

## **VMware vSphere 5.1 with ESXi and vCenter**

### **Course Summary**

#### **Description**

This powerful 5-day class is an intense introduction to virtualization using VMware's vSphere™ 5.1 including VMware ESX™ 5.1 and vCenter™. Assuming no prior virtualization experience, this class starts with the basics and rapidly progresses to more advanced topics. More than 40% of class time is devoted to labs so concepts, skills and best practices are developed and reinforced.

Initial labs focus on installation and configuration of stand-alone ESXi servers. As the class progresses, shared storage, networking and centralized management are introduced. The class continues on to more advanced topics including resource balancing, high availability, back up and recovery, troubleshooting and more. Disaster recovery, rapid deployment, hot migration and workload consolidation are also covered.

This class is unique in its approach; which is to identify common IT pain points and then clearly explain and demonstrate how virtualization delivers clear, tangible benefits (e.g.: reduced costs, greater consistency, responsiveness, reduced administration, server consolidation, etc.). Each topic is presented from the perspective of delivering key business value; not just the technical or mechanical aspects of the software.

#### **Objectives**

**At the end of this course, students will be able to:**

- Explain the many significant benefits of virtualization
- Install ESXi Server according to best practices
- Configure and manage local storage
- Create virtual, distributed virtual, and virtual to physical LAN segments
- Understand and use shared SAN storage including Fibre SAN, iSCSI SAN
- Define and use file share (NAS) datastores
- Install, configure and administer VMware vCenter
- Create virtual machines, install operating systems and applications
- Rapidly deployment of VMs using golden-master templates
- Create clones - one-time copies of virtual machine
- Perform VM cold migrations, hot migrations and Storage VMotion
- Configure, manage, monitor and secure users and groups
- Understand the benefits and trade offs of network, SAN,
- Deploy and use VMware Data Recovery to back up and recover VMs
- Create and manage load balanced clusters
- Manage power consumption with Distributed Power Management
- Understand, create and manage high availability clusters to protect against VM service loss caused by ESXi server failures
- Monitor and tune both ESXi and virtual machine performance
- Patch and update ESXi servers using vCenter Update Manager
- Understand how VMware and third party products, including operating systems, are impacted by virtualization
- Troubleshoot common problems

## VMware vSphere 5.1 with ESXi and vCenter

### Course Summary (cont'd)

#### Topics

- Virtualization Infrastructure
- How to Install ESXi 5.0 Installable
- Virtual and Physical Networking
- NAS Shared Storage
- Virtual Hardware and Virtual Machines
- vCenter
- VM Rapid Deployment using Templates, Clones
- ESXi and vCenter Permission Model
- Advanced Virtual Networking
- Using Fibre and iSCSI Shared Storage
- VMware File System (VMFS)
- Resource Management and Resource Pools
- Guided Consolidation
- Load Balancing w. Distributed Resource Scheduler
- Failure Recover with High Availability Clusters
- Back Up, Recovery
- Consolidation with vCenter Converter
- ESX and vCenter Alarms
- Managing Scalability and Performance
- Patch Management with VMware Update Manager
- Final Thoughts

#### Audience

This class is suitable for anyone who want to learn how to extract the maximum benefit from their investment in Virtual Infrastructure, including:

- System architects or others who need to design virtual infrastructure
- Security specialists responsible for monitor, managing, securing and administering Virtual Infrastructure
- Operators responsible for day-to-day operation of Virtual Infrastructure
- Performance and capacity analysts who need to understand, provision, monitor and performance tune Virtual Infrastructure
- Backup Administrators who need to understand the impact of existing and new back up strategies in a virtual environment
- Business Continuity specialists responsible for disaster recovery and high availability
- Storage administrators who need to understand how VMware ESX uses Fibre SAN and iSCSI SAN volumes and NAS datastores
- Managers who need an unbiased understanding of virtualization before committing their organization to a virtual infrastructure deployment.

#### Prerequisites

Students should have user, operator or administrator experience on common operating systems such as Microsoft Windows®, Linux™, UNIX™, etc. Experience installing, configuring and managing operating systems, storage systems and or networks is useful but not required. We assume that all attendees have a basic familiarity with PC server hardware, disk partitioning, IP addressing, O/S installation, networking, etc.

#### Duration

Five days

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### Course Outline

- I. Virtualization Infrastructure**
  - A. Virtualization explained
  - B. How VMware virtualization compares to traditional PC deployments
  - C. Common pain points in PC Server management
  - D. How virtualization effectively addresses common IT issues
  - E. VMware vSphere software products
- II. How to Install ESXi 5.1 Installable**
  - A. Understanding ESXi
  - B. Selecting, validating and preparing your server
  - C. Storage controllers, disks and partitions
  - D. Software installation and best practices
  - E. Joining ESXi to a Domain
  - F. First look at the VMware vSphere Client
- III. Virtual and Physical Networking**
  - A. vNetwork standard and distributed virtual Switches
  - B. Virtual Switches, Ports and Port Groups
  - C. Creating VMkernel ports
  - D. Creating, sizing and customizing Virtual Switches
- IV. NAS Shared Storage**
  - A. Benefits Shared Storage offer to Virtual Infrastructure
  - B. Shared Storage options
  - C. NFS Overview
  - D. Configuring ESX to use NFS Shares
  - E. Troubleshooting NFS connections
- V. Virtual Hardware and Virtual Machines**
  - A. VM virtual hardware, options and limits
  - B. Sizing and creating a new VM
  - C. Assigning, modifying and removing Virtual Hardware
  - D. Working with a VM's BIOS
  - E. VMware remote console applications
  - F. Installing an OS into a VM
  - G. Driver installation and customization
- VI. vCenter**
  - A. vCenter feature overview and components
  - B. VMware Licensing
  - C. Organizing vCenter's inventory views
  - D. Importing ESX hosts into vCenter management
  - E. Troubleshooting vCenter
- VII. VM Rapid Deployment using Templates, Clones**
  - A. Templates - Virtual Machine Golden Master images
  - B. Creating, modifying, updating and working with Templates
  - C. Patching, and refreshing Templates
  - D. Cloning, one time copies of VMs
  - E. Best practices for cloning and templating
- VIII. ESXi and vCenter Permission Model**
  - A. VMware Security model
  - B. Configuring local users and groups
  - C. Managing local permissions
  - D. vCenter security model
  - E. Local, Domain and Active Directory users and groups
  - F. How permissions are applied
- IX. Advanced Virtual Networking**
  - A. Uplinking Virtual and Physical Network segments using NICs
  - B. Distributed virtual switches and distributed Port Groups
  - C. NIC teaming for redundancy and Performance
  - D. Connecting to vLANs
  - E. Enhanced Network Security
  - F. Virtual routers and firewalls
  - G. Assigning physical NICs to VMs
- X. Using Fibre and iSCSI Shared Storage**
  - A. Fibre SAN overview
  - B. Identifying and using Fibre Host Bus Adapters
  - C. Scanning and Rescanning Fibre SANs
  - D. iSCSI overview
  - E. Virtual and physical iSCSI adapters
  - F. Connecting to iSCSI storage
  - G. Scanning and rescanning iSCSI SANS
  - H. Performance and redundancy considerations and best practices

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**VMware vSphere 5.1 with ESXi and vCenter****Course Outline****XI. VMware File System (VMFS)**

- A. Unique file system properties of VMFS
- B. Managing shared Volumes
- C. Creating new VMFS partitions
- D. Managing VMFS capacity with LUN spanning and LUN expansion
- E. Native and 3rd party Multipathing with Fibre and iSCSI SANs
- F. VMFS performance considerations

**XII. Resource Management and Resource Pools**

- A. How ESX delivers resources to VMs
- B. Shares, Reservations and Limits
- C. CPU resource scheduling
- D. Memory resource scheduling
- E. Resource Pools

**XIII. Guided Consolidation**

- A. Use Guided Consolidation to discover, Domains, Workgroups and servers
- B. Extract hardware profiles from select servers
- C. Monitor physical server resource consumption
- D. Select and convert physical servers to VMs
- E. Chapter 14 - VM Hot and Cold Migration, Storag

**XIV. Load Balancing w. Distributed Resource Scheduler**

- A. Delegated resource management with Resource Pools
- B. Resource balanced clusters with VMware Distributed Resource Scheduler
- C. DRS Cluster configuration and tuning
- D. Per-VM cluster policy overrides

**XV. Failure Recover with High Availability Clusters**

- A. High Availability options to minimize unplanned down time
- B. VMware High Availability clusters
- C. VMware Fault Tolerance

**XVI. Back Up, Recovery**

- A. Pro's and Con's of traditional back up strategies
- B. Backing up VMs with VMware Data Recovery
- C. Backing and restoring your ESXi server configuration
- D. Third party VM back up solutions

**XVII. Consolidation with vCenter Converter**

- A. vCenter Converter overview
- B. Converting physical machines, virtual machines and OS Images
- C. Cold migrations of physical machines to virtual machines
- D. Hot migrations of physical machines to virtual machines

**XVIII. ESX and vCenter Alarms**

- A. Alarm categories and definitions
- B. Creating custom alarms and actions
- C. Reviewing alarms and acknowledging them

**XIX. Managing Scalability and Performance**

- A. VMkernel CPU and memory resource management mechanisms
- B. Tuning VM storage I/O performance
- C. Identifying and resolving resource contention
- D. Monitoring VM and ESX host performance
- E. Performance and capacity planning strategies

**XX. Patch Management with VMware Update Manager**

- A. Configure and enable VMware Update Manager
- B. Establishing a patch baseline
- C. Verifying compliance and patching ESXi hosts

**XXI. Final Thoughts**

- A. Consolidation guidelines for VMs and Storage
- B. Determining which workloads to consolidate
- C. Other considerations