

- Configure guest operating system customization on vCenter Server system
- Create a template
- Deploy a virtual machine from a template
- Clone a virtual machine that is powered on

## Lab 14: VMware vCenter Converter

- Prepare a system for hot cloning
- Hot-clone a system

## Lab 15: Modifying a Virtual Machine

- Modify a virtual machine's disk, memory, and name
- Add a raw LUN to an existing virtual machine and verify that the guest operating system sees the new disk

## Lab 16: Managing Virtual Machines

- Remove a virtual machine from the vCenter Server inventory
- Re-add the virtual machine and verify that it appears in the inventory
- Delete a virtual machine from the disk and verify that it cannot be accessed
- Take snapshots of a virtual machine
- Revert to a snapshot
- Migrate a virtual machine using Storage VMotion

## Lab 17: Access Control

- Create a Windows account on the vCenter Server system
- Create the Virtual Machine Creator role
- Assign the role to a user
- Verify that the user can create a virtual machine
- Restrict virtual machine creation to the local datastore only
- Create a role named Template Deployer (Optional)

## Lab 18: Monitoring Virtual Machine Performance

- Monitor CPU utilization using vCenter Server
- Run a CPU-intensive application
- Undo changes made to your virtual machine for this lab

## Lab 19: Viewing Performance Data Using the Command Line

- Use resxtp to retrieve performance metrics on CPU, networking, and memory
- Log out of vMA

## Lab 20: Using Alarms

- Create a virtual machine alarm
- Trigger the virtual machine alarm then acknowledge it
- Disable a virtual machine alarm

## Lab 21: Resource Pools

- Create resource pools
- Verify resource pool functionality

## Lab 22: Thin Provisioning

- Prepare a VMFS volume
- Configure datastore alarms
- Create thin-provisioned virtual machines
- Deploy a thick-provisioned virtual machine from template
- Grow a VMFS volume
- Inflate a thin-provisioned virtual disk
- Determine the virtual machine disk format

# VMware vSphere 4 Fast Track

## Lab 23: VMware vCenter Linked Mode

- Enable vCenter Linked Mode
- Perform a combined query from a Linked Mode group
- Execute Administration operations in a Linked Mode group
- Isolate a vCenter Server instance from a Linked Mode group

## Lab 24: Migrating Virtual Machines

- Add a second ESX host to the datacenter
- Add a second ESX host to the VMotion distributed switch
- Create a VMkernel port for your host on the VMotion distributed switch
- Verify that your virtual machines' settings meet VMotion requirements
- Verify that your ESX host meets VMotion requirements
- Connect virtual machines to the Production network of the lower-numbered ESX host
- Perform a VMotion migration of your virtual machine

## Lab 25: VMware Distributed Resource Scheduler Clusters

- Create a DRS cluster
- Populate the DRS cluster
- Verify DRS cluster functionality
- Create, test, and remove anti-affinity rules
- Create, test, and remove affinity rules

## Lab 26: VMware Distributed Power Management

- Configure IPMI/iLO as the VMware DPM wake protocol
- Test the IPMI/iLO configuration
- Configure VMware DPM

## Lab 27: Using VMware High Availability

- Modify the cluster to add VMware HA functionality
- Verify VMware HA functionality
- Identify Available Resources with the Resource Allocation tab
- Manage VMware HA slot size
- Restrict admission in the VMware HA cluster

## Lab 28: Configuring VMware High Availability Network Redundancy

- Configure and test VMware HA failure detection time
- Configure an alternative heartbeat network for VMware HA
- Configure isolation addresses
- Verify heartbeat network functionality

## Lab 29: Configuring VMware Fault Tolerance

- Enable FT logging
- Activate FT
- Test FT

## Lab 30: Installing VMware vCenter Server Heartbeat (Optional)

- Configure a virtual machine for the lab
- Prepare the primary vCenter Server system
- Create and configure the secondary server
- Install the primary vCenter Server system
- Install the secondary vCenter Server system

## Lab 31: Configuring and Testing VMware vCenter Server Heartbeat (Optional)

- Explore the Configure Server wizard
- Connect to the vCenter Server Heartbeat console
- Test failover

# VMware vSphere 4 Fast Track

## Course Outline

### Lab 32: VMware Data Recovery

- Install the Data Recover plug-in
- Modify the Data Recovery virtual machine
- Perform initial setup of the Data Recover appliance
- Create a backup job
- Create a restore job

### Lab 33: Working with Host Profiles

- Create disparate configurations
- Create a host profile
- Attach, check, and apply a host profile

### Lab 34: VMware vCenter Update Manager

- Create a folder and add a virtual machine template
- List all patches installed on your virtual machine and template
- Create a patch baseline
- Scan for updates
- Remediate the virtual machine and template

### Lab 35: Installing ESX (VDC)

- Install ESX software
- Access the installed ESX host using the vSphere client

### Lab 36: Installing ESX (DVD)

- Install ESX software
- Access the installed ESX host using the vSphere client

### Lab 37: Scripted Installation (VDC)

- Edit an installation script
- Upload the installation script to an NFS repository
- Complete a scripted installation of an ESX host

### Lab 38: Scripted Installation

- Edit an installation script
- Upload the installation script to an NFS repository
- Complete a scripted installation of an ESX host