

Section 1: Configure and Administer vSphere Security

Objective 1.1: Configure and Administer Role-based Access Control

Knowledge:

- Compare and contrast propagated and explicit permission assignments
- Add/Modify/Remove permissions for users and groups on vCenter Server inventory objects
- Determine how permissions are applied and inherited in vCenter Server
- Configure VMware Directory Service
- Apply a role to a User/Group and to an object or group of objects
- Determine the appropriate set of privileges for common tasks in vCenter Server
- Compare and contrast default system/sample roles
- Determine the correct permissions needed to integrate vCenter Server with other VMware products

Objective 1.2: Secure ESXi, vCenter Server, and vSphere Virtual Machines

Knowledge:

- Harden virtual machine access
 - Control VM data access
 - Configure virtual machine security policies
- Harden a virtual machine against Denial-of-Service attacks
 - Control VM-VM communications
 - Control VM device connections
 - Configure network security policies
- Harden ESXi Hosts
 - Enable/Configure/Disable services in the ESXi firewall
 - Change default account access
 - Add an ESXi Host to a directory service
 - Enable Lockdown Mode
 - Control access to hosts (DCUI/Shell/SSH/MOB)
- Harden vCenter Server
 - Create/Manage vCenter Server Security Certificates
 - Change default account access
 - Restrict administrative privileges

Objective 1.3: Enable SSO and Active Directory Integration

Knowledge:

- Describe SSO architecture and components
- Differentiate available authentication methods with VMware vCenter
- Perform a multi-site SSO installation
- Configure/Manage Active Directory Authentication
- Configure/Manage Platform Services Controller (PSC)
- Configure/Manage VMware Certificate Authority (VMCA)
- Enable/Disable Single Sign-On (SSO) Users

Section 2: Configure and Administer Advanced vSphere Networking

Objective 2.1: Configure Advanced Policies/Features and Verify Network Virtualization Implementation

Knowledge:

- Explain the behaviour of a virtual Distributed Switch (vDS) Auto-Rollback
- Determine and configure appropriate port group PVLAN settings for VMs given communication requirements
- Determine physical network connectivity requirements between ESXi Hosts to support vDS deployments
- Configure LACP on vDS given design parameters
- Configure vDS across multiple vCenter Servers to support Long Distance vMotion

Objective 2.2: Configure Network I/O Control (NIOC)

Knowledge:

- Configure NIOC shares/limits based on VM requirements
- Explain the behavior of a given NIOC setting
- Determine Network I/O Control requirements
- Differentiate Network I/O Control capabilities
- Enable/Disable Network I/O Control

Section 3: Configure and Administer Advanced vSphere Storage

Objective 3.1: Manage vSphere Storage Virtualization

Knowledge:

- Configure FC/iSCSI/FCoE LUNs as ESXi boot devices
- Enable/Configure/Disable vCenter Server storage filters
- Configure/Edit hardware/dependent hardware initiators
- Enable/Disable software iSCSI initiator
- Configure/Edit software iSCSI initiator settings
- Configure iSCSI port binding
- Enable/Configure/Disable iSCSI CHAP

Objective 3.2: Configure Software-Defined Storage

Knowledge:

- Determine the role of storage providers in VSAN
- Determine the role of storage providers in VVOLs
- Explain VSAN failure domains functionality
- Configure/Manage VMware Virtual SAN
- Create/Modify VMware Virtual Volumes (VVOLs)
- Enable/Disable Virtual SAN Fault Domains
- Create Virtual Volumes given the workload and availability requirements
- Create storage policies appropriate for given workloads and availability requirements

Objective 3.3: Configure vSphere Storage Multi-pathing and Failover

Knowledge:

- Explain common multi-pathing components
- Differentiate APD and PDL states
- Understand the effects of a given claim rule on multipathing and failover
- Change the Path Selection Policy using the UI
- Determine required claim rule elements to change the default PSP
- Determine the effect of changing PSP on Multipathing and failover
- Determine the effects of changing SATP on relevant device behavior
- Configure/Manage Storage Load Balancing
- Differentiate available Storage Load Balancing options
- Differentiate available Storage Multi-pathing Policies
- Configure Storage Policies

Objective 3.4: Perform Advanced VMFS and NFS Configurations and Upgrades

Knowledge:

- Upgrade VMFS3 to VMFS5
- Compare functionality of newly created vs. upgraded VMFS5 datastores
- Compare and contrast VMFS and NFS datastore properties
- Extend/Expand VMFS datastores
- Place a VMFS datastore in Maintenance Mode
- Select the Preferred Path/Disable a Path to a VMFS datastore
- Enable/Disable vStorage API for Array Integration (VAAI)
- Given a scenario, determine a proper use case for multiple VMFS/NFS datastores

Objective 3.5: Setup and Configure Storage I/O Control

Knowledge:

- Enable and configure SIOC
- Configure/Manage SIOC
- Monitor SIOC
- Given a scenario, determine a proper use case for SIOC
- Compare and contrast the effects of I/O contention in environments with and without SIOC

Objective 4: Upgrade a vSphere Deployment to 6.x

Objective 4.1: Perform ESXi Host and Virtual Machine Upgrades

Knowledge:

- Configure download source(s)
- Stage patches & Extensions
- Remediate an object
- Upgrade a vSphere Distributed Switch
- Upgrade VMware Tools
- Upgrade Virtual Machine hardware
- Stage multiple ESXi Host upgrades
- Align appropriate baselines with target inventory objects

Objective 4.2: Perform vCenter Server Upgrades

Knowledge:

- Compare the methods of upgrading vCenter Server
- Backup vCenter Server database, configuration and certificate datastore
- Perform update as prescribed for Appliance or Installable
- Upgrade vCenter Server Appliance (vCSA)
- Given a scenario, determine the upgrade compatibility of an environment
- Determine correct order of steps to upgrade a vSphere implementation

Objective 5: Administer and Manage vSphere 6.x Resources

Objective 5.1: Configure Advanced/Multilevel Resource Pools

Knowledge:

- Determine the effect of the Expandable Reservation parameter on resource allocation
- Create a resource pool hierarchical structure
- Configure custom resource pool attributes
- Determine how resource pools apply to vApps
- Create/Remove a Resource Pool
- Add/Remove virtual machines from a Resource Pool
- Given a scenario, determine appropriate shares, reservations and limits for hierarchical Resource Pools

Objective 6: Backup and Recover a vSphere Deployment

Objective 6.1: Configure and Administer a vSphere Backups/Restore/Replication Solution

Knowledge:

- Compare and contrast vSphere Replication compression methods
- Differentiate VMware Data Protection capabilities
- Explain VMware Data Protection sizing guidelines
- Install and Configure VMware Data Protection
- Create a backup job with VMware Data Protection
- Backup/Restore a virtual machine with VMware Data Protection
- Install/Configure/Upgrade vSphere Replication
- Configure vSphere Replication for Single/Multiple VMs
- Recover a VM using vSphere Replication

Objective 7: Troubleshoot a vSphere Deployment

Objective 7.1: Troubleshoot vCenter Server, ESXi Hosts and Virtual Machines

Knowledge:

- Monitor status of the vCenter Server service
- Perform basic maintenance of a vCenter Server database
- Monitor status of ESXi management agents
- Determine ESXi Host stability issues and gather diagnostics information
- Monitor ESXi system health
- Locate and analyze vCenter Server and ESXi logs
- Determine the appropriate Command Line Interface (CLI) command for a given troubleshooting task
- Troubleshoot common issues, including:
 - vCenter Server service
 - SSO
 - vCenter Server connectivity
 - Virtual machine resource contention, configuration and operation
 - Platform Services Controller (PSC)
 - Problems with installation
 - VMware Tools installation
 - Fault Tolerant network latency

Objective 7.2: Troubleshoot vSphere Storage and Network Issues

Knowledge:

- Identify and isolate network and storage resource contention and latency issues
- Monitor networking and storage resources using vCOPs alerts and all badges
- Verify network and storage configuration
- Verify a given virtual machine is configured with the correct network resources
- Monitor/Troubleshoot Storage Distributed Resource Scheduler (SDRS) issues
- Recognize the impact of network and storage I/O control configurations
- Recognize a connectivity issue caused by a VLAN/PVLAN
- Troubleshoot common issues with:
 - Storage and network
 - Virtual switch and port group configuration
 - Physical network adapter configuration
 - VMFS metadata consistency

Objective 7.3: Troubleshoot vSphere Upgrades

Knowledge:

- Collect upgrade diagnostic information
- Recognize common upgrade issues with vCenter Server and vCenter Server Appliance
- Create/Locate/Analyze VMware log bundles
- Determine alternative methods to upgrade ESXi Hosts in event of failure
- Configure vCenter Server logging options

Objective 7.4: Troubleshoot and Monitor vSphere Performance

Knowledge:

- Monitor CPU and memory usage (including vRealize OM badges and alerts)
- Identify and isolate CPU and memory contention issues
- Recognize impact of using CPU/memory limits, reservations and shares
- Describe and differentiate critical performance metrics
- Describe and differentiate common metrics, including:
 - Memory
 - CPU
 - Network
 - Storage
- Monitor performance through esxtop
- Troubleshoot Enhanced vMotion Compatibility (EVC) issues
- Troubleshoot virtual machine performance with vRealize Operations

- Compare and contrast Overview and Advanced Charts

Objective 7.5: Troubleshoot HA and DRS Configurations and Fault Tolerance

Knowledge:

- Troubleshoot issues with:
 - DRS workload balancing
 - HA failover/redundancy, capacity and network configuration
 - HA/DRS cluster configuration
 - vMotion/Storage vMotion configuration and/or migration
 - Fault Tolerance configuration and failover issues
- Explain the DRS Resource Distribution Graph and Target/Current Host Load Deviation
- Explain vMotion Resource Maps

Objective 8: Deploy and Consolidate vSphere Data Center

Objective 8.1: Deploy ESXi Hosts Using Autodeploy

Knowledge:

- Utilize Auto Deploy Image Builder VMware PowerCLI scripts
- Utilize Host Profile answer files during an Auto Deploy of an ESXi Host
- Install and configure Auto Deploy
- Explain PowerCLI cmdlets for Auto Deploy
- Deploy/Manage multiple ESXi Hosts using Auto Deploy

Objective 8.2 Customize Host Profile Settings

Knowledge:

- Edit answer file to customize ESXi Host settings
- Modify and apply a storage PSP to a device using host profiles
- Modify and apply standard switch configuration across multiple hosts using host profiles
- Create/Edit/Remove a Host Profile from an ESXi Host
- Import/Export a Host Profile
- Attach/Apply a Host Profile to an ESXi Host or cluster
- Perform compliance scanning and remediation of an ESXi Hosts and clusters using Host Profiles

Objective 8.3: Consolidate physical workloads using vCenter Converter

Knowledge:

- Convert Physical Workloads using vCenter Converter
- Modify server resources during conversion
- Interpret and correct errors during conversion
- Collect diagnostic information on conversion operation
- Resize partitions during the conversion process

Objective 9: Configure Advanced vSphere Availability Solutions

Objective 9.1: Configure Advanced vSphere HA Features

Knowledge:

- Modify vSphere HA advanced cluster settings
- Configure a network for use with HA heartbeats
- Apply an admission control policy for HA
- Enable/disable advanced vSphere HA settings
- Configure different heartbeat datastores for an HA cluster
- Apply virtual machine monitoring for a cluster
- Configure Virtual Machine Component Protection (VMCP) settings
- Explain how vSphere HA communicates with Distributed Resource Scheduler and Distributed Power Management

Objective 9.2: Configure Advanced vSphere DRS Features

Knowledge:

- Configure VM-Host affinity/anti-affinity rules
- Configure VM-VM affinity/anti-affinity rules
- Enable/disable Distributed Resource Scheduler (DRS) affinity rules
- Configure the proper Distributed Resource Scheduler (DRS) automation level based on a set of business requirements
- Explain how DRS affinity rules effect virtual machine placement

Section 10: Administer and Manage vSphere Virtual Machines

Objective 10.1: Configure Advanced vSphere Virtual Machine Settings

Knowledge:

- Configure virtual machines for vGPUs, DirectPath I/O and SR-IOV
- Configure virtual machines for multicore vCPUs
- Differentiate virtual machine configuration settings
- Interpret virtual machine configuration files (.vmx) settings
- Enable/disable advanced virtual machine settings

Objective 10.2: Create and Manage a Multi-site Content Library

Knowledge:

- Publish a content catalog
- Subscribe to a published catalog
- Determine which privileges are required to globally manage a content catalog
- Compare the functionality of Automatic sync and On-Demand sync
- Configure Content Library to work across sites
- Configure Content Library authentication
- Set/configure Content Library roles
- Add/remove Content Libraries

Objective 10.3: Configure and maintain a vCloud Air connection

Knowledge:

- Deploy a virtual machine using vCloud Air
- Migrate a virtual machine to vCloud Air
- Configure vCenter Server connection to vCloud Air
- Configure replicated objects in vCloud Air Disaster Recovery service
- Given a scenario, determine the required settings for virtual machines deployed in vCloud Air