# VMware vSphere 5.1 Boot Camp

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| **Format** | 5-day 10hr/day instructor led training |
| **Course Books** | 700+ pg Study Guide with slide notes<br>250+ pg Lab Guide with detailed steps for completing labs |
| **vSphere Version** | Covers VMware vSphere 5.1 including ESXi 5.1 and vCenter |
| **Delivery** | Remote access to dedicated rack of servers with one **HP DL365 server/student,** an iSCSI SAN, etc. |
| **Max Attendees** | Limited by server availability. We currently have 150+ student servers available |
| **Requirements** | Course can be run from any location that has a reliable Internet connection. Each attendee needs a PC that supports Microsoft Terminal Services |
| **Lab Time** | 40+% of class time is devoted to hands-on labs |
| **Availability** | January, 2012 |
| **Certification** | Prepares attendees to challenge the ESXLab Certified Virtualization Specialist exam |

## Overview

This powerful 5-day 10hr/day class is an intensive introduction to VMware 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 advanced topics. 40+% of class time is devoted to labs so concepts, skills and best practices are developed and reinforced.

Labs start with installation and configuration of stand-alone ESXi servers and progress to shared storage, networking and centralized management. The class continues to advanced topics including resource balancing, high availability, power management, back up and recovery, performance, vCenter redundancy, VM redundancy. Disaster recovery, rapid deployment, hot migration and workload consolidation are also covered.

This class is unique in its approach; which is to identify and eliminate common IT pain points and then to use virtualization to delivers clear, tangible benefits. Each topic is presented from the perspective of delivering key business value; not just the technical or mechanical aspects of the software.

The 10hr/day format gives attendees the time to learn about and use advanced VMware topics and develop superior VMware management, deployment and troubleshooting skills.

By the end of the class, attendees will have learned the benefits, skills, and best practices of virtualization. Attendees will be able to design, implement, deploy, configure, monitor, manage and troubleshoot VMware vSphere 5.1.

## Objectives

At the end of the course, attendees 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 Single Sign On services and vSphere Inventory Services
- Install, configure and administer VMware vCenter for Windows
- Create virtual machines, install operating systems and applications
- Configure and use hotplug hardware including hot-add vCPUs and Memory
- Add and grow virtual disks including system disks and secondary volumes
- 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 Protection to back up and recover VMs
- Create and manage load balanced clusters
- Enable, configure and use Distributed Power Management to reduce electrical power by soft powering off unneeded ESXi servers
- Understand, create and manage high availability clusters to protect against VM service loss caused by ESXi server failures
- Configure VMs for zero unplanned downtime by deploying vSphere Fault Tolerance
- 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
- Create, administer, back up and recover vNetwork Distributed Switches
- Troubleshoot common problems

## Who Should Attend?

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

Attendees 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.


## Chapter List

Our class consists of the following 22 chapters:

1. Virtualization Infrastructure Overview
2. How to Install, Configure ESXi 5.1 Installable(HoL1)
3. Virtual and Physical Networking(HoL)
4. NAS Shared Storage(HoL)
5. Virtual Hardware and Virtual Machines(HoL)
6. vCenter(HoL)
7. VM Rapid Deployment using Templates, Clones(HoL)
   Advanced Virtual Hardware - Hot Plug CPU/Memory(HoL)
   Virtual Router Firewalls(HoL)
8. ESXi and vCenter Permission Model(HoL)
9. Using Fibre and iSCSI Shared Storage(HoL)
   Work with Raw Device Maps(HoL)
10. VMFS – The VMware Cluster File System(HoL)
11. Resource Management and Resource Pools(HoL)
12. ESX and vCenter Alarms(HoL)
13. Host Profiles(HoL)
14. Consolidation with vCenter Converter Standalone(HoL)
15. Back Up, Recovery with VMware Data Protection(HoL)
16. VM Hot and Cold Migration, Storage VMotion(HoL)
17. Load Balancing w. Distributed Resource Scheduler(HoL)
    DRS Power Management - Configure and Test(HoL)
    Storage I/O Control and Storage DRS Clusters (HoL)
18. Failure Recovery with High Availability Clusters(HoL)
    VM Fault Tolerance - Configure and Test(HoL)
19. Patch Management with VMware Update Manager(HoL)
20. Distributed Virtual Switches - Configure, Back Up and Recover(HoL)
21. Managing Scalability and Performance(HoL)
22. Final Thoughts

## Hands On Labs

Attendees will complete the following hands on labs during the class:

- Install of ESXi 5.1 and perform post-install configurations
- Create and update network Standard Virtual Switches
- Define, connect to and browse NFS file shares
- Create a Virtual Machine and install a guest OS into the VM. Install VMware Tools into the VM. Add 3rd party tools and utilities to the VM
- Install and configure Single Sign On (SSO). Configure identity sources including Active Directory
- Install and configure vCenter on Windows 2003. Install vCenter Modules
- Configure vCenter's inventory views to organize inventory objects
- Install and configure the VMware Next Generation Web Client
- Work with Clones and Templates. Convert a VM into a template. Rapidly deploy new VMs from template. Copy VMs using cloning. Use guest OS customization to easily change the identity of a VM. Create, update and deploy VMs using Guest OS Customization Specifications
- Work with virtual disks. Hot add a secondary virtual disk. Grow a non-system volume. Grow a Windows system disk and increase it's partitions without the need for 3rd party tools
- Configure and test hotplug memory
- Create multi-core vCPUs
- Test multihoming a VM by creating a virtual firewall/router
- Work with vCenter permissions. Use and customize Roles
- Create, update and work with Network Standard vSwitches. Create NIC Teams for added performance and redundancy
- iSCSI, Fibre Storage Area Networks. Connecting to shared storage
- Configure and add a Virtual Raw Device Map to a VM
- VMware VMFS – VMware's proprietary cluster file system. How to create, tune and grow VMFS volumes
- Resource management. Work with resource tuning settings. Create, manage and monitor Resource Pools
- VM migration including Cold Migration, Storage Migration and VMotion
- Automated VM resource load balancing with DRS clusters
- Create a DRS Power Managed DRS cluster. Test Power Management
- Use HA clusters to minimize VM down time due to server failures

- Configure a Fault Tolerant VM. Simulate a ESXi host failure to ensure no VM down time
- Back up and restore VMs using VMware Data Protection
- Using Converter Enterprise to migrate physical machines to VMs
- vCenter alarms for monitoring key infrastructure objects. Send SNMP traps to a trap receiver on high VM resource consumption
- Set up VMware Update Manager to patch/update ESXi hosts
- Enable and test VMware Storage I/O control to implement share based disk I/O scheduling
- Create and test a Storage DRS LUN cluster
- Create a distributed virtual Switch. Back up and restore the vDS configuration
- Performance analysis and benchmarking storage and networking

## Certification

Attendees have the option to earn ESXLab Certified Virtualization Specialist (ECVS) by challenging a certification exam at the end of the course.

## Detailed Chapter List

### *Chapter 1 - Virtualization Infrastructure Overview*

- Virtualization explained
- How VMware virtualization compares to traditional PC deployments
- Common pain points in PC Server management
- How virtualization effectively addresses common IT issues
- VMware vSphere software products

### *Chapter 2 – How to Install, Configure ESXi 5.1 Installable*

- Understanding ESXi
- Selecting, validating and preparing your server
- Storage controllers, disks and partitions
- Software installation and best practices
- Joining ESXi to a Domain
- First look at the VMware vSphere Client


## *Chapter 3 – Virtual and Physical Networking*

- vNetwork standard and distributed virtual Switches
- Virtual Switches, Ports and Port Groups
- Creating VMkernel ports
- Creating, sizing and customizing Virtual Switches

## *Chapter 4 – NAS Shared Storage*

- Benefits Shared Storage offer to Virtual Infrastructure
- Shared Storage options
- NFS Overview
- Configuring ESX to use NFS Shares
- Troubleshooting NFS connections

## *Chapter 5 – Virtual Hardware and Virtual Machines*

- VM virtual hardware, options and limits
- Sizing and creating a new VM
- Assigning, modifying and removing Virtual Hardware
- Working with a VM's BIOS
- VMware remote console applications
- Installing an OS into a VM
- Driver installation and customization

## *Chapter 6 – vCenter Server and the Next Generation Client*

- The need for Identity Source management
- Installing and configuring Single Sign On (SSO)
- Connecting to Active Directory and other identity sources
- vCenter feature overview and components
- VMware Licensing
- Registering vCenter with SSO
- Organizing vCenter's inventory views
- Importing ESX hosts into vCenter management
- Installing and Using the vSphere Next Generation vSphere Client (NGC)


## *Chapter 7 – VM Rapid Deployment using Templates, Clones*

- Templates - Virtual Machine Golden Master images
- Creating, modifying, updating and working with Templates
- Patching, and refreshing Templates
- Cloning, one time copies of VMs
- Best practices for cloning and templating
- Adding and resizing virtual disks

## *Chapter 7.1 – Advanced Virtual Machines*

- Enabling and using VM Hotplug in virtual hardware
- CPU and Memory hot plug
- Virtual NIC hot plug
- Customizing Virtual CPUs for optimal performance
- Enabling 3D hardware/software Video for desktop VMs

## *Chapter 8 – ESXi and vCenter Permission Model*

- VMware Security model
- Configuring local users and groups
- Managing local permissions
- vCenter security model
- Local, Domain and Active Directory users and groups
- How permissions are applied

## *Chapter 9 – Using Fibre and iSCSI Shared Storage*

- Fibre SAN overview
- Identifying and using Fibre Host Bus Adapters
- Scanning and Rescanning Fibre SANs
- iSCSI overview
- Virtual and physical iSCSI adapters
- Connecting to iSCSI storage and scanning and rescanning iSCSI SANS
- Performance and redundancy considerations and best practices

## *Chapter 9.1 – Raw Device Maps*

- Connecting VMs directly to SAN LUNs
- Physical vs. Virtual Raw Device Maps
- Impact of vMotion, Storage vMotion on RDMs


## *Chapter 10 – VMware File System (VMFS)*

- Unique file system properties of VMFS
- Creating and manage VMFS capacity with LUN spanning, LUN expansion
- Native and 3rd party Multipathing with Fibre and iSCSI SANs
- VMFS performance considerations

## *Chapter 11 – Resource Management and Resource Pools*

- How ESX delivers resources to VMs
- Shares, Reservations and Limits
- CPU resource scheduling
- Memory resource scheduling
- Resource Pools

## *Chapter 12 – ESX and vCenter Alarms*

- Alarm categories and definitions
- Creating custom alarms and actions
- Reviewing alarms and acknowledging them

## *Chapter 13 – Host Profiles*

- Using Host Profiles to capture an ESXi host configuration
- Perform configuration compliance scans
- Remediating out of compliance configuration issues
- Rapid ESXi host deployment/configuration with Host Profiles

## *Chapter 14 – Consolidation with vCenter Converter Standalone*

- vCenter Converter overview
- Converting physical machines, virtual machines and OS Images
- Cold migrations of physical machines to virtual machines
- Hot migrations of physical machines to virtual machines

## *Chapter 15 – Back Up, Recovery with VMware Data Protection*

- Pro's and Con's of traditional back up strategies
- Backing up VMs with VMware Data Protection
- Backing and restoring your ESXi server configuration
- Third party VM back up solutions


## *Chapter 16 – VM Hot and Cold Migration, Storage VMotion*

- Cold Migrations to new ESX hosts, datastores
- Hot Migrations with VMotion
- VMotion explanation, requirements, dependencies and troubleshooting
- Storage VMotion for hot VM disk migrations

## *Chapter 17 – Load Balancing w. DRS Clusters*

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

## *Chapter 17.1 – DRS Power Management*

- Understanding the role of Power Management
- Configuring individual ESXi hosts to enable soft power-off
- Testing vCenter power-off/power-on of ESXi hosts
- DRS Power Management settings

## *Chapter 17.2 – Storage I/O Control and Storage DRS*

- Storage I/O scheduling policies
- Enabling Storage I/O control to implement share based storage access
- Creating DRS Storage Clusters
- Tuning DRS Storage Clusters to balance out I/O loads and LUN capacity

## *Chapter 18 – Failure Recovery with High Availability Clusters*

- High Availability options to minimize unplanned down time
- VMware High Availability clusters
- VMware Fault Tolerance

## *Chapter 18.1 - HA Fault Tolerance*

- Delivering zero unplanned VM downtime with faulFault Tolerance overview, features and limitations
- Configuration, monitoring and recovery
- FT ESXi hosts and network compatibility requirements
- Creating and administering FT VMs


## *Chapter 19 – Patch Management with VMware Update Manager*

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

## *Chapter 20 – Advanced Virtual Networking*

- Understanding, creating and administering vNetwork Distributed Switches
- Migrating Standard vSwitch configurations to dvSwitches
- Backing up and recovering dvSwitches
- Troubleshooting and repairing dvSwitches
- vSwitch Security
- Traffic Shaping
- NIC Teaming strategies - Originating Port, MAC Hash, IP Hash, NIC Load and LACP

## *Chapter 21 – Managing Scalability and Performance*

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

## *Chapter 22 – Final Thoughts*

- Consolidation guidelines for VMs and Storage
- Determining which workloads to consolidate
- Other considerations


## For More Information

This class can be customized to meet your unique training and delivery needs, including:

- On-site delivery at your facility
- Custom timetables including 3-day rapid delivery boot-camps
- Content and Lab customization to meed your unique training needs
- Distance training
- Mentoring, implementation planning and assistance

For more information or to check pricing and availability, please contact your authorized ESXLab.com training partner.