

# VMware Certified Advanced Professional 6 – Data Center Virtualization Design Beta Exam

## Exam Preparation Guide

Beta Exam Code: 3V0-622

Beta Exam Preparation Guide Version 1.2

4 December 2015



### Disclaimer:

This preparation guide is intended to provide information about the objectives covered by this exam, as well as related resources. The material contained within this guide 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 recommended in this guide where needed to gain that understanding.

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## **1. The Exam**

### 1.1 Purpose of Exam

The VMware Certified Advanced Professional 6 – Data Center Virtualization Beta Design Exam (3V0-622) tests candidates on their ability to develop a vSphere 6.x conceptual design given a set of customer requirements, determine the functional requirements needed to create a logical design, and architect a physical design using these elements. A given solution may include any of these products and technologies:

- vSphere 6.x Enterprise Plus Edition
- VMware Virtual SAN
- vRealize Operations

### 1.2 Intended Audience

A typical candidate for the VCAP6-DCV Certification has approximately two years of experience designing a VMware virtualized data center solution. They are typically designers or architects, capable of translating business requirements into a virtualized data center design that can be utilized for deployment on a vSphere 6.x architecture. The candidate possesses an understanding of compute, storage and network virtualization design, extending to multi-site and large enterprise solutions. The candidate is capable of designing a solution that includes any or all of the vSphere 6.x Enterprise Plus collection of products and technologies. Candidates are required to obtain a valid VMware Certified Professional 6 certification prior to attempting this certification.

## **2. Objectives covered in the VCAP6-DCV Beta Design Exam**

### 2.1 Introduction

It is recommended that candidates have the knowledge and skills necessary to install, configure and administer a vSphere 6.x environment before taking the VCAP6-DCV Beta Design Exam. While there is no course requirement for this exam, VMware recommends that candidates complete the [VMware vSphere: Design and Deploy Fast Track \[V6\]](#) course. 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.

## 2.2 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.

### Section 1 – Create a vSphere Conceptual Design

#### Objective 1.1 – Gather and analyze business requirements

##### Skills and Abilities

- Associate a stakeholder with the information that needs to be collected.
- Utilize inventory and assessment data from a current environment to define a baseline state.
- Analyze customer interview data to explicitly define customer objectives for a conceptual design.
- Determine customer priorities for defined objectives.
- Ensure that Availability, Manageability, Performance, Recoverability and Security (AMPRS) considerations are applied during the requirements gathering process.
- Given results of the requirements gathering process, identify requirements for a conceptual design.
- Categorize requirements by infrastructure qualities to prepare for logical design requirements.

##### Tools

- [VMware Virtualization Case Studies](#)
- [The Benefits of Virtualization for Small and Medium Businesses](#)
- [Functional vs. Non-Functional Requirements](#)
- [Conceptual, Logical, Physical: It is Simple](#)
- [Virtualize Business Critical Applications \(blog\)](#)
- [Virtualizing Business Critical Applications on vSphere](#)

#### Objective 1.2 – Gather and analyze application requirements

##### Skills and Abilities

- Gather and analyze application requirements for a given scenario.
- Determine the requirements for a set of applications that will be included in the design.
- Collect information needed in order to identify application dependencies.

- Given one or more application requirements, determine the impact of the requirements on the design.

#### Tools

- [VMware TCO Calculator](#)
- [VMware Cost-Per-Application Calculator Methodology](#)
- [Virtualizing Oracle with VMware](#)
- [Virtualizing Exchange with VMware](#)
- [Virtualize SharePoint with VMware vSphere](#)
- [Virtualizing Microsoft SQL on VMware vSphere](#)
- [SAP and VMware Virtualization](#)
- [Business and Financial Benefits of Virtualization: Customer Benchmarking Study](#)

### **Objective 1.3 – Determine Risks, Requirements, Constraints and Assumptions**

#### Skills and Abilities

- Differentiate between the concepts of risks, requirements, constraints, and assumptions.
- Given a statement, determine whether it is a risk, requirement, constraint, or an assumption.
- Analyze impact of VMware best practices to identified risks, constraints, and assumptions.

#### Tools

- [Developing Your Virtualization Strategy and Deployment Plan](#)
- [Constraints, Assumptions \(Risk, Requirements\) & Dependencies](#)

### **Section 2 – Create a vSphere 6.x Logical Design from an Existing Conceptual Design**

#### **Objective 2.1 – Map Business Requirements to a vSphere 6.x Logical Design**

#### Skills and Abilities

- Analyze requirements for functional and non-functional elements.
- Build non-functional requirements into a specific logical design.
- Translate stated business requirements into a logical design.
- Incorporate the current state of a customer environment into a logical design.

## Tools

- [Conceptual, Logical, Physical: It is Simple](#)
- [What's New in VMware vSphere 6.0](#)
- [Functional vs. Non-Functional Requirements](#)
- [ITIL v3 Introduction and Overview](#)
- [Conceptual Architecture Action Guide](#)
- [Systems Architecture Fundamentals – Conceptual, Logical, Physical Designs](#)

## **Objective 2.2 – Map Service Dependencies**

### Skills and Abilities

- Evaluate dependencies for infrastructure and application services that will be included in a vSphere design.
- Create Entity Relationship Diagrams that map service relationships and dependencies.
- Analyze interfaces to be used with new and existing business processes.
- Determine service dependencies for logical components.
- Include service dependencies in a vSphere 6.x Logical Design.
- Analyze services to identify upstream and downstream service dependencies.
- Navigate logical components and their interdependencies and make decisions based upon all service relationships.

### Tools

- [Datacenter Operational Excellence Through Automated Application Discovery & Dependency Mapping](#)
- [VMware Application Dependencies and Entity Relationship Diagrams MK2](#)

## **Objective 2.3 – Build Availability Requirements into a vSphere 6.x Logical Design**

### Skills and Abilities

- Evaluate which logical availability services can be used with a given vSphere solution.
- Differentiate infrastructure qualities related to availability.
- Describe the concept of redundancy and the risks associated with single points of failure
- Explain class of nines methodology

- Determine availability component of service level agreements (SLAs) and service level management processes
- Determine potential availability solutions for a logical design based on customer requirements.
- Create an availability plan, including maintenance processes.
- Balance availability requirements with other infrastructure qualities.
- Analyze a vSphere design and determine possible single points of failure.

#### Tools

- [Datacenter Operational Excellence Through Automated Application Discovery & Dependency Mapping](#)
- [vSphere Availability Guide](#)
- [Protect Your Business with Automated Business Continuity Solutions](#)
- [VMware High Availability Deployment Best Practices](#)

### **Objective 2.4 – Build Manageability Requirements into a vSphere 6.x Logical Design**

#### Skills and Abilities

- Evaluate which management services can be used with a given vSphere Solution.
- Differentiate infrastructure qualities related to management.
- Differentiate available command line-based management tools (PowerCLI, vMA etc.)
- Evaluate VMware Management solutions based on customer requirements.
- Build interfaces into the logical design for existing operations practices.
- Address identified operational readiness deficiencies
- Define Event, Incident and Problem Management practices.
- Analyze Release Management practices
- Determine request fulfillment and release management processes.
- Determine requirements for Configuration Management
- Define change management processes based on business requirements.
- Based on customer requirements, identify required reporting assets and processes

#### Tools

- [Optimizing Your VMware Environment](#)
- [Four Keys to Managing Your VMware Environment](#)
- [Operational Readiness Assessment](#)
- [Operational Readiness Assessment Tool](#)
- [vCenter Server and Host Management Guide](#)
- [vSphere PowerCLI documentation Center](#)

## Objective 2.5 – Build Performance Requirements into a vSphere 6.x Logical Design

### Skills and Abilities

- Evaluate logical performance considerations for a given vSphere solution.
- Differentiate infrastructure qualities related to performance.
- Analyze current performance, identify and address gaps when building the logical design
- Using a conceptual design, create a logical design that meets performance requirements
- Determine performance-related functional requirements based on given non-functional requirements and service dependencies.
- Define capacity management practices and create a capacity plan
- Incorporate scalability requirements into the logical design
- Determine a performance component for service level agreements and service level management processes.

### Tools

- [Proven Practice: Implementing ITIL v3 Capacity Management in a VMware environment](#)
- [vSphere Monitoring and Performance Guide](#)

## Objective 2.6 – Build Recoverability Requirements into a vSphere 6.x Logical Design

### Skills and Abilities

- Evaluate which logical recoverability services are available for a given vSphere solution.
- Differentiate infrastructure qualities related to recoverability.
- Determine Business Continuity and Disaster Recovery solution options for a given vSphere Design.
- Given recoverability requirements, analyze services that will be impacted and provide a recovery plan for impacted services.
- Plan a data retention policy based on customer requirements.

### Tools

- [VMware vCenter™ Site Recovery Manager Evaluation Guide](#)
- [A Practical Guide to Business Continuity and Disaster Recovery with VMware Infrastructure](#)
- [Mastering Disaster Recovery: Business Continuity and Virtualization Best Practices Whitepaper](#)



## Objective 2.7 – Build Security Requirements into a vSphere 6.x Logical Design

### Skills and Abilities

- Evaluate which security services can be used with a given vSphere solution.
- Differentiate infrastructure qualities related to security.
- Build specific regulatory compliance requirements into the logical design.
- Analyze application and infrastructure security requirements.
- Build a role-based access model and map roles to services.
- Build a security policy based on existing security requirements and IT governance practices.
- Incorporate customer risk tolerance into the security policy.
- Assess the services that will be impacted and create an access management plan.
- Determine the proper security solution that would satisfy a regulatory requirement.
- Based on stated security requirements, analyze the current state for compliance/non-compliance.

### Tools

- [vSphere Security Guide](#)
- [Developing Your Virtualization Strategy and Deployment Plan](#)
- [Achieving Compliance in a Virtualized Environment](#)
- [Infrastructure Security: Getting to the Bottom of Compliance in the Cloud](#)
- [Securing the Cloud](#)

## Section 3 – Create a vSphere 6.x Physical Design from an Existing Logical Design

### Objective 3.1 – Transition from a Logical Design to a vSphere 6.x Physical Design

#### Skills and Abilities

- Analyze design decisions and options selected from the logical design
- Determine impact of VMware best practices to identified risks, constraints, and assumptions in a given vSphere design.
- Based on business requirements, determine the appropriate roles for each staff member.

#### Tools

- [Conceptual, Logical, Physical: It is Simple](#)
- [vSphere Server and Host Management Guide](#)

- [vSphere Virtual Machine Administration Guide](#)

### Objective 3.2 – Create a vSphere 6.x Physical Network Design from an Existing Logical Design

#### Skills and Abilities

- Analyze VLAN options with respect to virtual and physical switches.
- Given business requirements, determine the design for virtual network components:
  - STP
  - Jumbo Frames
  - Load-balancing
  - Trunking and link aggregation groups
- Evaluate network redundancy considerations for a given design.
- Analyze design for inclusion of Network I/O Control capabilities.
- Determine use case for multiple TCP/IP stacks in a given design.
- Based on given functional requirements for each service:
  - Determine the most appropriate networking technologies for the design.
  - Implement the service based on the required infrastructure qualities (AMPRS.)
- Analyze design for appropriate network teaming and failover solution.
- Determine network security and firewall requirements for a virtual network design
- Based on service level requirements, determine appropriate network performance characteristics.
- Given a current network configuration as well as technical requirements and constraints, determine the appropriate virtual switch solution:
  - vSphere Standard Switch
  - vSphere Distributed Switch
  - NSX
  - Hybrid solutions
- Based on an existing logical design, determine appropriate host networking resources.
- Properly apply converged networking considering VMware best practices.

#### Tools

- [vSphere Server and Host Management Guide](#)
- [vSphere Installation and Setup Guide](#)
- [vSphere Networking Guide](#)
- [Network Port Diagram for vSphere 6.x](#)
- [VMware Virtual SAN Network Design Guide](#)
- [Leveraging NIC Technology to Improve Network Performance in VMware vSphere](#)
- [Performance Evaluation of Network I/O Control in VMware vSphere 6](#)
- [vMotion Architecture, Performance and Best Practices in VMware vSphere 5](#)

## Objective 3.3 – Create a vSphere 6.x Physical Storage Design from an Existing Logical Design

### Skills and Abilities

- Evaluate criteria, capabilities and limitations between storage types (Block, NAS, Object Based)
- In a given design, determine Storage Policy availability and performance characteristics.
- Based on the logical design and given functional requirements, for each service:
  - Determine the most appropriate storage technologies for the design.
  - Implement the service based on the required infrastructure qualities.
- Ensure storage array capabilities are supported in a vSphere 6.x design:
  - Active/Active, Active/Passive
  - ALUA, VAAI, VASA
  - PSA (including PSPs and SATPs)
- Based on service level requirements include VMware technologies in the design, such as:
  - Storage I/O Control and Network I/O Control
  - Storage Policies
  - Storage vMotion
  - Storage DRS
  - Virtual SAN
- Given the functional requirements, size the storage for capacity, availability and performance, including:
  - Datastores, RDMs, Virtual Disks
  - Physical Storage (LUNs, Storage Tiering)
  - Based on the logical design, select and incorporate an appropriate storage network into the physical design:
    - Block (FC, iSCSI, FCoE, SAS)
    - NAS (NFSv3, NFSv4)
    - Object Based (Virtual SAN, Virtual Volumes)

### Tools

- [What's New: VMware Virtual SAN 6.0](#)
- [VMware Virtual SAN 6.0 Design and Sizing Guide](#)
- [VMware Virtual SAN Diagnostics and Troubleshooting Reference Manual](#)
- [The VMware Perspective on Software-Defined Storage](#)
- [vSphere Storage](#)
- [Resource Management Guide](#)
- [Virtual SAN TCO and Sizing Calculator](#)
- [What's New: VMware vSphere Virtual Volumes](#)
- [vSphere Installation and Setup Guide](#)
- [VMware Virtual Machine File System: Technical Overview and Best Practices](#)

- [TechNote: Bootstrapping VSAN without vCenter](#)

### Objective 3.4 – Determine Appropriate Compute Resources for a vSphere 6.x Physical Design

#### Skills and Abilities

- Analyze best practices with respect to CPU family choices.
- Evaluate NUMA and vNUMA with ESXi hosts and Virtual machines in a given design.
- Analyze the following in a vSphere design:
  - Enhanced vMotion compatibility
  - Implications of vSMP in virtual machines
  - Transparent Page Sharing (TPS) and large pages
  - Resource overcommitment
- Based on the service catalog and given functional requirements:
  - Determine the most appropriate compute technologies for the design.
  - Implement the service based on the required infrastructure qualities.
- Determine the impact of a technical design on the choice of server density:
  - Scale Up/Out
  - Auto Deploy
- Calculate the required number of nodes in an HA cluster based upon host failures and resource guarantees.
- Evaluate the implications of using reservations, limits, and shares on the physical design.
- Specify the resource pool and vApp configuration based upon resource requirements.
- Size the following resources appropriately:
  - Memory
  - CPU
  - I/O devices
  - Internal storage
- Given a constraint to use existing hardware, determine suitability of the hardware for the design.

#### Tools

- [vSphere Server and Host Management Guide](#)
- [What's New in the VMware vSphere® 6.0 Platform](#)
- [vSphere Installation and Setup Guide](#)
- [vSphere Resource Management Guide](#)
- [Performance Best Practices for VMware vSphere 6.0](#)
- [VMware vCenter Server Performance and Best Practices](#)
- [Best Practices for Performance Tuning of Latency-Sensitive Workloads in vSphere VMs](#)
- [Performance Characterization of Microsoft SQL Server on VMware vSphere 6](#)

- [Microsoft Exchange 2013 on VMware Best Practices Guide](#)
- [vSphere Monitoring and Performance Guide](#)
- [Interpreting esxtop statistics](#)

## Objective 3.5 – Determine Virtual Machine Configuration for a vSphere 6.x Physical Design

### Skills and Abilities

- Analyze the use of an RDM or a virtual disk for a given VM.
- Evaluate Virtual Machine memory management techniques (ballooning, compression, swapping) in a given vSphere design.
- Based on business requirements, determine the design significance of VM Swap location.
- Determine the latency sensitivity requirements of a given virtual machine workload.
- Evaluate virtual machine features based on the logical, functional and application requirements.
- Use VMware best practices to size virtual machines according to application requirements.
- Determine if reservations, shares, and limits are necessary.
- Based on an existing logical design, determine virtual hardware options.
- Build a Content Library of appropriate virtual machine offerings (e.g. templates, OVF, ISOs.)
- Determine appropriate use cases for vApps.
- Evaluate the suitability of using VMware FT or 3rd party clustering products (e.g. Microsoft Clustering, etc.) based on application requirements.
- Determine the impact of scheduled guest activities (e.g. anti-virus, backup, etc) to the design.
- Evaluate vFlash read cache requirements in a given design.

### Tools

- [Virtual Machine Administration Guide](#)
- [Best Practices for Performance Tuning of Latency-Sensitive Workloads in vSphere VMs](#)
- [Virtualizing a Windows Active Directory Domain Infrastructure](#)
- [Guest Operating System Installation Guide](#)
- [vSphere Resource Management Guide](#)
- [Understanding Memory Management in VMware vSphere 6.0](#)

## Objective 3.6 – Determine Data Center Management Options for a vSphere 6.x Physical Design

### Skills and Abilities

- Based on business requirements, determine client access options in a vSphere solution.
- Analyze business requirements when integrating vSphere with other VMware solutions.
- Evaluate the impact of the VMware Certificate Authority and the VMware Endpoint Certificate Store to the design.
- Based on the logical design and given functional requirements:
  - Determine the most appropriate datacenter management options for the design.
  - Implement the service based on the required infrastructure qualities.
- Analyze cluster requirements:
  - Availability requirements for HA and FT
  - Performance requirements for DRS and vMotion
  - Storage performance requirements for SDRS and Storage vMotion
- Determine appropriate vCenter Server design and sizing requirements:
  - vCenter Server Enhanced Linked Mode
  - vCenter Server virtual appliance vs vCenter Server for Windows
  - Platform Services Controller
- Evaluate access control methodologies for creating roles and assignment of users to roles.
- Determine proper structure for access control settings (i.e. folders, resource pools, etc.)
- Develop appropriate host and virtual machine deployment options.
- Include in the design appropriate technologies for:
  - Asset management
  - Event, incident and problem management
  - Logging, monitoring and reporting

### Tools

- [vSphere Monitoring and Performance Guide](#)
- [VMware vCenter Server 6.0 Availability Guide](#)
- [vCenter Server and Host Management Guide](#)
- [VMware vCenter Update Manager 6.0 Performance and Best Practices](#)
- [vCenter Server Deployment Guide](#)
- [VMware Interoperability Matrix](#)
- [VMware Proactive Incident Whitepaper](#)

### **3. Additional Resources**

#### 3.1 Mock Exam

VMware provides an interactive simulation of the design-tool found in the exam. This simulation is located at: TBD

#### 3.2 VCAP/VCIX Community

VMware provides an online community for VCAP/VCIX candidates. This community contains valuable information from other candidates and senior VCAPs/VCIXs, and is moderated by VMware certification staff. The community is located at:

<http://communities.vmware.com/community/vmtn/certedu/certification/VCIX>

#### 3.3 Test Driving a VMware vSphere environment

VMware provides Hands-on Labs for Datacenter Virtualization. These labs provide an environment where you can work with the products covered in this exam. The labs can be accessed by going here:

<https://www.vmware.com/go/try-vsphere-hol>

Version	Change Notes	Date
1.0	Initial Prep Guide Creation	10/25/2015
1.1	Standardized formatting	11/10/2015
1.2	Added Beta designation	12/04/2015