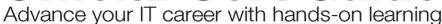
PEARSON IT CERTIFICATION



# **Official Cert Guide**





# VCP-DCV for vSphere 7.x

Exam 2V0-21.20



JOHN A. DAVIS STEVE BACA OWEN THOMAS

# Special Offer

# Save 80% on Premium Edition eBook and Practice Test

The VCP-DCV for vSphere 7.x (Exam 2V0-21.20) Official Cert Guide provides three eBook files (PDF, EPUB, and MOBI/Kindle) to read on your preferred device and an enhanced edition of the Pearson Test Prep practice test software. You also receive two additional practice exams with links for every question mapped to the PDF eBook.

See the card insert in the back of the book for your Pearson Test Prep activation code and special offers.

# VCP-DCV for vSphere 7.x (Exam 2V0-21.20) Official Cert Guide

# **Table of Contents**

Cover

Title Page

Copyright Page

Credits

**Dedications** 

About the Authors

About the Reviewer

Acknowledgments

Contents at a Glance

**Table of Contents** 

Foreword

Introduction

Part I: vSphere Architecture, Integration, and Requirements

Chapter 1 vSphere Overview, Components, and Requirements

Do I Know This Already? Quiz

Foundation Topics

vSphere Components and Editions

vSphere Components

**Editions and Licenses** 

vCenter Server Topology

Single Sign-On (SSO) Domain

Enhanced Linked Mode



#### vCenter HA

# Infrastructure Requirements

Compute and System Requirements

Storage Requirements

**Network Requirements** 

Infrastructure Services

# Other Requirements

Additional Requirements

vSphere Replication Requirements

vCenter High Availability Requirements

SDDC Requirements

## VMware Cloud vs. VMware Virtualization

Server Virtualization

**VMware SDDC** 

vCloud Suite and Private Clouds

VCF and Hybrid Clouds

VMC on AWS

VMware vCloud Director

**Cloud Automation** 

**Exam Preparation Tasks** 

Review All the Key Topics

Complete Tables and Lists from Memory

**Define Key Terms** 

**Answer Review Questions** 

# Chapter 2 Storage Infrastructure

Do I Know This Already? Quiz

**Foundation Topics** 

#### Storage Models and Datastore Types

How Virtual Machines Access Storage

Storage Virtualization: The Traditional Model

Software-Defined Storage Models

**Datastore Types** 



Storage in vSphere with Kubernetes

VMware NVMe

# vSAN Concepts

vSAN Characteristics

vSAN Terminology

What Is New in vSAN 7.0

vSAN Deployment Options

vSAN Limitations

vSAN Space Efficiency

vSAN Encryption

vSAN File Services

vSAN Requirements

Other vSAN Considerations

## vSphere Storage Integration

**VASA** 

VAAI

Virtual Volumes (vVols)

#### Storage Multipathing and Failover

Multipathing Overview

Pluggable Storage Architecture (PSA)

#### Storage Policies

Storage Policy Based Management (SPBM)

Virtual Disk Types

vSAN-Specific Storage Policies

#### Storage DRS (SDRS)

Initial Placement and Ongoing Balancing

Space Utilization Load Balancing

I/O Latency Load Balancing

SDRS Automation Level

SDRS Thresholds and Behavior

SDRS Recommendations

Anti-affinity Rules

**Datastore Cluster Requirements** 



NIOC, SIOC, and SDRS

**Exam Preparation Tasks** 

Review All Key Topics

Complete Tables and Lists from Memory

**Define Key Terms** 

**Review Questions** 

# Chapter 3 Network Infrastructure

Do I Know This Already? Quiz

**Foundation Topics** 

Networking Terms and Concepts

Traditional Networking Terminology

Virtual NICs

Virtual Switch Concepts

**VLANs** 

# vSphere Standard Switch (vSS)

MTU

vSS Network Policies

NIC Teaming Policies

**Network Security Policies** 

Traffic Shaping Policy

**VLAN Policies** 

# Distributed Virtual Switch (vDS)

Distributed Port Groups

**Uplink Port Groups** 

vSS and vDS Comparison

vDS Network Policies

Inbound Traffic Shaping

Port-Blocking Policies

Load-Based NIC Teaming

Resource Allocation Policy

**NetFlow and Monitoring Policy** 

Traffic Filtering and Marking Policy



# vDS Settings and Features

Private VLANs

Data CenterLevel Management

Port State Monitoring

Port State with vMotion

Port Mirroring

Port Binding and Allocation

LACP Support

vDS Health Check

# Other vSphere Networking Features

Multicast Filtering Mode

Discovery Protocol

TCP Segmentation Offload

DirectPath I/O

Single Root I/O Virtualization (SR-IOV)

VMkernel Networking and TCP/IP Stacks

**Exam Preparation Tasks** 

Review All Key Topics

Complete Tables and Lists from Memory

**Define Key Terms** 

**Review Questions** 

# Chapter 4 Clusters and High Availability

Do I Know This Already? Quiz

**Foundation Topics** 

Cluster Concepts and Overview

Enhanced vMotion Compatibility (EVC)

vSAN Services

# Distributed Resource Scheduler (DRS)

Recent DRS Enhancements

**DRS Rules** 

**DRS Migration Sensitivity** 

Resource Pools



# vSphere High Availability (HA)

vSphere HA Requirements

vSphere HA Response to Failures

Heartbeats

vSphere HA Admission Control

vSphere HA Advanced Options

Virtual Machine Settings

VM Component Protection (VMCP)

Virtual Machine and Application Monitoring

vSphere HA Best Practices

Proactive HA

# Other Resource Management and Availability Features

Predictive DRS

Distributed Power Management (DPM)

Fault Tolerance (FT)

vCenter Server High Availability

VMware Service Lifecyle Manager

**Exam Preparation Tasks** 

Review All Key Topics

Complete Tables and Lists from Memory

**Define Key Terms** 

**Review Questions** 

# Chapter 5 vCenter Server Features and Virtual Machines

Do I Know This Already? Quiz

**Foundation Topics** 

vCenter Server and vSphere

vSphere Managed Inventory Objects

**Host Profiles** 

Content Libraries

vSphere with Tanzu

#### Virtual Machine File Structure

Configuration File



Virtual Disk Files

**Snapshot Files** 

# Virtual Machine Snapshots

**Snapshot Use Cases** 

What a Snapshot Preserves

Parent Snapshots

**Snapshot Behavior** 

Limitations

## Virtual Machine Settings

VM Hardware/Compatibility

Virtual Disk Provisioning

**VMware Tools** 

Virtual Machine Options

Virtual Machine Advanced Settings

# Virtual Machine Migration

Virtual Machine Migration

vMotion Details

Storage vMotion Details

#### Virtual Machine Cloning

Clones

Rapid Provisioning with Templates

Instant Clones

**Exam Preparation Tasks** 

Review All Key Topics

Complete Tables and Lists from Memory

**Define Key Terms** 

**Review Questions** 

# Chapter 6 VMware Product Integration

Do I Know This Already? Quiz

**Foundation Topics** 

vSphere Add-ons

vSphere with Tanzu



vCenter Converter

VMware vSphere Replication

VMware SkyLine

#### vRealize Suite

vRealize Operations Manager (vROps)

vRealize Log Insight (vRLI)

vRealize Automation (vRA)

vRealize Orchestrator (vRO)

vRealize Network Insight (vRNi)

# Desktop and Application Virtualization

VMware Horizon

App Volumes

# Replication and Disaster Recovery

vSphere Replication

Site Recovery Manager (SRM)

# Private, Public, and Hybrid Clouds

VMware Cloud Foundation (VCF)

VMware Hybrid Cloud Extension (HCX)

VMware on AWS

Azure VMware Solution

#### Networking and Security

**AppDefense** 

NSX

**Exam Preparation Tasks** 

Review All Key Topics

Complete Tables and Lists from Memory

**Define Key Terms** 

**Review Questions** 

# Chapter 7 vSphere Security

Do I Know This Already? Quiz

**Foundation Topics** 

vSphere Certificates



vSphere Certificates Overview

Certificate Requirements

ESXi Host Certificates

# vSphere Permissions

Authentication and Authorization

Inventory Hierarchy and Objects

Privileges and Roles

Permissions

**Global Permissions** 

Best Practices for Roles and Permissions

Required Privileges for Common Tasks

How Permissions Are Applied by vCenter Server

# ESXi and vCenter Server Security

**Built-in Security Features** 

Security Profiles

ESXi Password Hardening

Joining an ESXi Host to a Directory Service

vSphere Authentication Proxy

ESXi Host Access

Control MOB Access

ESXi Secure Boot and TPM

vSphere Trust Authority (vTA)

vCenter Server Security

#### vSphere Network Security

#### Virtual Machine Security

Virtual Machine Hardening Best Practices

Configuring UEFI Boot

Disabling Unexposed Features

Other Common Settings

Virtual Machine Risk Profiles

Protecting Virtual Machines Against Denial-of-Service Attacks

Controlling VM Device Connections

Virtual Machine Encryption



Encrypted vSphere vMotion

virtual Trusted Platform Module (vTPM)

virtual Intel Software Guard Extension (vSGX)

#### Available Add-on Security

Compliance Using vRealize Operations Manager

VMware NSX

AppDefense

**Exam Preparation Tasks** 

Review All the Key Topics

Complete Tables and Lists from Memory

**Define Key Terms** 

**Review Questions** 

# Part II: vSphere Installation/Configuration

# Chapter 8 vSphere Installation

Do I Know This Already? Quiz

Foundation Topics

Installing ESXi Hosts

Installing ESXi Interactively

Scripted ESXi Installation

Using Auto Deploy

#### Deploying vCenter Server Components

vCenter Server Database

Platform Services Controller (PSC)

vCenter Server Appliance

Configuring and Managing VMware Certificate Authority (VMCA)

#### Configuring Single Sign-On (SSO)

SSO and Identity Sources Overview

Adding, Editing, and Removing SSO Identity Sources

Adding an Active Directory Identity Source

Adding an LDAP Authentication Source

Enabling and Disabling Single Sign-On (SSO) Users



Configuring SSO Policies

Configuring Identity Federation

# Initial vSphere Configuration

Implementing vSphere Client

Implementing VMware vSphere Lifecycle Manager

Configuring the vCenter Server Inventory

Implementing vCenter HA

**Using Host Profiles** 

**VMware Tools** 

Advanced ESXi Host Options

**Exam Preparation Tasks** 

Review All the Key Topics

Complete Tables and Lists from Memory

Define Key Terms

**Review Questions** 

# Chapter 9 Configuring and Managing Virtual Networks

Do I Know This Already? Quiz

**Foundation Topics** 

vSphere Standard Switches (vSS)

Creating and Configuring vSphere Standard Switches

Creating and Configuring Standard Port Groups

# vSphere Distributed Switches (vDS)

Creating and Configuring vSphere Distributed Switches

Creating and Configuring Distributed Port Groups

## VMkernel Networking

Configuring and Managing VMkernel Adapters

Configuring TCP/IP Stacks

#### Configuring and Managing Networking Features

Configuring Network I/O Control (NIOC)

Creating a Network Resource Pool

Using Private VLANs

Using DirectPath I/O



Single Root I/O Virtualization (SR-IOV)

Configuring and Managing Port Mirroring

Configuring and Managing Link Aggregation Groups (LAGs)

#### Managing Host Networking with vDS

Adding Hosts to a vDS

Managing Host Physical Network Adapters on a vDS

Migrating VMkernel Network Adapters to a vDS

Removing Hosts from a vDS

Migrating Virtual Machines to a vDS

Monitoring the State of Ports in a Distributed Port Group

Using the vDS Health Check

Networking Policies and Advanced Features

**Exam Preparation Tasks** 

Review All the Key Topics

Complete Tables and Lists from Memory

Define Key Terms

**Review Questions** 

# Part III: vSphere Management and Optimization

# Chapter 10 Managing and Monitoring Clusters and Resources

Do I Know This Already? Quiz

Foundation Topics

Creating and Configuring a vSphere Cluster

Creating a Cluster

Configuring a Cluster with Quickstart

**EVC Mode** 

#### Creating and Configuring a vSphere DRS Cluster

Creating a vSphere DRS Cluster

Creating a Resource Pool

Configuring Advanced DRS Options

# Creating and Configuring a vSphere HA Cluster

Creating a vSphere HA Cluster



Configuring Advanced vSphere HA Options

Configuring vSphere HA Admission Control

Configuring VMCP

Configuring Virtual Machine and Application Monitoring

Configuring Proactive HA

Configuring vSphere Fault Tolerance

# Monitoring and Managing vSphere Resources

Metrics

vSphere Client Performance Charts

Troubleshooting and Optimizing Performance

Monitoring and Managing Cluster Resources

Monitoring and Managing Resource Pool Resources

Monitoring and Managing Host Resources and Health

Monitoring and Managing Virtual Machine Resources

**ESXTOP** 

**VIMTOP** 

vCenter Server Appliance Management Interface (VAMI)

#### Events, Alarms, and Automated Actions

**Events** 

Viewing Events in the vSphere Client

Viewing the System Event Log

Streaming Events to a Remote Syslog Server

Alarms

Viewing and Acknowledging Triggered Alarms

Creating Alarm Definitions

**Alarm Actions** 

Advanced Use Cases for Alarms

# Logging in vSphere

ESXi Logs

vCenter Server Logs

Uploading System Logs to VMware

Log Levels

Configuring Syslog on ESXi Hosts



vRealize Log Insight (vRLI)

**Exam Preparation Tasks** 

Review All the Key Topics

Complete Tables and Lists from Memory

Define Key Terms

**Review Questions** 

# Chapter 11 Managing Storage

Do I Know This Already? Quiz

Foundation Topics

Configuring and Managing vSAN

Preparing for vSAN

Creating a vSAN Cluster with Quickstart

Manually Enabling vSAN

Editing vSAN Settings

Licensing vSAN

Viewing a vSAN Datastore

Configuring vSAN and vSphere HA

Disabling vSAN

Shutting Down and Restarting vSAN

Deploying vSAN with vCenter Server

Expanding a vSAN Cluster

Working with Maintenance Mode

Managing vSAN Fault Domains

Extending a vSAN Datastore Across Two Sites

Managing Devices in a vSAN Cluster

Increasing Space Efficiency in a vSAN Cluster

Using Encryption in a vSAN Cluster

Using vSAN Policies

Viewing vSAN Storage Providers

Using vSAN File Service

#### Managing Datastores

Managing VMFS Datastores



Managing Raw Device Mappings (RDMs)

Managing NFS Datastores

# Storage DRS and SIOC

Configuring and Managing Storage DRS

Configuring and Managing SIOC

#### NVMe and PMem

Managing VMware NVMe

Managing PMem

# Multipathing, Storage Policies, and vVols

Managing Multipathing

Managing Storage Policies

Configuring and Managing vVols

## **Exam Preparation Tasks**

Review All the Key Topics

Complete Tables and Lists from Memory

Define Key Terms

**Review Questions** 

# Chapter 12 Managing vSphere Security

Do I Know This Already? Quiz

**Foundation Topics** 

# Configuring and Managing Authentication and Authorization

Managing SSO

Users and Groups

Privileges and Roles

Permissions

**Global Permissions** 

**Editing Permissions** 

# Configuring and Managing vSphere Certificates

Managing vSphere Client Certificates

**Using Custom Certificates** 

Managing ESXi Certificates

General ESXi Security Recommendations



Configuring ESXi Using Host Profiles

Using Scripts to Manage Host Configuration Settings

ESXi Passwords and Account Lockout

SSH and ESXi Shell Security

PCI and PCIe Devices and ESXi

Disabling the Managed Object Browser

ESXi Networking Security Recommendations

ESXi Web Proxy Settings

vSphere Auto Deploy Security Considerations

Controlling CIM Access

## Configuring and Managing ESXi Security

Configuring the ESXi Firewall

Customizing ESXi Services

Using Lockdown Mode

Managing the Acceptance Levels of Hosts and VIBs

Assigning Privileges for ESXi Hosts

Using Active Directory to Manage ESXi Users

Configuring vSphere Authentication Proxy

Configuring Smart Card Authentication for ESXi

Configuring UEFI Secure Boot for ESXi Hosts

Securing ESXi Hosts with Trusted Platform Module

Securing ESXi Log Files

## Additional Security Management

Key Management Server

Changing Permission Validation Settings

Configuring and Managing vSphere Trust Authority (vTA)

Securing Virtual Machines with Intel Software Guard Extensions (SGX)

Encrypting a Virtual Machine

**Exam Preparation Tasks** 

Review All the Key Topics

Complete Tables and Lists from Memory

**Define Key Terms** 

**Review Questions** 



# Chapter 13 Managing vSphere and vCenter Server

Do I Know This Already? Quiz

Foundation Topics

vCenter Server Backup

Upgrading to vSphere 7.0

vCenter Server Data Transfer

Upgrading vCenter Server Appliance

Migrating vCenter Server for Windows to vCenter Server Appliance

Upgrading ESXi and Virtual Machines

Using Update Planner

# Using vSphere Lifecycle Manager

About VMware Update Manager

VMware Update Manager Download Service (UMDS)

Baselines and Images

ESXi Quick Boot

ESXi Firmware Updates

Hardware Compatibility Checks

**Exporting and Importing Cluster Images** 

Backup and Restore Scenarios

**Upgrading Virtual Machines** 

#### Managing ESXi Hosts

#### Monitoring and Managing vCenter Server

Monitoring and Managing vCenter Server with the VAMI

Monitoring and Managing vCenter Server with the vSphere Client

Updating the vCenter Server

Managing a vCenter HA Cluster

Repointing a vCenter Server to Another Domain

**Exam Preparation Tasks** 

Review All the Key Topics

Complete Tables and Lists from Memory

**Define Key Terms** 

**Review Questions** 



# Chapter 14 Managing Virtual Machines

Do I Know This Already? Quiz

Foundation Topics

Creating and Configuring Virtual Machines

Creating a New Virtual Machine

Powering on a VM

Opening a Console to a VM

Installing and Upgrading VMware Tools

Shutting Down a Guest

Cloning a Virtual Machine

Converting Between a VM and a Template

Deploying a Virtual Machine from a Template

Customizing the Guest OS

Deploying OVF/OVA Templates

# Managing Virtual Machines

Configuring Virtual Machine Hardware

**Editing Virtual Machine Options** 

Configuring Guest User Mappings

Editing OVF Details

Creating and Managing Virtual Machine Snapshots

Migrating Virtual Machines

#### Advanced Virtual Machine Management

Managing OVF Templates

Virtualization-Based Security

Managing VMs by Using PowerCLI

Configuring VMs to Support vGPUs

## **Content Libraries**

Introduction to Content Libraries

Creating a Content Library

Publishing a Content Library

Subscribing to a Content Library

Content Library Permissions

Content Library Synchronization Options



Adding Items to a Content Library Deploying VMs by Using a Content Library **Exam Preparation Tasks** Review All the Key Topics Complete Tables and Lists from Memory **Define Key Terms Review Questions** Chapter 15 Final Preparation Getting Ready Taking the Exam Appendix A: Answers to the Do I Know This Already? Quizzes and Review Questions Index Appendix B: Memory Tables Appendix C: Memory Table Answer Key Appendix D: Study Planner Glossary Α В C D F-F G Н I-L Μ Ν



Ο

P-Q

R

S

T-U

٧

W-Z