

VMS-ICM v5.5 - VMware vSphere: Install, Configure, Manage Training Program



Course Outline

Chapter 01 - Course Introduction and Methodology

Learn IT! Do IT! Know IT!
 Certified Virtualization Expert (CVE) Certification
 VMTraining's Physical Setup
 VMTraining's Setup Student to Datacenter
 VMTraining's Network IP Setup
 Chapter 01 Review

Chapter 02 - Virtualization Overview

Why Virtualize?
 Why Virtualize? - Cost Savings
 VMware ROI TCO Calculator v2.0
 Why Virtualize? - Simplified Management!
 What is Virtual Infrastructure?
 What is a Virtual Machine (VM)?
 Type 1 and Type 2 Hypervisors
 Cloud Computing
 VMware vCloud
 VMware Virtualization Products
 VMware Go
 VMware Server 2.0
 VMware Infrastructure 3 (VI3)
 vSphere 4 Features
 vSphere 4.1 - Features Added
 vSphere 4.1 Update 1 (2011/02/10) - New Features
 vSphere 5 Host Features
 vSphere 5 Network Features
 vSphere 5 Storage Features
 vSphere 5 vCenter Features
 vSphere 5 VM HW Ver. 8
 vSphere 5 Misc Features
 VMware vCenter Server
 VMware vCenter Orchestrator
 VMware View 4.6 (Virtual Desktop Infrastructure)
 VMware Workstation 8
 VMware ACE 2.7
 VMware Fusion 4.0.1
 VMware Player 3.1.4
 Windows/Microsoft Virtual PC 2007
 Microsoft Virtual Server 2005 R2 SP1
 Windows Server Virtualization Hyper-V R2 SP1 (Windows Server 2008 R2)

System Center Virtual Machine Manager 2008 R2 SP1
 SCVMM 2008 R2
 XenServer Enterprise v5.6 SP2
 XenDesktop & Essentials for XenServer
 Virtualization Platforms
 Chapter 02 Review

Chapter 03 - Planning and Installing ESX/ESXi

Topic 1: Planning the ESXi Deployment
 Physical Hardware Requirements
 vSphere Hypervisor 5 (VMware ESXi)
 VMware ESXi 5
 Booting ESXi from a SAN LUN (Fibre Channel or iSCSI)
 Booting ESXi from a SAN LUN
 Linux, Windows & ESX/ESXi
 Topic 2: vSphere 5 Deployment Guidelines
 Overview of Deployment Planning
 ESXi Compatibility Guides
 Determining ESX/ESXi Physical Host Size
 VMware Capacity Planner
 Storage: Capacity and Performance
 Memory Overcommitment
 Topic 3: vSphere Hypervisor (ESXi) Installation
 vSphere Hypervisor 5 Installable
 Demo: Installation of ESXi 5
 Local Configuration of ESXi 5 using DCUI
 Demo - Install ESXi 5
 UDA 2.0 Script ESXi/ESX Installation
 Demo - ESXi Host Install
 vSphere 5 ESXi Image Builder CLI
 vSphere 5 Auto Deploy for ESXi Installation
 vSphere 5 Auto Deploy Process
 vSphere 5 Auto Deploy Architecture
 Topic 4: Configuring Hostname Resolution and NTP
 Hostname Resolution in ESXi
 Configuring DNS Settings
 Time Synchronization
 Demo - ESXi NTP Information
 Topic 5: Troubleshooting ESXi
 esx.conf Settings
 ESXi/ESX Server Health Check
 ESXi Host Boot Process

Resetting root Password ESXi 5
 Troubleshooting ESXi CIM Management Agents
 Troubleshooting: vmware-hostd
 Purple Screen Of Death (PSOD)
 Chapter 03 Review

Chapter 04 - Using Tools to Administer a VMware Environment

Topic 1: Overview of 3rd Party Tools
 Veeam (veeam.com)
 Veeam nworks 5.6
 Veeam - FastSCP 3.0.3 (free)
 WinSCP 5.0.2 (free)
 Datastore Browser (included ESXi 5)
 ISO Programs
 Novell - PlateSpin Migrate
 Novell - PlateSpin Orchestrate
 Quest Software (formerly Vizioncore)
 PowerGUI (Quest, free)
 PHD Virtual (phdvirtual.com)
 VKERNEL (vkernel.com)
 Topic 2: ESXi Management
 ESXi Host & vCenter Server Management Overview
 Direct Console User Interface (DCUI)
 Managing ESXi with the vSphere Client (VIC)
 Demo - vSphere Client
 The Management User Interface (MUI) (ESX/ESXi/vCenter)
 Managing with the vSphere Web Client
 SSH Access: PuTTY, SecureCRT, FastSCP, etc.
 Demo - PuTTY Session
 Troubleshooting Options: ESXi 5
 Configuration of Troubleshooting Options in ESXi 5
 vSphere Hypervisor (ESXi) Only Features
 CLI Commands Overview
 vSphere Command Line Interface (vCLI)
 vCLI Commands
 Managing ESX/ESXi with the vSphere CLI (vCLI)
 vCLI Command Syntax
 vSphere SDK for Perl
 vSphere Management Assistant (vMA 5.0)
 PowerCLI 5.0
 Topic 3: Linux Command Review
 Windows Commands vs. Linux Commands
 Common Command Line Interface (CLI) Options
 ESXi 5 Text Editor
 Demo - VI Editor
 VMkernel System Information Viewing
 Topic 4: Troubleshooting the vSphere Client (VIC)
 vSphere Client Logs
 Cannot Login Using vSphere Client
 Chapter 04 Review

Chapter 05 - vCenter Server 5 and Licensing

Topic 1: Licensing
 vCenter Server 5 and ESXi/ESX Host Licensing Model
 Manage vSphere Licenses
 vSphere Essentials 5 for Small Business (per 1 Socket)
 vSphere 5 License Types and Pricing (per 1 Socket with vRAM Entitlements)
 Calculate vSphere 5 Licensing
 Windows Licensing Calculator
 Microsoft Server Virtualization Validation Program
 Novell SUSE Linux Enterprise Server 11 SP1 - Free
 Topic 2: vCenter Server Installation
 vCenter Server 5 Summary
 Managing Multiple Enterprise Locations
 vCenter Server 5 Specifications
 vCenter Server Database Overview

vCenter Server Virtual Appliance (vCSA) Specifications
 Demo - vCenter Appliance
 vCenter Server 5 Architecture
 vCenter Server 5 and Host Functionality
 Order of vCenter Installation
 Topic 3: vCenter Server Inventory
 vCenter Server Home Page
 Hosts and Clusters: Datacenters
 Hosts and Clusters: Folders and Clusters
 VMs and Templates: Subfolders
 vCenter Inventory: VMs Tab
 Datastores and Datastore Clusters: Folders and Datastores
 Networks: Portgroups & Distributed Switches (vDS)
 Topic 4: Managing vCenter Server
 Scheduled Tasks
 Events
 Sessions
 System Logs
 vCenter Solutions Manager
 Client Settings
 vCenter Mobile Access (vCMA)
 Topic 5: Planning vCenter Server Deployment
 vCenter Server 5 Database Sizing
 Backup Strategy for vCenter Server
 vCenter Server Heartbeat 6.4
 Topic 6: Troubleshooting vCenter Server and Database
 Refreshing vCenter Server
 ESXi Host Agent (hostd) hangs
 Demo - vCenter Statistics
 vCenter Server Log Files
 SQL Recovery Models
 vCenter Server Service (vpxd) Errors
 vCenter Server Standalone Mode
 Reinitializing the vCenter Server Database
 vSphere Client Session Errors
 Chapter 05 Review

Chapter 06 - Configuring Storage

Topic 1: Creating & Modifying Virtual Networks
 Networking Terms
 vSphere 5 Virtual Switch Types
 Network Connections in ESXi
 Add Network Wizard
 Standard Virtual Switches – ESXi
 Standard Virtual Switches – ESX
 Virtual Switch and Connection Type Identification
 VMware Assigned MAC Addresses
 Virtual Switch Physical NIC Configurations
 Ports Used by VMkernel
 NIC Teaming
 Cisco Discovery Protocol
 Modifying vSwitch Properties (Ports Tab)
 Modifying vSwitch Properties (Network Adapters Tab)
 VLAN Overview
 Standard vSwitch VLAN Configuration
 VLAN Planning
 Standard vSwitch Protection and VLANs
 Standard vSwitch and Port Group Policy Exceptions: Security
 Standard vSwitch and Port Group Policy Exceptions: Traffic Shaping
 Standard vSwitch and Port Group Policy Exceptions: NIC Teaming
 Network Failure and NIC Teaming Options
 Load Balancing Method: Route Based on the Originating Virtual Port ID (Default)
 Load Balancing Method: Route Based on IP Hash (Source + Destination)

Load Balancing Method: Route Based on Source MAC Hash
 Port Group: Override vSwitch Failover Order
 Multiple Policies Applied to a Single Team
 Physical Switch Configuration
 Demo - Network Configuration
 Topic 2: vSphere Distributed Virtual Switches
 vSphere Distributed vSwitch (vDS) Overview
 vSphere Distributed Switch (vDS) New Features in vSphere 5.0
 Creating a vSphere Distributed Switch
 Edit dvSwitch Settings
 Edit dvSwitch Uplink Policy Settings
 Edit dvSwitch Port Group Settings
 Port Binding Methods
 Private VLANs
 Private VLAN (PVLAN) Tagging
 Migrating Service Console Port or VMkernel Port to vDS
 Network I/O Control (NIOC)
 Network I/O Control (NIOC) Best Practices
 Create NetFlow
 Using Port Mirroring
 Demo - Virtual Distributed Switch
 Cisco Nexus 1000v Virtual Switch
 Nexus 1000v Architecture
 Networking Review
 Topic 3: Creating & Modifying Virtual Networks Using CLI
 Networking CLI Commands
 Physical NIC Commands
 Configure Physical NICs
 Virtual Switch Commands
 Configure Virtual Switches
 VMkernel Port Commands
 Configure the VMkernel Port
 Service Console (vswif) Commands
 Additional Service Console (vswif) Commands
 Adding a Second Service Console
 Chapter 06 Review

Chapter 07 - Configuring Storage

Topic 1: Storage Concepts
 Storage Terms
 SAN vs NAS in vSphere
 Device and Path Naming
 vSphere's Family of Storage APIs
 Multipathing
 Storage APIs - Multipathing
 Path Selection Considerations
 Viewing Multipathing
 Storage I/O Control (SIOC)
 Storage APIs - Array Integration
 Multipathing Commands
 Multipathing Commands (vCLI)
 Multipathing Command Examples
 Topic 2: iSCSI Storage (GUI & Command Line)
 Internet Small Computers Systems Interface (iSCSI)
 Overview
 iSCSI Terms for ESX/ESXi
 ESX/ESXi and iSCSI SAN Environment and Addressing
 Hardware vs. Software Initiators
 Multipathing with iSCSI
 Setup Steps - Multipathing with Software iSCSI
 iSCSI Software Initiator Networking
 Configuring iSCSI
 Configure Software Initiator
 Bind VMkernel ports to Storage Adapter (GUI)
 Bind VMkernel ports to Storage Adapter (CLI)
 Discovering iSCSI Targets

Demo - v5 Storage Setup
 Jumbo Frames
 Configure Software Initiator: CHAP Authentication
 iSCSI Session Options (CLI)
 iSCSI Software Initiator Troubleshooting
 iSCSI Vendors and Products
 Topic 3: Fibre Channel Storage
 What is Fibre Channel?
 Fibre Channel Terms for ESXi
 ESX/ESXi and Fibre Channel SAN Environment and Addressing
 Scanning Fibre Channel LUNs
 Multipathing with Fibre Channel
 Fibre Channel Vendors and Products
 Network/Storage Architecture Review
 Topic 4: VMFS Datastores (GUI & Command Line)
 Virtual Machine File System (VMFS-3)
 Virtual Machine File System (VMFS-5)
 Viewing and Creating a VMFS-3 Datastore
 Upgrade VMFS-3 to VMFS-5
 Viewing and Creating a VMFS-5 Datastore
 Demo - Creating a VMFS-3 Datastore
 Demo - Creating a VMFS-5 Datastore
 Expanding Your VMFS Datastore Using Extents
 Add an Extent to Existing VMFS
 Expand an ESX/ESXi 4.1/5 VMFS Volume
 Partition Alignment
 Disk Defragmentation
 VMFS Operations - vmkfstools
 Displaying Disk Usage Detail (ESX vdf -h ESXi df -h)
 Topic 5: NAS Storage and NFS Datastores (GUI & Command Line)
 Network Attached Storage (NAS) and ESX/ESXi
 NFS Components, Addressing and Access Control with NFS on Linux
 NFS Target on Windows 2003 R2
 Mount an NFS Datastore to Host
 Demo - NFS Creating
 NFS Configuration Options (CLI)
 Storage APIs - Array Integration NFS
 Topic 6: Raw Device Mapping (RDM)
 Raw Device Mapping (RDM)
 Raw Device Mapping Benefits
 RDM Compatibility Modes
 RDM CLI Commands
 Solid State Disks (SSD)
 Chapter 07 Review

Chapter 08 - VM Creation, Configuration, and Snapshots

Topic 1: Create a VM
 VM Virtual Hardware
 Types of Virtual NICs (vNIC)
 Virtual Machine Files
 Virtual Disk
 Virtual SCSI Controller Type
 VMDirectPath
 Virtual Machine Access to Storage
 Install Guest OS into VM
 VM Console & Menus
 VMware Tools
 VMware Tools Configurable Features
 Demo - Creating a VM
 Topic 2: Create Multiple VMs, Templates, & Clones
 Clones & Templates
 Deploy VM from Template
 Customizing the OS in a Virtual Machine
 Customization Specification Manager

Deploying Across Datacenters
 Demo - Template Provisioning
 Topic 3: Virtual Appliances
 Virtual Appliances
 Import Virtual Appliances
 Export VM to OVF Format
 Topic 4: VMware Converter (P2V – V2V)
 VMware Converter 5
 VMware Converter Sources
 VMware vCenter Converter 5
 Pre Conversion Tasks
 Hot Cloning - 4 Step Process
 Post Conversion Steps
 VMware vCenter Converter 5 Standalone
 Troubleshooting VMware Converter
 Topic 5: Manage VMs
 Hot and Cold VM Migrations
 Hot Add Memory and CPUs
 VM Properties - Hardware Tab
 VM Properties - Options Tab
 Demo - New VM Features in vSphere 5
 Resize a Virtual Disk
 Extend VMDK
 Extend Partitions Using gparted
 Renaming a Virtual Machine
 vmware-cmd.pl (vCLI)
 Kill a VM with esxcli
 Topic 6: Virtual Machine Startup/Shutdown
 Startup/Shutdown of VMs
 Enabling VM Startup/Shutdown
 VM Startup/Shutdown Override
 Demo - VM Startup/Shutdown
 Topic 7: Virtual Machine Snapshots
 Virtual Machine Snapshots
 Files Used by Snapshots
 Taking Snapshots
 Snapshot Manager
 Reverting to a Snapshot
 Deleting Snapshots
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 Topic 8: vSphere Web Client
 vSphere Web Client
 vSphere Web Client - Requirements
 Log in to Web Access
 Demo - v5 Web Client
 Topic 9: Virtual Machine Troubleshooting & Best Practices
 Troubleshooting VM Problems
 Differences Between VMs and Physical Servers (Best Practices)
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Chapter 09 - Security and Permissions

Topic 1: Controlling User Access and Passwords
 Types of Users
 vCenter/ESXi/ESX Host Security Model
 Permissions
 Roles
 Privileges Explained
 ESXi Host Permissions
 vCenter Permissions
 Multiple Group Permissions: No Conflicts - Groups Only
 Multiple Group Permissions: No Conflicts - Users and Groups
 Multiple Group Permissions: Conflicting Permissions
 Multiple Group Permissions: User Overrides and Unions
 Multiple User Permissions: Explicit vs. Inherited
 Multiple User Permissions: Explicit vs. Inherited #2
 Demo - vSphere Client Permissions

Topic 2: ESXi/ESX Active Directory (AD) Integration
 UNIX Authentication Model
 UNIX Authentication Flow
 AD-ESX/ESXi 4.1/5 Authentication Services
 Assign ESX/ESXi 4.1/5 Permissions Directly to AD Users
 Demo - Active Directory Integration
 Topic 3: Managing Firewalls
 TCP & UDP Ports
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 ESXi 5.0 Firewall
 ESXi Firewall Configuration via vSphere Client
 ESXi Host Firewall Commands
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 Topic 4: SSH Access
 Secure Shell (SSH)
 Controlling SSH Access
 SSH/Console Banner Message
 Monitoring ESXi Access
 Topic 5: The root Account
 root Logon
 Using substitute user(su) with root
 For More Security Information
 Topic 6: VMsafe and vShield
 VMsafe Overview
 Current VMsafe Partners
 vShield Product Family Overview
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Chapter 10 - Server and VM Monitoring

Topic 1: Optimizing Resources
 Transparent Memory Page Sharing
 Balloon-Driver: vmmemctl
 VMkernel Swap - Defined
 VM Swap Files
 VMkernel Swap vm-name.vswp
 Memory Compression
 Virtual CPUs (vCPUs)
 VMkernel CPU Load Balancing
 VMs' CPU & Memory Resource Setting Terms
 CPU Resource Settings
 Demo - Hardware Status
 Memory Resource Settings
 Memory Overhead
 ESXi 5 Resource Allocation per VM
 Resource Shares
 Monitoring - Hardware Status
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 Performance Monitoring
 Customize Performance Chart
 Troubleshooting Performance
 Problem: High CPU Utilization
 Problem: High Memory Utilization
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 Veeam Monitor
 Veeam Monitor Demo
 Quest Software vFoglight
 Demo - Veeam Monitor
 VKERNEL CapacityVIEW
 Topic 3: Configuring Alarms
 vCenter Alarms
 Alarm Settings
 Default Alarms in vCenter
 Configure vCenter Notifications
 Topic 4: ESXi and vCenter Logs
 ESXi 5 Log Files from DCUI
 Using esxtop

Demo - esxtop
Performance Snapshots from CLI
ESXi 5 Log file locations
ESXi 5 Log Files
Collecting vCenter Log Files
Collecting Diagnostics Data
Configuring Syslog on ESXi
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vCenter Storage Views
Storage Views - Reports
Storage Views - Maps
vCenter Topology Maps
Host Map View
Topic 2: Storage vMotion
Storage vMotion Migration
Requirements for Storage vMotion
Storage vMotion in vSphere 5
Storage vMotion - Command-Line Interface
(vCLI) Non-interactive Mode: SvMotion Examples
Demo - Storage vMotion
Topic 3: Configuring vMotion
vMotion Migration
How vMotion Works
Demo - vMotion
vMotion: ESX/ESXi Host Requirements
Identifying CPU Characteristics
Enable or Disable Nx/xD
vMotion Errors and Warnings
VM Map View
Advanced vMotion Errors
Topic 4: Distributed Resource Scheduler (DRS) Cluster
Distributed Resource Scheduler (DRS) Overview
DRS Cluster in the vCenter Inventory
vCenter Cluster
Demo - Creating a Cluster
Configure Automation Level
Initial Placement
Dynamic Balancing/History
Demo - DRS Usage
Virtual Machine Rules
Virtual Machine to Host Rules
Virtual Machine Options
Distributed Power Management (DPM)
Enhanced vMotion Compatibility (EVC)
VM Swapfile Location
Topic 5: Datastore Clusters & Storage DRS (SDRS)
vSphere Storage API for Storage Awareness (VASA)
Profile-Driven Storage
Storage Capabilities
VM Storage Profiles
Apply Storage Profiles to VMs
Expert Tip: Known Port Conflict
Datastore Clusters
Create a Datastore Cluster
Storage DRS (SDRS) Overview
Datastore Cluster Information
Demo - Storage DRS
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Resource Pools
Expandable Reservations
Resource Pool Example Summary
Resource Pool Example: CPU Limits

Troubleshooting Memory Resources
Retaining Host Resource Pools
Best Practices for VM Resources
Monitoring the DRS Cluster - Resource Allocation
Monitoring the DRS Cluster - DRS Resource Distribution
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Edit Host Profile
Attach Host Profile
Check Compliance with Host Profile
Per Host Answer Files
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Demo - Host Profiles in vSphere 4.x
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Linked vCenter Servers Overview
Linked Mode Group Prerequisites
Create a Linked Mode Group
Manage Multiple vCenters
Topic 9: vSphere Storage Appliance (VSA)
vSphere Storage Appliance (VSA) - Overview
vSphere Storage Appliance (VSA) - Components
vSphere Storage Appliance (VSA) - Architecture
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Chapter 12 - Patching and Upgrading ESXi

Topic 1: Patching ESXi Standalone Hosts
Planned Downtime: Maintenance Mode
Patch Installation: vihostupdate.pl
Topic 2: Patching with Update Manager
Update Manager 5 Overview
Update Manager Terms
Update Manager vSphere Client Plugin
Update Manager Baselines
Update Manager Remediation Defaults and Configuration
Options
Update Manager Events
Update Manager Notifications
Patch Repository
Update Manager Download Service
Update Manager Sizing Estimator
Update Manager Tab
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Topic 3: Upgrades and Migrations
Upgrade Methodology
Upgrade VirtualCenter/vCenter to a New Version
Upgrade vCenter 4.1 to 5.0
ESX/ESXi Migration to New Hardware 3.x to Any Version
Upgrade Distributed Switch to 5.0
ESXi 4.x/5.0 Migration to New Hardware - Enterprise Plus
ESX/ESXi Upgrade using Update Manager
Upgrade the Virtual Machines
Use the vSphere Client to Upgrade the VMware Tools
Use vSphere Client to Upgrade Virtual Machine Hardware
Use Update Manager to Upgrade Virtual Machines
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Chapter 13 - Disaster Recovery and Backup

Topic 1: Site Recovery Manager (SRM)
VMware Site Recovery Manager (SRM) V5.0
VMware Site Recovery Manager (SRM) V5.0 - New Features
SRM Architecture Overview
SRM - Site Recovery Infrastructure
SRM - Create Recovery Plans

11200 Rockville Pike, Suite 220 Rockville, MD 20852 | **Phone:** 301-984-7400 | **Fax:** 301-984-7401

Web: www.asmed.com | **E-mail:** info@asmed.com

SRM - Test Recovery Plans

SRM - Automate Failover

Topic 2: High Availability (HA)

VMware High Availability

New vSphere 5 HA Features

vSphere 5 HA in Action

Demo - v5 High Availability

Configure HA Cluster

VMware HA: Virtual Machine Options

Host Isolation

Guidelines for Isolation Response Setting

HA VM Monitoring

HA Datastore Heartbeating

Viewing Your HA Cluster

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Topic 3: VM Fault Tolerance

Fault Tolerance Overview

Fault Tolerance Requirements

Configure VMkernel NIC

Turn on Host Certificate Checking

Turn on Fault Tolerance

Topic 4: Microsoft Clustering

Virtualizing Microsoft Clusters

Microsoft Cluster Services

Microsoft Cluster Services Requirements

Topic 5: Backup Strategies

Backup Strategies for VMs

Topic 6: VMware Data Recovery

Data Recovery 2.0 Overview

Demo - Data Recovery Setup

Data Recovery Installation & Features

Configure Network Settings

Configure VMs to Backup

Configure Data Recovery Appliance and Setup Backup Job

Demo - Data Recovery

Topic 7: Third Party Backups

PHD Virtual Backup and Recovery 5.3 for VMware

PHD Virtual Backup v5.1 - vCenter Plugin

Quest vRanger 5.2 (formerly Vizioncore)

vRanger Pro - Screenshots

Veeam Backup & Replication v5.0.2 with vPower

Veeam Backup - Screenshot

Chapter 13 Review

Course Closure