ProTech Professional Technical Services, Inc.

VMware vSphere 6.7 Optimize, Upgrade, Troubleshoot

Course Summary

Description

This class provides an in-depth look at vSphere 6.7. In this course, cover how to deploy vSphere 6.7, how to optimize it – including VMs, ESXi hosts, vCenter Server Appliance, networking and shared SAN storage… with the goal of delivering both scalability and performance. We show step-by-step how to upgrade or migrate to vCenter Server Appliance 6.7, how to use VMware Update Manager to upgrade ESXi hosts and how to use VUM how to upgrade VM virtual hardware.,And, we will also show you how to diagnose, isolate and fix common problems. All of Web Client, Host Client, and command line tools are all used to explore, configure, update, investigate and zero in on performance bottlenecks and to find and fix trouble spots. Up to 45% of class time is devoted to labs so concepts, skills and best practices are developed and reinforced. By the end of the class, attendees will have learned practical, actionable skills in vSphere design, implementation, upgrading, sizing, scalability, performance optimization and troubleshooting

Topics

- Install, Configure and Secure ESXi 6.7
- Virtual and Physical Networking
- Advanced Networking
- Connecting to NAS Shared storage
- Virtual Hardware and Virtual Machines
- Upgrade, Configure vCenter Server Appliance
- Virtual Machine Rapid Deployment
- Use VMware Update Manager to Upgrade ESXi hosts
- Connecting to Fibre & iSCSI Shared Storage
- Direct VM to SAN Access with Raw Device Maps

- VMware File System (VMFS 6)
- Storage Profiles
- VMotion Migration, Cold Migration, Storage VMotion
- Managing ESXi Host Configurations with Host Profiles
- VMware High Availability Clusters
- VMware Fault Tolerance
- Storage Load Balancing with SDRS Clusters
- Distributed vSwitch Features and Scalability

Audience

This class is suitable for anyone who wants 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 administering, managing, securing Virtual Infrastructure
- vSphere Administrators responsible for day-to-day operation of Virtual Infrastructure
- vSphere Performance analysts who need to understand, provision, monitor Virtual Infrastructure
- Storage administrators who work with Fibre / iSCSI SAN volumes and NAS datastores
- Managers who need an unbiased understanding of virtualization before committing their organization to a virtual infrastructure deployment.

Prerequisites

This is not a beginner level course. Attendees should have experience installing and configuring and administering vSphere 5.x or 6.x components including ESXi, vCenter server or vCenter Server Appliance.

Duration

Five Days

Course Outline (vertical, left margin)

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Course Outline

I. Install, Configure and Secure ESXi 6.7
A. Install and configure ESXi 6.7 using Best Practices
B. Enable and secure command line access including the console and Secure Shell
C. Using Lockdown mode to restrict management access
D. Working with ESXi log files
E. Working with VMkernel Paging Files on local storage, flash storage and shared storage
F. Lockdown modes introduced in vSphere 6.7
G. Use command line tools to review and update host configurations
H. Using command line tools to create/manage users and permissions

II. Virtual and Physical Networking
A. Create / update standard Virtual Switches
B. vSwitch security policies
C. Network failure detection and beaconing
D. Enabling Discovery Protocol settings
E. Use Jumbo Frames to improve network performance
F. Use command line tools to create, update and repair Standard vSwitches
G. Use esxtop to monitor network activity

III. Advanced Networking
A. Configuring vSwitch Security policies, Promiscuous Mode, Forged Transmits and MAC address changes
B. Understanding and using Traffic Shaping
C. The Five physical NIC teaming policies including their pros / cons and use cases
D. Troubleshoot networking configuration and performance issues

IV. Connecting to and Using NAS Shared storage
A. Connecting to NFS v3 storage
B. Network design for high service availability
C. Best practices for performance and reliability

V. Virtual Hardware and Virtual Machines
A. VM virtual hardware, options and limits
B. Creating and right-sizing Virtual Machines for CPU, memory
C. Installing VMware Tools
D. Virtual Machine best practices
E. Import and export VMs in Open Virtual Machine Format
F. Implement and use vFlash Read Cache storage to accelerate VM read performance
G. Configure and use virtual NVMe vDisks

VI. Upgrade, Configure vCenter Server Appliance
A. Deploy vCenter Server Appliance 6.0 via the command line and configuration files
B. Upgrade vCenter Appliance 6.0 to vCenter Appliance 6.7
C. vCenter deployment and redundancy options
D. Connecting Single Sign On (SSO) to Active Directory and other identity sources
E. Use command line tools to backup and restore an ESXi host's configuration

VII. VM Rapid Deployment using Templates, Clones
A. How to create a Template VM
B. Using Guest OS Customization for Windows and non-Windows OS'
C. Enabling, using Hotplug Virtual CPU and memory
D. Enabling, using Hotplug disks, networking, USB devices and more

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Course Outline (cont.)

E. Predictive and adaptive sizing strategies for VMs
F. Troubleshooting Virtual Machine issues
G. Use esxtop to analyze VM performance

VIII. Use VMware Update Manager to Upgrade ESXi hosts
A. Using command line tools to backup and restore an ESXi host's configuration
B. Configure VMware Update Managers
C. Create ESXi host Patch Baselines
D. Importing a new ESXi install media image
E. Attaching a Host Upgrade patch baseline
F. Performing host compliance scans
G. Upgrading an ESXi host from ESXi 6.0 to ESXi 6.7

IX. Connecting to Fibre & iSCSI Shared Storage
A. General SAN features and capabilities
B. Overview of Fibre Storage Networks
C. VMware APIs for Array Integration (VAAI)
D. Storage network design for performance and redundancy
E. Connecting to Fibre and iSCSI shared storage
F. iSCSI Hardware and Software Initiators
G. iSCSI Static and Send Targets LUN discovery
H. Troubleshooting storage issues
I. Use esxtop to review storage controller and datastores configuration and I/O activity

X. Direct VM to SAN Access with Raw Device Maps
A. Explain Physical and Virtual Raw Device Maps (RDMs)
B. Use cases and benefits of Raw Device Maps

C. How Raw Device Maps work with VM cold, VMotion and Storage VMotion migrations
D. Using RDMs to implement Virtual and Virtual/Physical Microsoft Fail Over Clusters

XI. VMware File System (VMFS)
A. Unique file system properties of VMFS
B. Creating and managing shared Volumes
C. Managing VMFS capacity with LUN spanning and LUN expansion
D. Understand VMware multipath options
E. Benefits of using vendor multipath solutions
F. Understanding and selecting multipathing policies
G. VMFS performance, scalability and reliability considerations
H. Review storage queuing, I/O aborts and other storage issues
I. Diagnose and troubleshoot storage performance
J. VMware vSphere Flash Read Cache description and use cases
K. Troubleshooting VMFS issues
L. Use esxtop to review datastore I/O activity

XII. Storage Profiles
A. SAN and user defined storage profiles
B. Using storage speed, replication to define storage capabilities
C. VMware APIs for Storage Awareness (VASA)
D. Creating VM storage profiles
E. VM/Storage compliance checks
F. Remediating incorrectly placed VMs
G. Understanding Storage I/O Control
H. Enable priority storage queues with Storage I/O Control

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Course Outline (cont.)

XIII. *Storage Load Balancing with SDRS Clusters*
  A. Creating and using Storage Distributed Resource Scheduling clusters (SDRS)
  B. Cluster properties for capacity and I/O load balancing
  C. Best practices for building storage clusters

XIV. *VMotion Migration, Cold Migration, Storage VMotion*
  A. Cold Migrations to new ESXi hosts, datastores
  B. Hot Migrations with VMotion
  C. VMotion requirements and dependencies
  D. How VMotion works – detailed explanation
  E. Troubleshooting VMotion
  F. Storage VMotion for hot VM disk migrations

XV. *Chapter 15 – Managing ESXi Host Configurations with Host Profiles*
  A. The challenge of maintaining approved ESXi host configurations
  B. Using Host Profiles to harvest an ESXi host configuration rule set
  C. Updating a Host Profile rule set
  D. Attaching a Host Profile rule set to an ESXi host and completing a compliance scan
  E. Remediating non-compliant host configurations and verifying host configuration compliance

XVI. *VMware High Availability Clusters*
  A. Minimize unplanned VM down time VMware High Availability clusters
  B. VM requirements for HA Clusters
  C. Storage fault recovery in High Availability clusters (All Paths Down, Permanent Device Loss)
  D. Monitoring VM health in HA clusters
  E. Admission Control policy settings for predictable pCPU/pRAM resource availability

  F. Identifying and troubleshooting issues in VMware HA clusters

XVII. *VMware Fault Tolerance*
  A. Eliminate VM unplanned down time with VMware Fault Tolerance
  B. Role of the Primary and Secondary VM in a Fault Tolerance configuration
  C. Explain how Fast Checkpointing keeps the Secondary VM vCPU, vRAM, vDisk up to date
  D. Enabling VM Fault Tolerance
  E. Initial VM synchronization
  F. Testing Fault Tolerance

XVIII. *Distributed vSwitch Features and Scalability*
  A. Features and benefits of Distributed vSwitches
  B. Role of the DVUplink port group
  C. Adding ESXi hosts to dvSwitches
  D. Creating dvSwitch port groups
  E. Migrating physical NICs and VMkernel ports to dvSwitches
  F. dvSwitch configuration backup and restore
  G. Configuring custom VM MAC address generation policies
  H. Testing dvSwitch network health

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

- Install of ESXi 6.7 and perform post-install configuration steps
- Review ESXi services and configure ESXi firewall
- Enable ESXi Lockdown mode to prevent direct host configuration changes
- Create/update Standard vSwitch configurations
- Configure vSwitch Security Policies for Promiscuous Mode, MAC Address Changes and Forged Transmits
- Configure a vSwitch, VMkernel ports for Jumbo Frame use
- Connect to NFS storage

Course Outline (side vertical text)

Course Outline (cont)

- Create a new VM according to best practices
- Import and configure vCenter Server Appliance 6.0 via command line
- Perform an upgrade of vCenter Server Appliance from v6.0 to v6.7
- Use vCLI command line tools like esxcli, localcli, vmware-cmd and other commands
- Use esxtop to monitor resource use and pinpoint performance concerns
- Rapidly deploy VMs from Templates and Clones
- Tune VM vCPU to maximize CPU performance
- Implement an ESXi host vFlash Read Cache volume
- Enable and use Hot-plug virtual hardware
- Monitor storage controller queue length and performance
- Monitor ESXi host and VM memory use
- Update VMs for service by pCPU cores (not hyperthreaded logical processors)
- Configure and use VMware Update Manager to update an ESXi host from ESXi 6.0 to ESXi 6.7
- Use VMware Update Manager to upgrade a VM's virtual hardware
- Connect to an iSCSI SAN
- Create VMFS file systems
- Expand VMFS using LUN Spanning and LUN expansion
- Create custom storage profiles and assign them to VMFS volumes
- Assign storage profiles to VMs
- Perform storage compliance checks and remediate non-compliant VMs
- Create Storage DRS clusters and use Storage DRS to manage storage capacity and I/O load
- Create a High Availability Cluster
- Configure All Paths Down and Permanent Device Loss policies in an HA cluster
- Create a multi-core Fault Tolerant VM
- Create Distributed vSwitches

- Bulk migrate VMs from Standard to Distributed vSwitches
- Work with dvSwitch Configuration Backup Up and Restore
- Enable and use dvSwitch Health Management
- Using dvSwitch port shadowing
- Testing network health on dvSwitches
- Work with dvSwitch configuration roll back and recovery

HoL – Every attendee performs one or more Hands on Labs at the end of each chapter