

# VMware Certified Advanced Professional

## Datacenter Administration Exam Blueprint

VDCA410 Exam

Exam Blueprint Version 1.9

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### Disclaimer:

This blueprint is intended to provide information about the objectives covered by this exam, related resources, and recommended courses. The material contained within this blueprint is not intended to guarantee that a passing score will be achieved on the exam. VMware recommends that a candidate thoroughly understands the objectives indicated in this guide and utilizes the resources and courses recommended in this guide where needed to gain that understanding.

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## **Section 1: The Exam**

### 1.1 Purpose of Exam

The VDCA410 VMware Certified Advanced Professional on vSphere – Datacenter Administration exam tests potential VCAP-DCA candidates on their skills and abilities installing, configuring and administering large and/or more complex virtualized environments.

### 1.2 Number of Questions

The VDCA410 exam consists of approximately 40 live lab activities and a short pre-exam survey consisting of 9 questions. Live lab activities consist of multiple tasks, where each task is scored. The total number of activities provided is based on the total number of tasks. Because of this, the actual number of lab activities may vary slightly between exams.

### 1.3 Passing Score

The passing score for this exam is 300. The scale is from 100-500. Scaled scores are calculated using a mathematical formula that considers a variety of factors, including the number and type of exam questions included in a specific version of the exam. Because this combination may vary in different versions of the same examination, scaled scores provide a fair score for each individual based on the version of the exam taken.

Points are awarded for the successful completion of each lab task. Most items on the exam are composed of several tasks, and partial credit is awarded for those tasks that are completed successfully. Candidates can choose to complete a task using different methods, as points are awarded based on successful completion, not on the steps used to complete the task.

### 1.4 How Objectives Relate to Questions on the Exam

Objectives summarize what the test is designed to measure. Objectives are developed by Exam Developers and SMEs based on identified tasks that relate to the job of administering a vSphere environment. Once the initial development process is complete, these objectives are verified using an external group of individuals in the actual job role. The external survey determines the number of questions for each objective, which relates directly to the criticality of the task in the job role.

## 1.5 Languages

The exam is available in English.

## 1.6 Time Limit

The total time for this exam is 210 minutes. Candidates who take the VCAP-DCA exam in a country where English is not a primary language will have an additional 30 minutes added to the exam time. This time extension is automatic, no additional action is required from the candidate. For the purposes of this exam, countries where English is considered one of the primary languages include Australia, New Zealand, Belize, South Africa, Bermuda, the United Kingdom, Canada, the United States and Ireland. An additional 15 minutes is provided to complete the survey questions and agreements.

When scheduling an exam, it is important to note that hardware resources are allocated for the duration of the exam. Since the hardware will be reallocated after the exam, it is critical that candidates arrive at the time their exam is scheduled to begin. To allow for unforeseen issues, candidates will be given a 30 minute grace period. After 30 minutes, the exam will be placed in a “No Show” status and the hardware will be reallocated for use by other exams. A candidate who is aware that they may arrive more than 30 minutes late to their scheduled exam should contact Pearson VUE to re-schedule.

## 1.7 Scheduling and Taking the Exam

This exam is administered through Pearson VUE. For details on the rules and procedures associated with registering for and taking the exam, which exams are available, latest certification news and more, please visit the VMware page on Pearson VUE’s website at <http://www.pearsonvue.com/vmware> .

Pearson VUE’s website can also be used to locate a testing center in your area, schedule a VMware exam, and review exam history information.

The VDCA410 exam requires pre-authorization, which includes the verification of your existing VCP status. The link to this pre-authorization is: <http://mylearn.vmware.com/feedback.cfm?survey=20128> .

## 1.8 Certification Tracks

The VDCA410 exam is a core component of the VCAP-DCA certification. The certification requires a passing score on the exam, and the candidate must be a VCP to obtain this certification. There is no course requirement for this exam, though several courses are suggested [below](#).

The VCAP-DCA Certification is a component of the [VMware Certified Design Expert](#) certification track.

## 1.9 Retake Policy

If a candidate fails an exam on the first attempt, he or she must wait 10 business days from their original appointment time before he or she can register to retake the exam. There is no limit to the number of retakes a candidate can attempt, but the same waiting period applies after each failed attempt. Once the exam is passed, a candidate may not make any further attempts.

## 1.10 Exam Security

VMware reserves the right to refuse certifying a candidate who violates exam security policies. This includes copying and redistribution of exam material, using any type of study material during the exam itself, attempting to photograph exam items and taking an exam using a false identity. VUE testing centers will take you photo and capture your digital signature upon arrival to take the exam.

## 1.11 Exam Environment

The exam consists of a number of tasks that are performed using actual equipment consisting of an ESX host, and ESXi host and a vCenter Server virtual machine. A number of pre-configured virtual machines will also be present for use with certain tasks. The lab environment is currently based on vSphere 4.0, and tasks in the lab are product version neutral. This means that any task presented in the exam can be performed in 4.0 or 4.1 and either version of the documentation can be used to prepare for the exam.

The VDCA410 exam includes troubleshooting tasks. As a result, some components may not be correctly configured, or may not have been configured at all, which is entirely intentional. In addition, some lab tasks are dependent on the successful completion of previous tasks. Every task can be completed successfully, and knowledge of how the task is completed is essential to determine what component or components must be configured or re-configured.

## **Section 2: Intended Audience**

### 2.1 Intended Audience

A candidate should have approximately two years experience in a virtual environment and have demonstrated technical leadership with vSphere technologies. Candidates should be capable of using automation tools and should be able to implement, configure and administer all vSphere Enterprise components. A successful candidate will most likely have additional industry-recognized general IT certifications--or the equivalent experience (typically 4-7 years).

## **Section 3: Objectives covered in the VDCA410 Exam**

### 3.1 Introduction

It is recommended that candidates have the knowledge and skills necessary to install, configure and administer a vSphere 4 environment before taking the VDCA410 exam. While there is no course requirement for this exam, several courses are available that can help provide knowledge on objectives that are covered by this exam. It is recommended that the candidate utilize these courses and/or other materials where needed to provide background information on the objectives in the exam.

### 3.2 Objectives

Prior to taking this exam, candidates should understand each of the following objectives. Each objective is listed below; along with related tools the candidate should have experience with, and related documentation that contains information relevant to the objective. All objectives may also be referenced in other product documentation not specifically highlighted below. The candidate should be familiar with all relevant product documentation or have an equivalent skillset.

## **VDCA410 Section 1 – Implement and Manage Storage**

### **Objective 1.1 – Implement and Manage Complex Storage Solutions**

#### Knowledge

- Identify RAID levels

- Identify supported HBA types
- Identify virtual disk format types

#### Skills and Abilities

- Determine use cases for and configure VMware DirectPath I/O
- Determine requirements for and configure NPIV
- Determine appropriate RAID level for various Virtual Machine workloads
- Apply VMware storage best practices
- Understand use cases for Raw Device Mapping
- Configure vCenter Server storage filters
- Understand and apply VMFS resignaturing
- Understand and apply LUN masking using PSA-related commands
- Analyze I/O workloads to determine storage performance requirements

#### Tools

- [Fibre Channel SAN Configuration Guide](#)
- [iSCSI SAN Configuration Guide](#)
- [ESX Configuration Guide](#)
- [ESXi Configuration Guide](#)
- [vSphere Command-Line Interface Installation and Scripting Guide](#)
- Product Documentation
- vSphere Client
- vscsiStats
- vSphere CLI
  - vicfg-\*
  - vifs
  - vmkfstools
  - esxtop/resxtop

### **Objective 1.2 – Manage Storage Capacity in a vSphere Environment**

#### Knowledge

- Identify storage provisioning methods
- Identify available storage monitoring tools, metrics and alarms

#### Skills and Abilities

- Apply space utilization data to manage storage resources
- Provision and manage storage resources according to Virtual Machine requirements
- Understand interactions between virtual storage provisioning and physical storage provisioning

- Apply VMware storage best practices
- Configure datastore alarms
- Analyze datastore alarms and errors to determine space availability

#### Tools

- [vSphere Datacenter Administration Guide](#)
- [Fibre Channel SAN Configuration Guide](#)
- [iSCSI SAN Configuration Guide](#)
- [vSphere Command-Line Interface Installation and Scripting Guide](#)
- Product Documentation
- vSphere Client
- vSphere CLI
  - `vmkfstools`

### **Objective 1.3 – Configure and Manage Complex Multipathing and PSA Plug-ins**

#### Knowledge

- Explain the Pluggable Storage Architecture (PSA) layout

#### Skills and Abilities

- Install and Configure PSA plug-ins
- Understand different multipathing policy functionalities
- Perform command line configuration of multipathing options
- Change a multipath policy
- Configure Software iSCSI port binding

#### Tools

- [vSphere Command-Line Interface Installation and Scripting Guide](#)
- [ESX Configuration Guide](#)
- [ESXi Configuration Guide](#)
- [Fibre Channel SAN Configuration Guide](#)
- [iSCSI SAN Configuration Guide](#)
- Product Documentation
- vSphere Client
- vSphere CLI
  - `esxcli`

## Section 2 – Implement and Manage Networking

### Objective 2.1 – Implement and Manage Complex Virtual Networks

#### Knowledge

- Identify common virtual switch configurations

#### Skills and Abilities

- Determine use cases for and apply IPv6
- Configure NetQueue
- Configure SNMP
- Determine use cases for and apply VMware DirectPath I/O
- Migrate a vSS network to a Hybrid or Full vDS solution
- Configure vSS and vDS settings using command line tools
- Analyze command line output to identify vSS and vDS configuration details

#### Tools

- [vSphere Command-Line Interface Installation and Scripting Guide](#)
- [vNetwork Distributed Switch: Migration and Configuration](#)
- [ESX Configuration Guide](#)
- [ESXi Configuration Guide](#)
- Product Documentation
- vSphere Client
- vSphere CLI
  - vicfg-\*

### Objective 2.2 – Configure and Maintain VLANs, PVLANS and VLAN Settings

#### Knowledge

- Identify types of VLANs and PVLANS

#### Skills and Abilities

- Determine use cases for and configure VLAN Trunking
- Determine use cases for and configure PVLANS
- Use command line tools to troubleshoot and identify VLAN configurations

### Tools

- [vSphere Command-Line Interface Installation and Scripting Guide](#)
- [ESX Configuration Guide](#)
- [ESXi Configuration Guide](#)
- Product Documentation
- vSphere Client
- vSphere CLI
  - vicfg-\*

## **Objective 2.3 – Deploy and Maintain Scalable Virtual Networking**

### Knowledge

- Identify VMware NIC Teaming policies
- Identify common network protocols

### Skills and Abilities

- Understand the NIC Teaming failover types and related physical network settings
- Determine and apply Failover settings
- Configure explicit failover to conform with VMware best practices
- Configure port groups to properly isolate network traffic

### Tools

- [ESX Configuration Guide](#)
- [ESXi Configuration Guide](#)
- [vSphere Command-Line Interface Installation and Scripting Guide](#)
- Product Documentation
- vSphere Client
- vSphere CLI
  - vicfg-\*

## **Objective 2.4 – Administer vNetwork Distributed Switch Settings**

### Knowledge

- Explain relationship between vDS and logical vSes

### Skills and Abilities

- Understand the use of command line tools to configure appropriate vDS settings on an ESX/ESXi host

- Determine use cases for and apply Port Binding settings
- Configure Live Port Moving
- Given a set of network requirements, identify the appropriate distributed switch technology to use
- Use command line tools to troubleshoot and identify configuration items from an existing vDS

#### Tools

- [ESX Configuration Guide](#)
- [ESXi Configuration Guide](#)
- [vSphere Command-Line Interface Installation and Scripting Guide](#)
- Product Documentation
- vSphere Client
- vSphere CLI
  - vicfg-\*

### **Section 3 – Deploy DRS Clusters and Manage Performance**

#### **Objective 3.1 – Tune and Optimize vSphere Performance**

#### Knowledge

- Identify appropriate BIOS and firmware setting requirements for optimal ESX/ESXi Host performance
- Identify appropriate ESX driver revisions required for optimal ESX/ESXi Host performance
- Recall where to locate information resources to verify compliance with VMware and third party vendor best practices

#### Skills and Abilities

- Tune ESX/ESXi Host and Virtual Machine memory configurations
- Tune ESX/ESXi Host and Virtual Machine networking configurations
- Tune ESX/ESXi Host and Virtual Machine CPU configurations
- Tune ESX/ESXi Host and Virtual Machine storage configurations
- Configure and apply advanced ESX/ESXi Host attributes
- Configure and apply advanced Virtual Machine attributes
- Tune and optimize NUMA controls

#### Tools

- [vSphere Resource Management Guide](#)
- [vSphere Command-Line Interface Installation and Scripting Guide](#)
- [Performance Troubleshooting for VMware vSphere 4](#)
- Product Documentation

- vSphere Client
  - Performance Graphs
- vSphere CLI
  - vicfg-\*
  - resxtop/esxtop
  - vscsiStats

### **Objective 3.2 – Optimize Virtual Machine Resources**

#### Knowledge

- Compare and contrast virtual and physical hardware resources
- Identify VMware memory management techniques
- Identify VMware CPU load balancing techniques
- Identify pre-requisites for Hot Add features

#### Skills and Abilities

- Calculate available resources
- Properly size a Virtual Machine based on application workload
- Configure large memory pages
- Understand appropriate use cases for CPU affinity

#### Tools

- [vSphere Resource Management Guide](#)
- [vSphere Command-Line Interface Installation and Scripting Guide](#)
- [Understanding Memory Resource Management in VMware® ESX™ Server 4.1](#)
- [VMware vSphere™ : The CPU Scheduler in VMware® ESX™ 4.1](#)
- vSphere Client
  - Performance Charts
- vSphere CLI
  - resxtop/esxtop

### **Objective 3.3 – Implement and Maintain Complex DRS Solutions**

#### Knowledge

- Explain DRS affinity and anti-affinity rules
- Identify required hardware components to support DPM
- Identify EVC requirements, baselines and components
- Understand the DRS migration algorithm, the Load Imbalance Metric, and their impact on migration recommendations

### Skills and Abilities

- Properly configure BIOS and management settings to support DPM
- Test DPM to verify proper configuration
- Configure appropriate DPM Threshold to meet business requirements
- Configure EVC using appropriate baseline
- Change the EVC mode on an existing DRS cluster
- Create DRS and DPM alarms
- Configure applicable power management settings for ESX Hosts
- Properly size virtual machines and clusters for optimal DRS efficiency
- Properly apply virtual machine automation levels based upon application requirements

### Tools

- [vSphere Resource Management Guide](#)
- Product Documentation
- vSphere Client
  - DRS Resource Distribution Chart

## **Objective 3.4 – Perform Capacity Planning in a vSphere Environment**

### Knowledge

- Understand the DRS slot-size algorithm and its impact on migration recommendations
- Identify tools needed for monitoring capacity planning
- Identify performance metrics related to resource contention and saturation

### Skills and Abilities

- Predict when additional ESX/ESXi Host, network or storage resources will be required by observing an existing environment
- Determine when to expand or contract provisioned Virtual Machine resources based upon observed Virtual Machine utilization
- Interpret performance metrics from vCenter to properly size the environment

### Tools

- [vSphere Resource Management Guide](#)
- [Overview Performance Charts Help](#)
- Product Documentation
- vSphere Client

### Objective 3.5 – Utilize Advanced vSphere Performance Monitoring Tools

#### Knowledge

- Identify hot keys and fields used with `resxtop/esxtop`
- Identify fields used with `vscsiStats`

#### Skills and Abilities

- Configure `esxtop/resxtop` custom profiles
- Determine use cases for and apply `esxtop/resxtop` Interactive, Batch and Replay modes
- Use `vscsiStats` to gather storage performance data
- Use `esxtop/resxtop` to collect performance data
- Given `esxtop/resxtop` output, identify relative performance data for capacity planning purposes

#### Tools

- [vSphere Resource Management Guide](#)
- [vSphere Command-Line Interface Installation and Scripting Guide](#)
- Product Documentation
- vSphere Client
- vSphere CLI
  - `esxtop/resxtop`
  - `vscsiStats`

## Section 4 – Manage Business Continuity and Protect Data

### Objective 4.1 – Implement and Maintain Complex VMware HA Solutions

#### Knowledge

- Identify the three admission control policies for HA
- Identify heartbeat options and dependencies

#### Skills and Abilities

- Calculate host failure requirements
- Configure customized isolation response settings
- Configure HA redundancy in a mixed ESX/ESXi environment
- Configure HA related alarms and monitor an HA cluster
- Create a custom slot size configuration
- Understand interactions between DRS and HA
- Create an HA solution that ensures primary node distribution across sites

- Analyze vSphere environment to determine appropriate HA admission control policy
- Analyze performance metrics to calculate host failure requirements
- Analyze Virtual Machine workload to determine optimum slot size
- Analyze HA cluster capacity to determine optimum cluster size

#### Tools

- [vSphere Availability Guide](#)
- Product Documentation
- vSphere Client

### **Objective 4.2 – Deploy and Test VMware FT**

#### Knowledge

- Identify VMware FT hardware requirements
- Identify VMware FT compatibility requirements

#### Skills and Abilities

- Modify VM and ESX/ESXi Host settings to allow for FT compatibility
- Use VMware best practices to prepare a vSphere environment for FT
- Configure FT logging
- Prepare the infrastructure for FT compliance
- Test FT failover, secondary restart and application fault tolerance in a FT Virtual Machine

#### Tools

- [vSphere Availability Guide](#)
- Product Documentation
- vSphere Client

### **Objective 4.3 – Configure a vSphere Environment to support MSCS Clustering**

#### Knowledge

- Identify MSCS clustering solution requirements
- Identify the three supported MSCS configurations

#### Skills and Abilities

- Configure Virtual Machine hardware to support cluster type and guest OS
- Configure a MSCS cluster on a single ESX/ESXi Host
- Configure a MSCS cluster across ESX/ESXi Hosts

- Configure standby host clustering

#### Tools

- [Setup for Failover Clustering and Microsoft Cluster Service](#)
- Product Documentation
- vSphere Client

### **Objective 4.4 – Deploy and Maintain vCenter Server Heartbeat**

#### Knowledge

- Identify the five protection levels for vCenter Server Heartbeat
- Identify the three server protection options for vCenter Server Heartbeat
- Identify supported cloning options

#### Skills and Abilities

- Install and configure vCenter Server Heartbeat
- Determine use cases for and execute a manual switchover
- Recover from a failover
- Monitor vCenter Server Heartbeat and communication status
- Configure heartbeat settings
- Configure shutdown options
- Configure application protection
- Add/Edit Services
- Add/Edit Tasks
- Edit/Test Rules
- Install/Edit Plug-ins
- Add/Remove Inclusion/Exclusion Filters
- Perform Full System and Full Registry checks
- Configure/Test Alerts
- Troubleshoot common vCenter Server Heartbeat error conditions

#### Tools

- [vCenter Server Heartbeat QuickStart Guide](#)
- [vCenter Server Heartbeat Reference Guide](#)
- Product Documentation
- vSphere Client

## Section 5 – Perform Operational Maintenance

### Objective 5.1 – Implement and Maintain Host Profiles

#### Skills and Abilities

- Use Profile Editor to edit and/or disable policies
- Create sub-profiles
- Use Host Profiles to deploy vDS

#### Tools

- [vSphere Datacenter Administration Guide](#)
- [VMware vSphere™ 4: Deployment Methods for the VMware® vNetwork Distributed Switch](#)
- Product Documentation
- vSphere Client

### Objective 5.2 – Deploy and Manage Complex Update Manager Environments

#### Knowledge

- Identify firewall access rules for Update Manager

#### Skills and Abilities

- Determine use case for, install and configure Update Manager Download Service
- Configure a shared repository
- Configure smart rebooting
- Manually download updates to a repository
- Perform orchestrated vSphere upgrades
- Create and modify baseline groups
- Troubleshoot Update Manager problem areas and issues
- Generate database reports using MS Excel or MS SQL
- Upgrade vApps using Update Manager

#### Tools

- [VMware vCenter Update Manager Installation and Administration Guide](#)
- Product Documentation
- vSphere Client
- vmware-ums

## Section 6 – Perform Advanced Troubleshooting

### Objective 6.1 – Configure, Manage and Analyze vSphere Log Files

#### Knowledge

- Identify vCenter Server log file names and locations
- Identify ESX/ESXi log files names and locations
- Identify tools used to view vSphere log files

#### Skills and Abilities

- Generate vCenter Server and ESX/ESXi log bundles
- Use `vicfg-syslog` to configure centralized logging on ESX/ESXi Hosts
- Test centralized logging configuration
- Configure the vMA appliance as a log host
- Use `vilogger` to enable/disable log collection on the vMA appliance
- Use `vilogger` to configure log rotation and retention
- Analyze log entries to obtain configuration information
- Analyze log entries to identify and resolve issues

#### Tools

- [vSphere Management Assistant Guide](#)
- [vSphere Command-Line Interface Installation and Scripting Guide](#)
- [vSphere Datacenter Administration Guide](#)
- Product Documentation
- vSphere Client
- `vicfg-syslog`
- `vilogger`

### Objective 6.2 – Troubleshoot CPU and Memory Performance

#### Knowledge

- Identify `resxtop/esxtop` metrics related to memory and CPU
- Identify vCenter Server Performance Chart metrics related to memory and CPU

### Skills and Abilities

- Troubleshoot ESX/ESXi Host and Virtual Machine CPU performance issues using appropriate metrics
- Troubleshoot ESX/ESXi Host and Virtual Machine memory performance issues using appropriate metrics
- Use Hot-Add functionality to resolve identified Virtual Machine CPU and memory performance issues

### Tools

- [vSphere Resource Management Guide](#)
- [vSphere Command-Line Interface Installation and Scripting Guide](#)
- Product Documentation
- vSphere Client
- vSphere CLI
  - `resxtop/esxtop`

## **Objective 6.3 – Troubleshoot Network Performance and Connectivity**

### Knowledge

- Identify virtual switch entries in a Virtual Machine's configuration file
- Identify virtual switch entries in the ESX/ESXi Host configuration file
- Identify CLI commands and tools used to troubleshoot vSphere networking configurations
- Identify logs used to troubleshoot network issues

### Skills and Abilities

- Utilize `net-dvs` to troubleshoot vNetwork Distributed Switch configurations
- Utilize `vicfg-*` commands to troubleshoot ESX/ESXi network configurations
- Configure a network packet analyzer in a vSphere environment
- Troubleshoot Private VLANs
- Troubleshoot Service Console and vmkernel network configuration issues
- Troubleshoot DNS and routing related issues
- Use `esxtop/resxtop` to identify network performance problems
- Use CDP and/or network hints to identify connectivity issues
- Analyze troubleshooting data to determine if the root cause for a given network problem originates in the physical infrastructure or vSphere environment

### Tools

- [ESX Configuration Guide](#)
- [ESXi Configuration Guide](#)
- [vSphere Command-Line Interface Installation and Scripting Guide](#)

- Product Documentation
- vSphere Client
- vSphere CLI
  - vicfg-\*
  - net-dvs
  - resxtp/esxtp

## Objective 6.4 – Troubleshoot Storage Performance and Connectivity

### Knowledge

- Recall vicfg-\* commands related to listing storage configuration
- Recall vSphere 4 storage maximums
- Identify logs used to troubleshoot storage issues
- Describe the VMFS file system

### Skills and Abilities

- Use vicfg-\* and esxcli to troubleshoot multipathing and PSA-related issues
- Use vicfg-module to troubleshoot VMkernel storage module configurations
- Use vicfg-\* and esxcli to troubleshoot iSCSI related issues
- Troubleshoot NFS mounting and permission issues
- Use esxtp/resxtp and vscsiStats to identify storage performance issues
- Configure and troubleshoot VMFS datastores using vmkfstools
- Troubleshoot snapshot and resignaturing issues
- Analyze log files to identify storage and multipathing problems

### Tools

- [ESX Configuration Guide](#)
- [ESXi Configuration Guide](#)
- [vSphere Command-Line Interface Installation and Scripting Guide](#)
- Product Documentation
- vSphere Client
- vSphere CLI
  - vicfg-\*
  - esxcli
  - resxtp/esxtp
  - vscsiStats
  - vmkfstools

## Objective 6.5 – Troubleshoot vCenter Server and ESX/ESXi Host Management

### Knowledge

- Identify CLI commands and tools used to troubleshoot management issues

### Skills and Abilities

- Troubleshoot vCenter Server service and database connection issues
- Troubleshoot the ESX Service Console firewall
- Troubleshoot ESX/ESXi server management and connectivity issues
- Determine the root cause of vSphere management or connectivity issue

### Tools

- [ESX Configuration Guide](#)
- [ESXi Configuration Guide](#)
- [vSphere Command-Line Interface Installation and Scripting Guide](#)
- Product Documentation
- vSphere Client
- vSphere CLI
  - vicfg-\*

## Section 7 – Secure a vSphere Environment

### Objective 7.1 – Secure ESX/ESXi Hosts

#### Knowledge

- Identify configuration files related to network security
- Identify virtual switch security characteristics

#### Skills and Abilities

- Add/Edit Remove users/groups on an ESX Host
- Customize SSH settings for increased security
- Enable/Disable certificate checking
- Generate ESX Host certificates
- Enable ESXi lockdown mode
- Replace default certificate with CA-signed certificate
- Configure SSL timeouts
- Secure ESX Web Proxy
- Enable strong passwords and configure password policies
- Identify methods for hardening virtual machines

- Analyze logs for security-related messages

#### Tools

- [ESX Configuration Guide](#)
- [ESXi Configuration Guide](#)
- [vSphere Command-Line Interface Installation and Scripting Guide](#)
- Product Documentation
- vSphere Client
- vSphere CLI
  - vicfg-user
  - vifs

### **Objective 7.2 – Configure and Maintain the ESX Firewall**

#### Knowledge

- Identify vicfg-firewall commands
- Explain the three firewall security levels
- Identify ESX firewall architecture with/without vCenter Server

#### Skills and Abilities

- Enable/Disable pre-configured services
- Configure service behavior automation
- Open/Close ports in the firewall
- Create a custom service
- Set firewall security level

#### Tools

- [ESX Configuration Guide](#)
- [ESXi Configuration Guide](#)
- [vSphere Command-Line Interface Installation and Scripting Guide](#)
- Product Documentation
- vSphere Client
- vSphere CLI
  - vicfg-firewall

## Objective 7.3 – Deploy and Administer vShield Zones

### Knowledge

- Identify vShield Zones components
- Identify the four CLI command modes

### Skills and Abilities

- Configure vShield Zones
- Backup and restore vShield Manager Data
- Backup CLI Configuration
- Create/Delete Layer 2/3/4 firewall rules using VM Wall
- Install/Uninstall a vShield manually and from template
- Configure vShield Manager plug-in capability
- Configure VM Flow charts
- Update vShield Zones
- Add/Edit/Delete User Accounts
- Assign rights to a user
- Add/Delete Application-Port Pair mapping
- Execute/Schedule Execution of virtual machine discovery
- Utilize vShield Zones CLI commands to configure and monitor vShield Zones
- Analyze traffic using VM Flow to determine root cause of network related issues

### Tools

- [vShield Zones QuickStart Guide](#)
- [vShield Zones Administration Guide](#)
- [Introduction to vShield Zones](#)
- Product Documentation
- vShield Manager
- vShield CLI
- vSphere Client

## Section 8 – Perform Scripting and Automation

### Objective 8.1 – Execute VMware Cmdlets and Customize Scripts Using PowerCLI

#### Knowledge

- Identify vSphere PowerCLI requirements
- Identify Cmdlet concepts

- Identify environment variables usage

#### Skills and Abilities

- Use VMRun to execute commands in a guest OS
- Install vSphere PowerCLI
- Install Update Manager PowerShell Library
- Use basic and advanced Cmdlets to manage VMs and ESX Hosts
- Use Web Service Access Cmdlets
- Use Datastore and Inventory Providers
- Given a sample script, modify the script to perform a given action

#### Tools

- [vSphere PowerCLI Installation Guide](#)
- [vSphere PowerCLI Administration Guide](#)
- Product Documentation
- vSphere PowerCLI commands
- vSphere PowerCLI Cmdlets

### **Objective 8.2 – Administer vCenter Orchestrator**

#### Knowledge

- Identify vCenter Orchestrator requirements
- Identify default Orchestrator plug-ins

#### Skills and Abilities

- Install and Configure vCenter Orchestrator
- Configure vCenter Orchestrator database
- Configure vCenter Orchestrator LDAP connection
- Configure vCenter Orchestrator vCenter server connections
- Run a Workflow
- Administer Actions, Tasks, Workflows and Policies
- Administer Packages
- Identify appropriate Workflow for a given management activity

#### Tools

- [vCenter Orchestrator Installation and Configuration Guide](#)
- [vCenter Orchestrator Administration Guide](#)
- Product Documentation

- vCenter Orchestrator Web Configuration
- vCenter Orchestrator Client
- vSphere Client

### **Objective 8.3 – Administer vSphere Using the vSphere Management Assistant**

#### Knowledge

- Identify vMA prerequisites
- Identify vMA specific commands
- Determine when vMA is needed

#### Skills and Abilities

- Install and Configure vMA
- Add/Remove target servers
- Perform updates to the vMA
- Use `vmkfstools` to manage VMFS datastores
- Use `vmware-cmd` to manage VMs
- Use `esxcli` to manage Storage Multipathing
- Troubleshoot common vMA errors and conditions

#### Tools

- [vSphere Management Assistant Guide](#)
- [vSphere Command-Line Interface Installation and Scripting Guide](#)
- Product Documentation
- vSphere Management Appliance
- `vifp`
- `vima-update`
- vSphere CLI
  - `vicfg-*`
  - `vmkfstools`
  - `esxcli`
  - `vmware-cmd`
- vSphere Client

## Section 9 – Perform Advanced vSphere Installations and Configurations

### Objective 9.1 – Install ESX Server with custom settings

#### Knowledge

- Identify Service Console memory defaults and maximums
- Identify default and optional ESX partitions

#### Skills and Abilities

- Configure optional ESX partitions during installation
- Install/uninstall custom drivers
- Configure advanced bootloader options
- Configure kernel options
- Given a scenario, determine when to customize a configuration

#### Tools

- [ESX and vCenter Server Installation Guide](#)
- Product Documentation
- vSphere CLI
  - vicfg-advcfg
  - vicfg-module
- vSphere Client

### Objective 9.2 – Plan and Execute Scripted Installations

#### Knowledge

- Identify default installation scripts
- Identify boot options for scripted installation

#### Skills and Abilities

- Perform a scripted ESX Host installation
- Perform a scripted ESXi Host installation
- Configure media repository
- Edit installation script parameters
- Configure pre/post script tasks
- Evaluate use cases for scripted installation

#### Tools

- [ESX and vCenter Server Installation Guide](#)
- Product Documentation
- ks-first-safe.cfg
- ks-first.cfg

### Objective 9.3 – Configure vCenter Server Linked Mode

#### Knowledge

- Identify Linked Mode Prerequisites
- Identify differences between Linked and non-linked vCenter Server Configurations
- Identify when a role requires reconciliation

#### Skills and Abilities

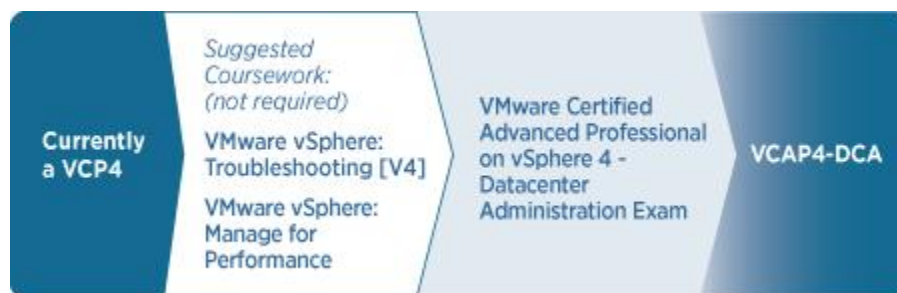
- Reconcile Roles in a Linked Mode Configuration
- Create and Join a Linked Mode Group
- Determine use cases for vCenter Server Linked Mode
- Troubleshoot Linked Mode Configurations

#### Tools

- [ESX and vCenter Server Installation Guide](#)
- [vSphere Datacenter Administration Guide](#)
- Product Documentation
- vSphere Client

## **Section 4: VCAP-DCA Paths and Suggested Courses**

### 4.1 VCAP-DCA Path Options



## 4.2 Suggested Courses

The VCAP-DCA exam covers several bodies of knowledge, including performance optimization, troubleshooting, security and automation. VMware offers courses that cover these bodies of knowledge, as follows:

### **VMware vSphere: Manage for Performance**

This course is a three-day, hands-on training course that explores performance management in a VMware vSphere™ environment. It provides the knowledge and skills necessary to make fundamental design decisions that enhance performance and to meet performance goals in an already-deployed vSphere installation. The course covers the following objectives:

- Explain the performance impact of using different monitor modes
- Use vSphere tools to monitor the performance of ESX/ESXi hosts
- Diagnose performance problems relating to CPU, memory, network, and storage on an ESX/ESXi host
- Discuss how to achieve an optimal virtual machine configuration
- Discuss guidelines for monitoring application performance
- Manage higher availability and data protection using vCenter Server

This course covers performance related objectives on the VDC410 exam and is recommended for individuals who want to gain a better understanding of performance related objectives.

### **VMware vSphere: Troubleshooting**

This course is a four-day hands-on training course that focuses on providing system administrators with the advanced knowledge, skills, and abilities to achieve competence in troubleshooting a VMware vSphere™ environment. In this course, you will spend most of the time diagnosing and rectifying configuration problems created on VMware ESX™/ESXi hosts and VMware vCenter™ Server systems. This course covers the following objectives:

- Use the VMware vSphere Client and service console commands to configure or diagnose and rectify problems on ESX
- Use the vSphere Client and the VMware vSphere Management Assistant (vMA) appliance to configure or diagnose and rectify problems on ESX and ESXi hosts
- Use ESXi technical support mode to diagnose and rectify problems on ESXi
- Create and use a network sniffer to capture and display virtual switch network traffic
- Use the vSphere Client and command-line tools to troubleshoot VMware VMotion™, VMware Storage VMotion, VMware High Availability, VMware Distributed Resource Scheduler, and virtual machine power-on problems

This course covers troubleshooting related objectives and covers use of the vSphere Management Assistance and the vSphere CLI. It is recommended for individuals who want to gain a better understanding of troubleshooting related objectives and/or command line processes.

### **VMware vSphere: Manage and Design for Security**

This course is a three-day hands-on training course that focuses on best practices for secure design, deployment, and operation of a VMware vSphere™ environment. Through lecture, discussion, and hands-on practice, you will gain the knowledge and skills necessary to meet the security and compliance goals of your organization. This course covers the following objectives:

- Identify vulnerabilities in the current design of a vSphere environment and recommend corrective actions
- Harden vSphere components as described in vSphere Hardening Guide
- Recommend configuration and change management policies, processes, and systems

This course covers security related objectives and recommended for individuals who want to gain a better understanding of those objectives.

### **VMware vSphere: Automation with vSphere PowerCLI**

This course is a two-day hands-on training course that focuses on the use of VMware vSphere™ PowerCLI to automate VMware vSphere 4. This course demonstrates ways to automate tasks that can reduce your IT costs while improving efficiency, availability, flexibility, and manageability:

- Automate VMware® ESX™ configuration
- Automate the provisioning of virtual machines
- Automate changes to virtual machine configuration
- Automate cluster operations
- Automate reporting

This course covers objectives related to PowerCLI and automation and is recommended for individuals who want to gain a better understanding of these objectives.

## **Section 5: Additional Resources**

### 5.1 Mock Exam

VMware will provide a mock exam for the VDCA410. The mock exam simulates a sample question and lab activity similar to the type of questions and activities found on the exam.

The mock exam, when available, will be located at: <http://www.vmware.com/go/vcap>

## 5.2 VCAP-DCA Community

VMware provides an online community for VCAP-DCA candidates. This community contains valuable information from other candidates and senior VCAPs, and is moderated by VMware certification staff.

The community is located at: <http://communities.vmware.com/community/vmtn/certedu/certification/vcap>

## 5.3 Building a vSphere Test Environment

All VMware products, including vSphere 4, can be downloaded and evaluated for 60 days. If you have the equipment to install a copy of ESX/ESXi 4.x, you can install ESX in a VM. This would allow you to install multiple copies of ESX and a copy of vCenter Server. For shared storage, obtain a virtual appliance that contains an iSCSI target. Several of these are available on the [appliance marketplace](#).