

VMware Enterprise Administration Exam Blueprint v3.5

Section 1 – Storage

Objective 1.1 – Create and Administer VMFS datastores using advanced techniques.

Knowledge

- Describe how to identify iSCSI, Fibre channel, SATA and NFS configurations using CLI commands and log entries
- Describe the VMFS file system
 - Metadata
 - Multi-access and locking
 - Extents
 - Tree structure and files
 - Applicability to clustered environment
 - Journaling
- Explain the process used to align VMFS partitions
- Explain the use cases for round-robin load balancing

Skills and Abilities

- Perform advanced multi-pathing configuration
 - Configure multi-pathing policy
 - Configure round-robin behavior using command-line tools
 - Manage active and inactive paths
- Verify SAN LUN accessibility
- Configure and use NPIV HBAs
- Manage VMFS file systems using command-line tools
- Configure NFS datastores using command-line tools
- Configure iSCSI hardware and software initiators using command-line tools

Tools

- VI client
- CLI
 - esxcfg-vmhbadevs
 - vdf
 - fdisk
 - vmkfstools

Objective 1.2 – Implement and manage complex data security and replication configurations.

Knowledge

- Describe methods to secure access to virtual disks and related storage devices
 - Distributed Lock Handling
- Identify tools and steps necessary to manage replicated VMFS volumes
 - Resignaturing
 - Snapshot LUNs
- Understand how to configure physical storage adapter properties

Skills and Abilities

- Configure storage network segmentation
 - FC Zoning
 - iSCSI/NFS VLAN
- Configure LUN masking
 - Storage device
 - Host
- Configure iSCSI/NFS security options
- Use esxcfg-advcfg
 - Set Resignaturing and Snapshot LUN options
 - Set ESX Server host-side disk options
- Manage RDMS in a replicated environment
 - Virtual compatibility mode
 - Physical compatibility mode
- Use proc nodes to identify driver configuration and options
- Use esxcfg-module
 - Modify storage adapter settings
 - Identify and load/unload modules
 - Get module status

Tools

- VI client
- CLI
 - esxcfg-advcfg
 - esxcfg-module

Objective 1.3 – Troubleshoot Virtual Infrastructure storage components.

Knowledge

- Identify storage related events and log entries
- Analyze storage events to determine related issues

Skills and Abilities

- Verify storage configuration using CLI, VI client and server log entries
- Troubleshoot storage connection issues using CLI , VI Client and logs
 - Rescan events
 - Failover events
- Interpret log entries for configuration validation and predictive analysis
- Troubleshoot file system errors using logs and CLI

Tools

- VI client
- CLI
 - vm-support script
 - esxcfg-*
 - vmkfstools

Objective 1.4 – Implement and manage Storage VMotion.

Knowledge

- Describe Storage VMotion operation
- Explain implementation process for Storage VMotion
- Identify Storage VMotion use cases
- Understand performance implications for Storage VMotion

Skills and Abilities

- Use Remote CLI to perform Storage VMotion operations
 - Interactive mode
 - Non-interactive mode
- Implement Storage VMotion based on various use cases
 - Migration of all virtual disks to target storage location
 - Migration of virtual disks to independent target storage locations

Tools

- Remote CLI

Section 2 – Networking

Objective 2.1 – Install and configure Virtual Infrastructure networks.

Knowledge

- Differentiate physical and virtual switch characteristics
- Create and modify virtual switches and virtual switch policies
- Enable advanced networking capabilities
 - TCP Segmentation Offload (TSO)
 - Jumbo Frames
 - NetQueue
- Identify and understand the impact of various routing protocols

Skills and Abilities

- Configure service console network using CLI
- Configure VLANs (virtual networks)
- Configure TSO and Jumbo Frames
- Enable Cisco Discovery Protocol
- Use CLI commands to modify virtual network configuration

Tools

- CLI
 - esxcfg-nics
 - esxcfg-vswitch
 - esxcfg-vmknic
- VI client

Objective 2.2 – Install and configure a virtual networking infrastructure to meet set security design requirements.

Knowledge

- Understand network segmentation benefits and best practices
 - Isolation of Service Console traffic
 - Isolation of VMkernel traffic

- Define common network security risks and explain their impact to a virtual network infrastructure
- Describe and configure virtual switch security policies

Skills and Abilities

- Configure VLANs
- Set virtual networking security attributes
 - Forged Transmits
 - Promiscuous Mode
 - MAC Address Changes
 - VLAN configuration
- Configure switch notification

Tools

- CLI
 - esxcfg-vswitch
 - esxcfg-vswif
 - esxcfg-vmknic
- VI client

Objective 2.3 – Administer advanced VMkernel networking configurations.

Knowledge

- Define configuration options for VMkernel ports
 - Peer DNS
 - MTU
 - TSO
- Understand VMkernel routing
- Troubleshoot VMkernel configuration issues

Skills and Abilities

- Add and remove VMkernel ports
- Enable/Disable VMkernel ports
- Configure the VMkernel routing table

Tools

- CLI
 - esxcfg-vmknic
 - esxcfg-route
- VI client

Objective 2.4 – Manage Failover and Failure Detection

Knowledge

- Describe how to map port groups to physical NICs
- Understand failover order for physical NICs and attached port groups
- Explain options for detecting link failures
- Troubleshoot failover operations

Skills and Abilities

- Use CLI commands to manage uplinks
- Configure failover order
 - Active Adapters
 - Standby Adapters
 - Unused Adapters
 - NIC promotion
- Configure beacon probing
- Configure reverse teaming
- Set advanced network failover options
 - Failover detection
 - Failback
 - Link state tracking

Tools

- CLI
 - esxcfg-vswitch
- VI Client

Objective 2.5 – Administer advanced Service Console networking configurations.

Knowledge

- Define configuration options for VMkernel ports
 - Peer DNS
 - MTU
 - TSO
- Understand VMkernel routing
- Troubleshoot VMkernel configuration issues

Skills and Abilities

- Inspect Service Console network configuration
- Enable/Disable vswif interface
- Configure advanced service console networking
 - Redundant HA heartbeat
 - Packet tracing
 - CHAP authentication for iSCSI
- Configure hostname resolution
 - /etc/hosts
 - /etc/nsswitch.conf
 - /etc/resolv.conf
- Monitor traffic over a Virtual Switch
 - Bandwidth
 - Dropped packets
- Identify and resolve network issues using network monitoring tools
 - tcpdump
 - Snoop

Tools

- CLI
 - esxcfg-vswif
 - dig
 - netstat
 - route
 - nslookup
 - hostname
 - vmknics
 - esxcfg-route
- VI client

Objective 2.6 – Manage Service Console firewall configurations.

Knowledge

- Understand firewall rules
- Explain the use of services in a firewall configuration
- Identify which ports must be open in a virtual infrastructure firewall configuration

Skills and Abilities

- Configure ESX Server firewall settings
- Open and close ports
- Monitor firewall logs

Tools

- CLI
 - esxcfg-firewall
- VI client

Objective 2.7 – Administer complex iSCSI configurations.

Knowledge

- Understand how iSCSI is used with the VMkernel
- Identify iSCSI features and limitations
- Design an iSCSI solution

Skills and Abilities

- Configure the ESX Server iSCSI software initiator
- Open the related firewall ports for iSCSI
- Manage iSCSI initiator settings
 - Discovery
 - CHAP authentication

Tools

- CLI
 - esxcfg-swiscsi
 - vmkiscsi-tool
 - esxcfg-rescan
 - esxcfg-firewall
- VI client

Section 3 – DRS Clusters and Performance Monitoring

Objective 3.1 – Create and administer complex DRS clusters.

Knowledge

- Demonstrate the use of resource pools and child pools with DRS clusters
- Understand how to monitor DRS cluster performance and resource utilization within the cluster
- Explain best practices for DRS cluster design
- Understand performance considerations for DRS clusters

Skills and Abilities

- Deploy complex resource pools
 - Utilize best practice guidelines
 - Configure expandable reservations where applicable
- Deploy a complex DRS cluster
 - Ensure optimal use of Maintenance Mode
 - Configure appropriate threshold settings
- Implement Distributed Power Management within a DRS cluster
- Monitor DRS clusters
 - Cluster performance
 - Resource utilization
 - Troubleshooting

Tools

- VI client

Objective 3.2 – Demonstrate advanced performance analysis techniques.

Knowledge

- Demonstrate the use of various performance tools
- Understand configuration options for performance data collection
 - line graphs vs. stacked graphs
 - real-time vs. historical metrics
 - statistics collection levels
- Use performance information to troubleshoot and resolve:
 - CPU Utilization issues
 - Memory utilization issues
 - Disk utilization issues

- Network utilization issues

Skills and Abilities

- Use esxtop to monitor the health of the ESX Server
- Use vm-support to capture performance snapshots of the ESX Server
- Use guest OS performance analysis tools to determine performance characteristics within the virtual machine
- Generate reports and collate data from VirtualCenter
 - Alarms
 - Resource utilization
 - Performance
 - Topology Maps
- Diagnose resource utilization issues
 - CPU ready time/wait time
 - Memory ballooned/swapped
 - Disk queue depth/locking
 - Network dropped packets/

Tools

- CLI
 - esxtop
 - vm-support
- VI Client
 - Performance graphs
 - VirtualCenter management server configuration

Section 4 – Business Continuity and Data Protection

Objective 4.1 – Configure Virtual Machine Clustering.

Knowledge

- Explain the different methods of clustering virtual machines
 - Cluster in a box
 - Cluster across boxes
 - Physical to Virtual clustering (N+1 clusters)
- Describe how shared storage is configured with clustering
- Understand HBA configuration options

Skills and Abilities

- Configure bus sharing options
 - Physical
 - Virtual
- Configure Raw Device Mappings (RDMs)
 - Pass-through
 - Non pass-through
- Configure HBA options
 - Queue depth
 - Device/LUN Reset
 - Timeout value

Tools

- CLI
 - esxcfg-advcfg
 - esxcfg-module
- VI client

Objective 4.2 – Configure advanced HA deployments

Knowledge

- Describe guidelines for restart priority and isolation response.
- Explain how to customize a typical HA deployment
- Understand HA communication (heartbeat)
- Detail impact of DRS affinity rules on an HA cluster
- Describe troubleshooting techniques
- Explain best practices for HA deployment

Skills and Abilities

- Configure restart priority and isolation response
 - Cluster-wide setting
 - Individual VM override settings
- Configure advanced HA options
 - Failure detection time
 - Redundant isolation address settings
 - Default failover host
- Configure physical switch settings to support HA
- Troubleshoot HA deployments
 - Failover capacity

- Examine log entries
- Correct network issues

Tools

- CLI
 - esxcfg-advcfg
 - hostname -s
- VI Client

Objective 4.3 – Configure and Administer VMware Consolidated Backup (VCB)

Knowledge

- Explain VCB capabilities, limitations and best practices
- Describe how snapshots are created
- Understand differences between file-level and full VM backups
- Detail what files are part of a full VM backup
- Explain how to integrate VCB with
 - Third-party backup software
 - Multipathing software
 - VirtualCenter
 - VMFS Storage
- Explain VMware Converter based restores
- Describe common VCB log files

Skills and Abilities

- Verify sizing of VCB holding tanks based on full VM backup requirements
- Perform integration tests
 - VCB to VirtualCenter
 - VCB to Third-party backup software
 - VCB to VMFS Storage
- Analyze VCB logs to verify functionality
- Use VCB command line tools to verify and troubleshoot VCB deployments
- Review multipathing configuration
- Run performance tests to determine optimal VCB deployment
- Configure a VCB backup role into VirtualCenter

Tools

- CLI
 - vcbVmName
 - vcbSnapshot

- vcbMounter
- vcbExport
- mountvm
- vcbRestore
- vcbUtil
- VI client
- VMware Converter

Section 5 – Operational Maintenance

Objective 5.1 – VMware Update Manager

Knowledge

- Describe Update Manager capabilities
- Explain VUM architecture and components
- Describe DRS-enabled remediation

Skills and Abilities

- Install and Configure Update Manager
 - VUM Server
 - VUM Agents
 - VUM Download Server
 - VI Client plug-in
- Perform Update Manager tasks
 - Establish baselines
 - Fixed
 - Dynamic
 - Manage and attach baselines
 - Schedule and perform scans
 - Interpret scan status and compliancy
 - Schedule and perform remediation
 - Rollback
- Troubleshoot remediation failures

Tools

- VI client
- CLI
 - vmware-umds

Section 6 – Logging

Objective 6.1 – Configure VirtualCenter log behavior

Knowledge

- Identify location of VirtualCenter related log files
- Describe options for customizing VirtualCenter log behavior
- Describe options for customizing VI Client log behavior
- Explain default log file characteristics
- Understand log file collection methods

Skills and Abilities

- Modify VirtualCenter Server log configuration
- Modify VirtualCenter Agent log configuration
- Export VirtualCenter logs

Tools

- VI client
- CLI

Objective 6.2 – Configure Service Console log behavior

Knowledge

- Describe Service Console log consolidation
- Identify location of Service Console related log files
- Describe options for customizing Service Console log behavior
- Explain default log file characteristics
- Understand log file collection methods
- Define additional third-party log files located on the Service Console

Skills and Abilities

- Configure Service Console log file rotation
- Modify VC Server log configuration
- Modify VC Agent log configuration
- Export VC logs

Tools

- CLI
 - syslogd
 - logger

Section 7 – ESX Server Security

Objective 7.1 – Configure secure remote access.

Knowledge

- Explain how to prevent remote root login
- Describe the process to allow selected users remote access capabilities
- Understand authentication process and options
- Describe SSH implementation
- Understand how user access is tracked and logged
- Explain the use of TCP wrappers to restrict access from specific hosts/addresses

Skills and Abilities

- Enable/Disable root SSH login
- Modify the default settings to allow both incoming and outgoing SSH traffic
- Create ESX Server user accounts and assign group memberships
 - Command Line
 - VI client
- Configure SSH
 - AllowUsers/DenyUsers
 - Banner
- Define VI Client roles and user and group assignments
- Use Service Console commands to track user access
- Use esxcfg-auth to modify authentication settings
 - Preferred authentication method
 - Login attempts
 - Password aging
- Configure TCP wrappers
 - hosts.allow/hosts.deny

Tools

- CLI
 - vmware-authd
 - esxcfg-auth
 - who
 - w
 - last
 - fuser

Objective 7.2 – Delegate administrative privileges

Knowledge

- Explain how to restrict access to administrative functions
- Describe the process to restrict access to specific administrative commands
- Understand how attempts to use administrative functions can be logged

Skills and Abilities

- Switch from a standard user account to root
- Enable the use of the wheel group
- Configure sudo
 - Users/Groups
 - Hosts
 - Commands
 - Aliases
 -

Tools

- CLI
 - visudo
 - su
 - sudo
 - which

Section 8 – Rapid Provisioning

Objective 8.1 – ESX Server Scripted Installation

Knowledge

- Explain the usage of the Scripted Installation wizard

- Describe the various methods of automated deployment
 - CD Rom
 - HTTP/FTP
 - NFS
- Define the directives contained in the installation script

Skills and Abilities

- Set up hardware and various connections
 - Boot from SAN
 - Layout of local drives in various raid configurations
- Create an install script and verify the following sections
 - Command
 - %packages
 - %pre
 - %post
 - %vmlicense_text
- Configure Service Console components of an ESX server
 - Network Time Protocol (NTP)
 - DNS
 - SNMP
- Install supported third party agents according to the design plan

Tools

- VI client
- CLI