Citrix Xen Server

*Citrix XenServer 5.6 Administration*

- In this Citrix XenServer 5.6 training course, students will learn skills necessary to configure and administer XenServer 5.6, XenCenter, and Provisioning Services 5.6. Through virtual labs, as well as demonstrations and the practical application of concepts, students will gain experience with:
  - Configuring a XenServer virtualization server
  - Managing a XenServer using XenCenter
  - Creating Windows and Linux virtual machines
  - Creating XenServer resource pools and connecting to remote storage
  - Using XenMotion and automatic virtual machine placement
  - Designing a Provisioning Server farm
  - Creating, assigning and administering virtual disks
  - Managing target devices
  - Configuring high availability

*Audience*

- This course is designed for IT professionals, Architects, Systems Engineers and Citrix Partner Network members.

*Preparatory Recommendations*

- Prior to taking this course, Citrix recommends that learners possess the following knowledge and experience:
  - A basic knowledge of the purpose and goals of virtualization technology
  - An understanding of computing architecture, including network and storage devices, device drivers and operating systems
  - Basic experience installing and administering Windows Server 2003 or Windows Server 2008
  - Basic experience installing and administering Linux variants
  - Intermediate knowledge of network devices and site architecture, including configuring vLANs
  - Basic knowledge of storage terminology and technologies, including partitions, SANs, LUNs, iSCSI, NFS, and CIFS file shares

*Key Skills*

- In this Citrix XenServer 5.6 training course, students will learn skills necessary to configure and administer XenServer 5.6, XenCenter, and Provisioning Services 5.6. Through hands-on labs, students will gain experience with:
- Configuring a XenServer virtualization server
- Managing a XenServer using XenCenter
- Creating Windows and Linux virtual machines
- Creating XenServer resource pools and connecting to remote storage
- Using XenMotion and automatic virtual machine placement
- Designing a Provisioning services farm
- Creating, assigning and administering virtual disks
- Managing target devices

❖ **Instructional Method**

❖ This course is available in either classroom or self-paced online formats, and includes access to a live lab environment, as well as demonstrations and the practical application of concepts through hands-on exercises.

❖ **Module 1: Introductions and courseware overview**

❖ **Module 2: XenServer Introduction**

- XenServer Product Line
- Citrix XenServer 5.6 New Features
- Role-based Access Control
- Dynamic Memory Control
- Virtual Machine Disk Snapshot
- Automated Virtual Machine Optimizations and Power Management
- StorageLink Site Recovery
- Heterogeneous Pools
- Enhanced Operating-System Support
- Enhanced XenCenter Interface
- Administrative Logging and Audit
- XenServer Architecture Overview
- XenServer Architectural Components
- Emulation Example
- Paravirtualization Example
- XenCenter Overview
- XenCenter Performance Data

❖ **XenServer and XenCenter Installation**

- XenServer Installation
- Virtual Machine Storage
- Single and Multiple Disk System Installations
- Multiple Disk System
- Installing XenServer
- Pre-Installation Checklist
- XenServer Installation Process
- Practice: XenServer Installation
- Installing XenCenter
- XenCenter Windows Consoles
- XenCenter Linux Consoles
- XenServer Licensing
- Licensing Components
- License File Management
- Obtaining License Files
- Installing the Citrix License Server
- License Management Console
- Review Questions

**Windows Virtual Machines**

- Virtual Memory and Disk Size Limits
- Virtual Device Support
- Windows Virtual Machine Architecture
- To Create a Windows Virtual Machine
- Installation from an ISO
- ISO Libraries
- To Create an ISO Library
- Practice: Windows Virtual Machine Creation from an ISO Library
- XenServer Tools
- Review Questions

**Linux Virtual Machines**

- Linux Virtual Machine Architecture
- Linux Distributions
- Xen-enabled Distributions
- Non-Xen-enabled Distributions
- Creating Linux Virtual Machines
- To Create a Linux Virtual Machine
- Installing XenServer Tools
- To Install XenServer Tools
- Virtual Network Computing for Virtual Machines
- To Configure VNC for Virtual Machines

**Templates and Life-Cycle Operations**

- Virtual Machine Templates
- Practice: Virtual Machine Templates
- Exporting a Virtual Machine
- Importing a Virtual Machine
- Copying a Virtual Machine
- Practice: Importing and Exporting a Virtual Machine
- New Virtual Machine Creation Using a Template
- Life-Cycle Operations
- Suspend and Resume
- Deleting a Virtual Machine
- Practice: Life-Cycle Operations
XenConvert

- Xen Virtual Appliance Formats
- Open Virtualization Format
- XenConvert Default Behavior
- Physical Machine Conversion
- To Produce a Virtualized Instance of a Workload
- Source Volume Properties
- Destination Volume Properties
- Disk Properties
- Practice: Disk Space
- Converting from Physical to Virtual Machine
- To Complete the P2V Conversion
- New Virtual Machine in XenCenter
- Practice: P2V Conversion
- Virtual-to-Virtual-Machine Conversion
- To Convert a Server or Desktop to a Virtual Machine

Resource Management

- Virtual Machine Resource Management
- Virtual Disks
- Virtual Disk Sizes
- vDisk Resizing
- Virtual NICs
- Virtual CPUs
- Memory
- Multiprocessor HAL in Windows 2000
- Practice: Resource Management
- Resource Optimization
- CPU Scheduler
- CPU Priorities
- Network and Storage Resources
- Practice: Fine-Tuning Resources
- Dynamic Memory Control
- Dynamic Memory Control Configuration
- DMC Behavior when Launching New Virtual Machines
- Events and Alerts
- To Set Host Alerts in XenCenter
- To Set Virtual Machine Alerts in XenCenter
- Alert Customization
- Perfmon String
- Valid Virtual Machine Elements
- Valid Host Elements
- Persistent XenServer Performance Statistics
- E-mail Alert Configuration
- Performance Statistics in XenCenter
- Performance Graphs in XenCenter
- XenCenter Searches
Networking

- Network Components and Architecture
- Network Architecture Diagram
- Internal-only Networks
- Virtual NICs
- External Networks
- VLAN Support and Components
- Practice: Network Component Descriptions
- Initial Network Setup
- Management and Normal Interfaces
- IP Address Information for Normal NICs
- Practice: Configuring Physical Networks
- NIC Bonds
- NIC Bonding Architecture
- Active-Active Mode
- Load Balancing
- Network Adapter Drivers
- Virtual Network Setup
- Virtual NIC Creation
- Virtual NICs Connections
- To Configure a NIC Bond for a Standalone Host
- NIC Bond Configuration for Resource Pools
- Network Configuration
- To Configure a VLAN

Managing XenServer

- Managing XenServer Users
- End User Authentication using Active Directory (AD)
- Active Directory Integration Key Benefits
- External Authentication Process
- Active Directory Integration
- Active Directory Integration Configuration
- Role-based Access Control
- Roles
- Command-Line Interface Overview
- XenServer Menu-Driven Text Console
- Command-line Interface Operations Targets
- XenServer Objects
- Core XenServer Objects
- Host Connector Objects
- Virtual Machine Connector Objects
- Object Naming within the Command-Line Interface
- Command-Line Interface Usage
- Command-Line Interface Prerequisites
- Basic Command-Line Interface Syntax
- Command-Line Interface Shortcuts
- Common Object Commands
- The List Command
- List Command Displayed Parameters
- List Command Class Object
- To Use the List Command Procedure
- Expanded Fields
- The Parameter Commands
- Parameter Command Modifiers
- To Use the Param Command
- Practice: XenServer Commands
- XenServer Help Commands
- To Access Help Commands
- command-Line Interface Access
- XenServer Host Command-Line Interface
- To Access the Command-Line Interface Directly from the Host Procedure
- To Access the XenServer Command-Line Interface Using SSH Procedure
- To Access the XenServer Command-Line Interface Using XenCenter
- Remote Command-Line Interface Access
- Credential Arguments
- Remote Host Example
- Review Questions
- Storage
- Storage Introduction
- Storage Components
- Storage Types
- Storage Type Feature Comparison
- Practice: Storage Components
- Storage Architecture
- Storage Repositories
- Local Disk Storage Architecture
- Storage Repository Architecture
- Practice: Storage Architecture
- Multiple Storage Repositories
- Practice: Storage Repositories
- Initial Storage Setup
- Local Storage
- Virtual Machine Storage Types
- Virtual Disk Setup
- Virtual Disk Size
- Practice: Local Storage
- Scaling Storage for the Enterprise
- Remote Storage Features
- Storage Capability Comparison
- Fibre Channel SANs Overview
- Fibre Channel Architecture
- Storage Repositories Configuration
- LUN Device Path
- Practice: Fibre Channel HBA Management
- iSCSI Storage Overview
- iSCSI Terminology and Names
- iSCSI Network
- Software-based iSCSI
- iSCSI Storage Configuration
- iSCSI Setup Best Practices
- Practice: iSCSI Storage
- NFS Storage Overview
- NFS Remote Storage
- Software NFS Architecture
- NFS Virtual Disks
- NFS Remote Storage Configuration
- NFS Setup Best Practices
- Practice: NFS Storage
- Third-Party Storage
- NetApp Storage Overview
- NetApp Storage Architecture
- FlexVol Limits and Parameters
- NetApp Access Control
- NetApp Features
- Dell EqualLogic Storage Integration
- Storage Management
- Dedicated NIC Bonds for Remote Storage
- Dedicated Remote Storage Interface Configuration
- Storage Multipathing
- iMultipathing and Disaster Recovery
- Storage Repository Recovery
- StorageLink Overview
- StorageLink Components
- StorageLink Manager Interface
- StorageLink Configuration
- Creating a Storage Repository
- To Create a Storage Repository
- Allocating Storage for Virtual Machines
- Creating a Storage Profile
- Template Management
- Virtual Machine Creation from Templates
- StorageLink Command-Line Interface and PowerShell

- **Resource Pools**
  - Resource Pools Overview
  - Resources Shared in a Pool
  - Resource Pool Architecture
  - Pool Member Types
  - Resource Pool Communication
  - Heterogeneous Pools
  - Pool Member Requirements
  - Resource Pool Requirements Diagram
  - CPU Requirements
  - Network Settings
 XenServer Licenses in a Resource Pool
 Resource Pool Administration
 Resource Pool Creation and Configuration
 Shared Configurations
 Pool Members
   To Prepare for Adding a Member
   To Add a Member to a Resource Pool
   To Remove a Secondary Member from a Resource Pool
 Resource Pool Recovery
 Master Failure Overview
 Failure Detection Process
 Recovered Master Reconnection
   To Promote a Secondary Member to a Master
 Practice: Master and Secondary Server Roles
 Virtual Machine Movement
   Automatic Virtual Machine Placement
   Virtual Machine Location
 XenMotion Overview
 XenMotion CPU Requirements
   To Use XenMotion (XenCenter)
 Alternate Virtual Machine Movement Methods
   Practice: Virtual Machine Movement

 High Availability

 High Availability Overview
 High Availability Requirements
 High Availability Considerations
 Restart Protection Levels
 Protection Level Settings
 Server Failure Tolerance
 Overcommitting
 Overcommitment Warning
 High Availability on a XenServer Pool
 High Availability Failure Tolerance
   To Configure High Availability (XenCenter)
   To Configure High Availability (Command-Line Interface)
 Host Fencing
   Changing High Availability Settings (CLI)
   Practice: Configuring High Availability
 Disaster Recovery
 Metadata
   Practice: Virtual Machine Rollback
   To Roll Back a Virtual Machine (XenCenter)
   To Roll Back a Virtual Machine (Command-Line Interface)

 Workload Balancing

 Workload Balancing Overview
 Workload Balancing Key Concepts
Workload Balancing Components
Workload Balancing Deployment
Workload Balancing High Availability
Single Server Deployment
Key Services
XenServer Environment Sizes
Workload Balancing Installation
Pre-Installation Considerations
Installation on a Single Server
Workload Balancing Installation Verification
Workload Balancing Configuration
To Initialize Workload Balancing
Pool Workload Balancing Configuration
Authorization for Workload Balancing
XenServer and the Workload Balancing Server
Antivirus Software Configuration
Performance Thresholds and Metric Weighting
Practice: Workload Balancing Power Management
Workload Balancing Settings Configuration
Optimization Mode
Fixed and Scheduled Optimization Modes
Optimization Recommendations
Workload Balancing Power Management
Power Management Behavior
Power Management and Virtual Machine Consolidation
To Apply Optimization Recommendations Automatically
Practice: Workload Balancing
Critical Thresholds
Default Settings for Critical Thresholds
Tuning Metric Weightings
Host Exclusion from Recommendations
To Exclude Hosts
Optimal Server Selection
Maintenance Mode with Workload Balancing Enabled
Workload Balancing Reports
Pool Optimization Performance History Report
Pool Audit Log History
Pool Health
Pool Health History Report
Pool Optimization History
Virtual Machine Motion History Report
Virtual Machine Performance History Report
Configuring for a Different Workload Balancing Server
Disable Workload Balancing
To Update Workload Balancing Credentials

Troubleshooting XenServer

XenServer Logs and Reports
XenCenter Event Logs

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Server Status Reports
XenServer dmesg Overview
To Generate the dmesg File in XenCenter
To Generate the dmesg File in the Command-Line Interface
XenServer Crashdump Overview
To Generate a Crashdump File in XenCenter
To Generate the Crashdump File in the Command-Line Interface
XenServer Debug Tools
XenCenter Searches
Troubleshooting Usage
Upgrading Usage
XenServer Alerts
To Create XenServer Alerts in XenCenter
To Create E-mail Alerts in XenCenter
Overcommitment Warnings
XenServer-to-XenCenter Communications
XenCenter Version
Valid License
Network Port Availability
XenServer Patch Location
XenServer Patch Installation
Rolling Pool Upgrade
Planning a Rolling Upgrade
To Prepare for Upgrading
To Perform a Rolling Upgrade

Provisioning Services Installation and Configuration

Provisioning Services for XenServer
Citrix Provisioning Services Infrastructure
Provisioning Services Administration
Citrix Provisioning Services Components
Key Services
Practice: Key Services
Installation Planning
Network Boot Services
Boot Process
DHCP Deployment Options
DHCP Configuration
Provisioning Services Farm Design
Farms
SQL Database Server
SQL Database Authentication
Sites
Stores
Write Caches
Practice: Write Cache
Storage Requirements
Sample vDisk Storage Requirements
Provisioning Services Installation
To Install Provisioning Services
Provisioning Services Configuration
To Configure a Provisioning Services Farm
Store Configuration
Provisioning Services Hosts in the Console
Target Device Connections
Server Properties
Target Device Management
Target Device Collection
Target Device Views
Target Device Properties
To Copy Target Device Properties
Target Device Additions to the Database
Auto-Add Wizard
Active Directory Integration
Domain Password Management
Automatic Password Renegotiation
To Integrate Active Directory
To Enable Machine Account Password Management
Troubleshooting Provisioning Services Installation and Configuration
Review Questions

vDisk Administration

vDisk Image Modes
Standard Image Mode
Difference Disk Image Mode
Private Image Mode
Write-Cache Types
Cache on Server Disk
Cache on Server Disk: Local Storage
Cache on Server Disk: Shared Storage
Cache on Device's Hard Drive
Cache on Device's Hard Drive: Local Storage
Cache on Device's Hard Drive: Shared Storage
Target Device-based RAM Cache
Target Device RAM
To Create a vDisk
vDisk File Creation
VHD Format
vDisk Mounting
vDisk Formatting
Master Target Device
Boot Order
Master Target Device Software
To Create a Windows Master Target Device using the Imaging Wizard
To Image Windows Target Devices with XenConvert
vDisks Streaming to Diskless Virtual Machines
To Create a Diskless Virtual Machine
To Create a Master Target Virtual Machine Workload Image
Practice: Master Target Device
Troubleshooting vDisk Creation Issues
vDisk Management
To Unassign vDisks from Target Devices
To Delete a vDisk
vDisk Locks
vDisk Backup
vDisk Updates
Automatic Update
Incremental Update
Autoupdate Tool
Incremental Update Rollback
Scheduled vDisk Updates
Practice: vDisk Updates
vDisk Update Strategies
High Availability Overview
High Availability Benefits
High Availability Components
Boot File Configuration for High Availability
Provisioning Services Host Addition to the Boot File
To Add a Login Server
Enabling High Availability on vDisks