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Tips on Preparing for and Passing the VCP5-DCV Exam

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Introduction

The VMware Certified Professional - Data Center Virtualization on VMware vSphere 5.x (VCP5-DCV) is a very valuable and popular certification. According to the VMware blog, more than 100,000 VCPs exist today. But, only a small portion is VCP5-DCV. Other VCPs may be certified on older versions of vSphere or on other tracks, such as the desktop track (VCP5-DT) and cloud track (VCP5-Cloud). Because 100% of the Fortune 100 companies have virtualized some portion of their datacenter utilizing VMware products, the need for VCPs will likely continue to grow.

This paper is aimed at IT professionals, who are interested in becoming VMware Certified Professionals on Data Center Virtualization (VCP5-DCV). It provides the benefits of earning the certification, details for earning the certification, and tips for passing the exam. The main point of reference for this paper is VMware's official website for VCP5-DCV.

Benefits of VCP5-DCV

The main benefit of earning VCP5-DCV certification is to distinguish you from others in the community. Individuals may desire this certification for themselves as a means to validate their technical capabilities as they look to advance their career. Likewise, companies may desire this certification for their employees as a means to validate the technical capabilities of the company or a specific team within the company. For example, many of VMware's partners maintain a team of VCP5-DCV professionals.

A major benefit of the VCP5-DCV certification is the salary potential. Global Knowledge and Windows IT Pro recently published the 2014 IT Skills and Salary Survey that indicates the mean salary for IT professionals that hold the VCP5-DCV certification is $94,515. See details at:
http://images.globalknowledge.com/wwwimages/pdfs/2014_Salary_Report.pdf

The official VCP5-DCV benefits, which are posted on VMware's official website for VCP5-DCV, are:
- Recognition of your technical knowledge and skills
- Official transcripts
- Use of VCP5-DCV logo
- Access to the exclusive VCP portal and logo merchandise store
- Invitation to beta exams and classes
- Discounts from VMware Press
- Discounted admission to VMware events
- Complimentary VMware Workstation license
- Greater opportunities for career advancement

Additionally, VCP5-DCV can be used to meet a requirement for obtaining some advanced certifications, such as VMware Certified Advanced Professional 5 – Data Center Administration (VCAP5-DCA), the VMware Certified Advanced Professional 5 – Data Center Design (VCAP-DCD) and the VMware Certified Design Expert 5 – Data Center Virtualization (VCDX-DCV). VCP5-DCV is no longer required before obtaining the VMware Certified Professional – Desktop (VCP5-DT) or VMware Certified Professional – Cloud (VCP5-Cloud) certifications.

How to Achieve VCP5-DCV

Be sure to follow the official paths and blueprint on VMware's official website for VCP5-DCV. Here is a summary of the paths to become VCP5-DCV:

- If you are just getting started, then the requirements are:
    - Take a qualifying course, such as VMware vSphere Install Configure Manage or VMware vSphere FastTrack
    - Gain hands-on experience
    - Pass a VCP5-DCV exam

- If you are already VCP4 (but not VCP5-DCV), then the steps are:
    - VMware recommendation: Take the *VMware vSphere What's New [v5.x]* course or another qualifying course
    - Gain hands-on experience
    - VMware requirement: Pass a VCP5-DCV exam

- If you have taken a VCP4-DCV qualifying course, but are not yet certified, then the requirements are:
    - Take the *VMware vSphere What's New [v5.x]* course or another qualifying course, such as *Optimize and Scale*
    - Gain hands-on experience
    - Pass a VCP5-DCV exam

Two exams are currently available for VCP5-DCV—the VCP510 exam and the VCP550 exam. Either exam can be used to earn VCP5-DCV certification. If you are already have VCP5-DCV status and earned it by taking the VCP510 exam, then you do not need to take the VCP550 exam. Generally speaking, anyone who still needs to take a course on the path to VCP5-DCV certification should take a version 5.5 course and take the VCP-550 exam.

If you want to take a course that does the best job for preparing you for taking a VCP5-DCV exam, then consider taking the vSphere FastTrack class. It is a 50-hour class (five 10-hour days). It covers everything that is covered in the vSphere Install Configure Manage course, plus more. Generally speaking, the vSphere Install Configure Manage course focuses on vSphere Enterprise edition, while the vSphere FastTrack course focuses on vSphere Enterprise Plus edition. This means the vSphere FastTrack course includes details on features that are only available in the Enterprise Plus edition, such as host profiles, storage DRS, storage profiles, and distributed virtual switches, which are covered in the exam.

If you feel you are already very strong with the material covered in the vSphere Install Configure Manage course, but need to take a qualifying course, then the vSphere Optimize and Scale course may be a great choice.

This white paper examines many of the objectives, but not all. Be sure to download the correct blueprint for the specific exam that you plan to take (VCP510 or VCP550). Closely examine the blueprint and address each item prior to scheduling the exam.

The main steps towards registering for the exam are to use VMware certification website to gain authorization and Pearson VUE's website to register. Here is a statement from the VMware Certification Registration FAQ web page:

> The exam registration process for VMware certification exams starts at www.vmware.com/certification. Begin here to determine the certification you wish to achieve and to check for any pre-requisites. When you are ready to take the certification exam, click the "Register" link so that your authorization can be processed. Next, schedule the specific testing location, date and time by going to www.pearsonvue.com/vmware

The typical price for either exam is $225.

General Tips for Exam Preparation

Ensure that the materials you are studying are based on the proper version of vSphere that corresponds to the exam version that you intend to take. VCP510 corresponds to VMware vSphere 5.1 and VCP550 corresponds to VMware vSphere 5.5.

Get familiar with the configuration maximums. The VCP510 exam should not cover maximums and minimums that changed between vSphere versions 5.0 and 5.1, but the VCP550 exam could cover lots of maximums and minimums, including those that changed between versions 5.1 and 5.5. Try to memorize most of the maximums listed in the vSphere Install Configure Manage (or FastTrack) course material. Then wait until a day or two before the exam and to get familiar with the remaining maximums, but don't bother memorizing all of them. Here is a link to the official Configuration Maximums for vSphere version 5.1:

https://www.vmware.com/pdf/vsphere5/r51/vsphere-51-configuration-maximums.pdf

Here is a link to the official Configuration Maximums for vSphere version 5.5:
http://www.vmware.com/pdf/vsphere5/r55/vsphere-55-configuration-maximums.pdf

Although the exam is not "hands-on"—it is intended to verify that you have hands-on knowledge and experience with vSphere. As you review the exam blueprint, verify that you know how to perform any related administrative tasks. Ensure that you can perform *each* associated task just as comfortably using the vSphere Web Client as using the vSphere Client (thick client). Be prepared to answer questions that are aimed at having you identify the specific steps to perform a specific task. Pay attention to the specific wording used in the interfaces. For example, the exam could state that you "need to non-disruptively migrate a running VM from one ESXi host to another" and ask you to identify the specific steps. A correct answer could be "right-click the VM and select Migrate." An incorrect answer could be "right-click the VM and select vMotion." This is because the interface does not state *vMotion* as an option, but it does state *Migrate*.

Consider reading *The VCP5 Certification Guide* by Bill Ferguson and published by VMware Press. It will soon be updated for the VCP-550 exam.

Consider using some unofficial tools that are praised by many VCPs and VMware students for usefulness in preparing for the exam. A good example is the unofficial *vReference Sheet*, which you can access at:
http://www.vreference.com/vsphere-5-card/

Ensure that you gain hands-on experience with all items covered in the blueprint. Consider building a home lab. Many sources on the Internet provide unofficial advice on building vSphere lab environments. Here is a good example: http://boerlowie.wordpress.com/2011/11/30/building-the-ultimate-vsphere-lab-part-1-the-story/
Also consider using some unofficial, third-party practice exams. Although these are not sanctioned by VMware

and could contain some bad information, they tend to be useful tools for exam preparation. Some popular examples are:

- Elastic Sky: http://www.elasticsky.co.uk/practice-questions/
- Class Marker: http://www.classmarker.com/online-test/start/?quiz=kmh4e272723524e2
- The SLOG: http://www.simonlong.co.uk/blog/vcp5-practice-exams/

The best choice for VCP5-DCV practice exams is MeasureUp, which provides a practice exam for VCP5-DCV for a fee that includes a money back guarantee. They are the official practice exam provider for VMware. Learn more here: http://www.measureup.com/VCP5-Datacenter-Virtualization-VCP5-DV-P3734.aspx

The VCP510 and VCP550 exams are scored on a scale from 100 to 500, using a scaled method and not a direct percentage. The passing score is 300. Don't worry much about that as you prepare. Instead, aim for consistently achieving 80% or better on the various practice exams.

Some multiple-choice questions require more than one answer. These questions clearly indicate the number of answers the user must select. You must select all the correct answers and only those answers to score points for that question.

Strive for good time management during the exam. The VCP510 exam contains 85 questions and has a 90-minute time limit, so only allow about one minute per question. \The VCP550 exam has 135 questions and has a 120 minute time limit, so only allow about 50 seconds per question. Don't get stuck on any specific question for too long, even if you think something is wrong with the question. If the question is tricky, such as more than one option seems to fit but the question only calls for a single response, then simply answer the question as best you can and move forward. In this case, a good approach is to ask yourself, "Which answer is VMware most likely wanting?"

VCP510 vs. VCP550 – VCP550 has more questions (135 vs. 85), a longer time limit (120 minutes vs. 90 minutes), less time per question (about 53 seconds vs. about 63 seconds). Since both exams are graded using a scaled score that it is based on many factors, most candidates should not consider the differences in the number of questions and time limit as a criteria for selecting which exam to take. The main factor to consider is the candidate's knowledge for each version (vSphere 5.5 vs. vSphere 5.1)

Questions are mostly multiple-choice, and each question clearly identifies the specific number of correct answers. Some questions may be drag and drop, such as taking a set of steps and dropping them into the correct order in order to identify the correct procedure to accomplish a specific goal. Some questions may be matching items in one list with items in another list.

Special Considerations for the VCP550 Exam

For the VCP550 exam, pay extra attention to new features in version 5.5 and changes from 5.1. Some examples are:

- Single sign-on (SSO) has been rebuilt from the ground up in version 5.5 and uses a multi-master architecture with replication that does not require a database. It now offers a simplified deployment, in which a single server running vCenter Server, the inventory service, the Web Client, and the SSO server could support 1000 ESXi hosts and 10,000 VMs. It now provides enhanced Active Directory integration that enables cross-domain authentication. It also provides the ability to define sites within an SSO domain.

- The latest supported version of Adobe Flash for Linux systems is 11.2, which is not adequate for VMware vSphere Web Client 5.5, which requires version 11.5 or later. Per VMware KB article 2054599, a workaround for Linux users is to use Google Chrome, which has a *Pepper* version of Adobe Flash integrated into the browser.

- The embedded Postgres database that is available for the vCenter Server Appliance can now support 100 hosts and 3000 VMs.

- vSphere Data Protection 5.1 is not compatible with vSphere 5.5 because of a change in the way vSphere Web Client operates. vSphere Data Protection 5.1 users who upgrade to vSphere 5.5 must also update vSphere Data Protection to continue using vSphere Data Protection.

- ESXi 5.5 provides the ability to hot-add and hot-remove PCIe SSD devices.

- The *balanced* policy for ESXi host power management is no longer limited to performance state (P-state), but can now utilize the deep processor power state (C-state) for additional power savings.

- VM version 10:
    - Requires vSphere 5.5
    - Provides a new type of Advanced Host Controller Interface (AHCI)
    - Provides LSI SAS support for Oracle Solaris 11 OS
    - Provides virtual SATA controller for virtual disks and virtual CD-ROM devices, which allows up to 30 devices per virtual controller. Four virtual storage controllers per VM is still the limit, so the maximum virtual SATA disks per VM is now 120. In ESXi 5.1, the maximum number of virtual disks per VM is 60 (15 devices per virtual controller)
    - The vSphere client cannot be used to edit the settings of virtual machines of version 10 or higher. The vSphere Web Client must be used to edit the settings of these VMs.

- Version 5.1 supported hardware accelerated 3D graphics, using NVIDIA based GPUs inside the ESXi host and virtual graphics processing units (vGPUs) inside the VM. Version 5.5 expands the support to include Intel based GPUs, AMD based GPUs, and Linux based VMs. The Web Client can be used to *Enable 3D Support* for the VM and set its 3D Renderer property to *Automatic*, *Hardware*, or *Software*.

- The vSphere Web Client now provides drag and drop features, new filters, and *recent items* views.

- vSphere App HA is a new feature that works with vSphere HA to improve the uptime of VM-based applications. It can be used to respond to issues by restarting applications in VMs, instead of being limited to restarting the entire VM.

- VMware HA 5.5 complies with VM to VM anti-affinity rules.

- The maximum size for virtual disk files (VMDKs) and raw device mappings (RDMs) in vSphere 5.5 is increased to 62 TB from the 2TB minus 512 bytes limit in vSphere 5.1.

- Improved support for MSCS includes Windows 2012 support, round-robin multipath policy, iSCSI, and FCoE.

- vSphere 5.5 provides end to end support for 16 Gbps fiber channel. Version 5.1 supported 16 Gbps adapters but effectively throttled the adapters to 8 Gbps.
- Permanent device loss (PDL) state indicates that a disk device has been permanently removed, such that the device will not return, based on SCSI sense codes. When the device enters this PDL state, the vSphere host can take action to prevent directing any further, unnecessary I/O to this device.
- vSphere Replication 5.5 work well with Storage vMotion at the protected site and it provides Multi-Point-in-Time (MPIT) Snapshot Retention. MPIT provides a configurable retention policy, where multiple snapshots and delta files can be automatically retained at the recovery site allowing VMs to be recovered to multiple points in time.
- vSphere Flash Read Cache is a new feature in vSphere 5.5 which configures locally attached Flash-based devices in an ESXi host to serve as a Flash Swap Cache. It replaces the Swap to SSD feature introduced in vSphere 5.0 and provides a write-through cache to enhance VM performance.
- vSphere 5.5 provides LACP enhancements. It allows up to 64 link aggregation groups (LAGS) per ESXi host and per distributed virtual switch. LACP can be configured on the uplinks on distributed virtual switches.
- 40 GB NICs are supported for Mellanox ConnextX-3 VPI adapters configured in Ethernet mode.

For more details, read the What's New in VMware vSphere 5.5 Platform guide at:
http://www.vmware.com/files/pdf/vsphere/VMware-vSphere-Platform-Whats-New.pdf

Objectives Deserving Special Attention

This paper does not cover all of the items in the blueprint; however, you should carefully address and study each and every objective and knowledge item in the blueprint as you prepare for the exam. Although this paper does not cover all the items, this section identifies some of the items that deserve extra attention, because they can be easily overlooked or under appreciated.

To prepare for the exam, ensure that you can:

- Identify the available vSphere editions, and their features of each edition. Determine the appropriate vSphere edition based on customer requirements. For example, if a customer requires the use of private VLANs (PVLANs), storage DRS, or host profiles, then vSphere Enterprise Plus is required.
- Identify and compare vCenter Server editions. For example, vCenter Server Foundation edition is intended for smaller environments with a maximum of three ESXi hosts. Standard edition provides capabilities for vCenter Orchestrator and Linked Mode.
- Identify other VMware solutions that interact with vSphere and the purpose of each. For example:
- VMware Horizon View is a virtual desktop infrastructure (VDI) solution.
    - VMware Site Recovery Manager (SRM) is a disaster recovery (DR) solution.
    - VMware Virtual SAN is a storage solution.
- Explain at a high level how these solutions integrate with vSphere:
    - VMware Horizon View:
        - o View Connection servers can be implemented in VMs to provide the management, brokering and provisioning services.
        - o View Composer can be installed on the vCenter Server or on a separate Windows server to enable linked clones.

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- VMware SRM:
  - o Requires two or more independent vSphere environments that are managed by separate vCenter Servers
  - o The SRM database should be separate from the vCenter Server database
  - o VMware vSphere Replication can be used with SRM or used independently of SRM to replicate VMs between sites. vSphere Replication is implemented using a virtual appliance and a database, which can be embedded.
- VMware Virtual SAN:
  - o Requires locally installed spinning disks and solid-state disks in participating ESXi hosts.
  - o Requires Virtual SAN traffic to be enabled on a vmkernel port on each participating ESXi host.
  - o Requires Virtual SAN to be enabled for a vSphere cluster.
  - o Requires at least three participating ESXi hosts
  - o Limited to eight participating ESXi hosts per cluster.
  - o Requirements for participating ESXi hosts include 6 GB memory and ESXi version 5.5 , managed by vCenter Server 5.5

- Memorize the main ports used by various VMware vSphere components. Here is a list of some of the main ports used by vCenter Server, as identified in the *vSphere Install Configure Manage [v 5.5]* course.
  - 443 (HTTPS)
  - 80 (HTTP)
  - 902 (User Datagram Protocol heartbeat)
  - 8080 (Web Services HTTP)
  - 8443 (Web Services HTTPS)
  - 60099 (Web Services Change Service Notification)
  - 389 (LDAP)
  - 636 (SSL)
  - See VMware KB Article 1012382 for a detailed table. Here is an unofficial diagram from the *vReference* website showing most of the ports and vSphere components. http://www.vreference.com/public/ConnectionsPorts-v5.pdf.

- Identify SSO requirements, installation procedure, and upgrade procedure (VMware KB article 2053132). Also explain the impact on vSphere whenever SSO is unavailable. Primarily, the impact is that no one can access the vCenter Server. (VMware KB article 2057799)

- Determine availability requirements for a vCenter Server in a given vSphere implementation. Availability can be provided by VMware HA and by VMware vCenter Heartbeat.

- Deploy the vCenter Appliance: The main steps are:
  - Download the OVF and associated files from VMware
  - Use the vSphere Web Client to select **File** > **Deploy OVF Template** and use the wizard to complete the deployment
  - Power on the appliance and use the VM console to view the welcome screen and the URL that it contains.
  - Use a web browser to connect to the URL, accept the license agreement, and configure. The main configuration options are:
    - o **Configure with default settings**, which uses an embedded database.
    - o **Upload configuration file,** which configures the appliance per specifications that are stored in the file.
    - o **Set custom configuration**, which permits the appliance to be configured interactively.

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- Describe the main steps for installing the VMware vSphere Web Client:
  - The main prerequisite is the installation of SSO.
  - Run the vCenter Server Installer and select **Custom Install** > **vSphere Web Client** and click **Install**.
  - Use the wizard to perform the installation.
  - When prompted, provide the SSO Lookup Service URL and SSO administrator credentials.
  - If prompted, choose to install the Lookup Service Certificate
  - Use the wizard to complete the installation.
- Identify vCenter Server and vCenter Server database requirements. The following components require a database: vCenter Server, SSO version 5.0 and 5.1 (but not version 5.5), and VMware Update Manager.
- Identify the steps to enable or disable memory compression cache on an ESXi host, which are:
  - Use the vSphere Client to select the ESXi host
  - Navigate to **Configuration** tab > **Software** and select **Advanced Settings**
  - In the left pane, select *Mem* and locate *Mem.MemZipEnable*.
  - Set its value to 1 (enable) or 0 (disable).
  - Click **OK**
- Identify the upgrade requirements and procedure for vSphere. The main steps for an in-place upgrade are:
  - Upgrade vCenter Server components
    - SSO
    - Inventory Service
    - vCenter Server
    - Web Client
  - Upgrade VMware Update Manager (VUM)
  - Use VUM to upgrade each ESXi host.
  - Upgrade VMFS-3 datastores to VMFS-5
  - Upgrade VMware Tools in each VM
  - Upgrade the VM hardware version of each VM
- Describe how permissions are applied and inherited in vCenter Server. Given a set of configured permissions, identify the resulting effective permissions for a user. Generally speaking, permissions that are applied on a lower level object takes precedence over permissions applied at a higher level. For example, the permissions applied to a sub-folder take precedence over permissions to its parent folder. Also, permissions applied directly to a specific user take precedence over permissions set on a group that contains the user.
- Join an ESXi host to an Active Directory domain using the vSphere Web Client. The steps are to select the ESXi host, select the **Manage** tab, and select **Authentication Services**.
- Explain ESXi lockdown mode, which is used to prohibit any direct remote user connections to the host (such as SSH and vSphere Client) for the purpose of improving security. Identify the procedure to enable lockdown mode on an ESXi host.
- Identify use cases for implementing standard switches. For example, the client only has enterprise licenses not enterprise plus licenses.
- Identify vSphere Distributed Switch (vDS) capabilities. Identify and explain features on a vDS that are not available on a standard virtual switch (vSS), such as private VLANs (PVLANs), Network I/O Control (NIOC), VLAN Trunking, port binding (static, dynamic and ephemeral) and ingress traffic shaping,
- Explain how to use wizards to add ESXi hosts to a vDS and to migrate virtual machines to a vDS
- Explain how to migrate an existing vmkernel virtual adapter from vSS to a vDS port group.

- Explain how to monitor the state of dvPorts using the vSphere Web Client. The steps are to navigate to **Inventory** > **Networking**, select the vDS, select the **Manage** tab, click the **Ports** option and click on the **Start Monitoring Port State** button.

- Expalain how to configure LACP on Uplink port groups using the vSphere Web Client. The steps as explained in VMware KB Article 2034277 are:
  - Navigate and select the Uplink port group
  - Select the **Manage** tab, click **Settings**
  - Click the **Edit** button and use the interface to enable LACP and set the **LCAP Mode** to either *Active* or *Passive*
  - Click **OK**

- Identify and explain the available policies for vSS and vDS, such as VLAN, NIC Teaming, and Security.

- Identify the specific steps for configuring VLANs on a distributed port group. For example to configure a distributed port group for VLAN 100 using the vSphere Web Client:
  - Navigate to **Inventory** > **Networking** and select the port group in the inventory pane.
  - Select **Manage** > **Settings** > **Policies**
  - Click the **Edit** button.
  - Set **VLAN Type** to *VLAN* and set **VLAN ID** to *100*.

- Identify the specific steps for configuring jumbo frames on vSS and vDS. Explain the differences in the procedure to enable jumbo frames on vSS vs. vDS.

- Explain the naming convention used for runtime names (such as vmhba1:0:0:6) on storage devices (LUNs). The runtime name is comprised of adapter name (such as vmhba1), then channel number (such as 0), then target number (such as 0), and finally LUN number (such as 6).

- Identify the prerequisite virtual network and vmkernel virtual adapter prerequisites for implementing the iSCSI software adapter. Identify the steps to configure the iSCSI software adapter, including setting the IQN, discovery addresses, and network binding.

- Identify and explain all the available iSCSI CHAP authentication methods, which include *One-way CHAP* and *Mutual CHAP*. These can be set for each initiator or per target.

- Identify and explain all the available CHAP Security Levels, which include *Do not use CHAP*, *Do not use CHAP unless required by the target*, *Use CHAP unless prohibited by the target*, and *Use CHAP*.

- Identify the steps to turn off and on the storage filters using the vSphere Web Client. The steps are to select the vCenter Server, select **Manage** > **Settings** > **Advanced Settings** and use the **Edit** key to assign values to the appropriate keys. For example, ensure that *config.vpxd.filter.vmfsFilter* to *True* to prevent a device containing a VMFS datastore from appearing in the New Datastore wizard.

- Identify the benefits, limitations, and steps to upgrade a VMFS3 datastore to VMFS5. Details are in VMware KB Article 2003813. For example, the upgrade can be performed without disrupting rung VMs that reside in the datastore.

- Explain the purpose and identify the steps to place a VMFS datastore in maintenance mode

- Identify the steps to set the preferred path for accessing a VMFS datastore

- Explain the purposes and features of VMware Tools. One main purpose is to supply device drivers. Identify the process for upgrading VMs, which include upgrading VMware Tools then upgrading the virtual hardware. Identify the impact of configuring a VM for virtual hardware version 10, which includes forcing the use of the vSphere Web Client to edit the VM.

- Identify use case for using the VMXNET3 virtual network adapter. Generally speaking, use it in all cases, where supported for the guest OS and applications. For details, see VMware KB article 1001805.

- Identify use cases for using the VMware Paravirtual SCSI (PVSCSI) adapter and explain the process configuring a VM to usePVSCSI. For details see VMware KB Article 1010398.

- Identify the procedure to access the console of a VM using the vSphere Web Client, which requires installing the Client Integration Plug-in, when using Microsoft Internet Explorer. Google Chrome and Mozilla Firefox do not require the plug-in.
- Identify steps to change a virtual disk type from thin provisioned to thick provisioned (use the datastore browser to inflate the VMDK file) and from thick to thin (change the provisioning type during a storage vMotion migration).
- Explain how to set disk shares directly on VM using **Edit Settings** > **Resource** tab. Explain how these shares are only applied during periods of disk I/O contention involving VMs on the same ESXi host. Explain the difference in using Storage IO Control (SIOC) to apply disk shares to VMs running on separate ESXi hosts, but utilizing the same datastore.
- Explain best practices for time synchronization for the ESXi hosts (VMware KB Article 2004453) and VMs. Identify the steps to configure ESXi hosts to use NTP to synchronize with a central source. Identify the steps to configure VMs to synchronize the guest OS time via VMware Tools. Explain the proper method for controlling time in VMs, Active Directory (AD) domain controllers, and VMs when AD is virtualized, which involves configuring the PDC Emulator and the ESXi hosts to synchronize with an external source.
- Explain how to convert a physical server to a virtual server using VMware Converter. Explain how to use VMware Converter to modify the VM's virtual hardware during the migration.
- Explain the functionality and purpose for vApps (such as start-up order). Explain how to create, clone, and export vApps. Explain the purpose and the implementation steps for using IP address pools in vApps.
- Identify the steps for updating a template. For example, to install Windows Updates in a template, these steps can be used:
    - Convert the template to VM
    - Power on the VM and logon to Windows (using the VM console or remote desktop)
    - Install the updates and reboot (if necessary) to complete the installation of the update
    - Shutdown the VM
    - Convert VM to template
- Explain how to deploy virtual appliances and vApps from OVF templates. Identify the steps to export VMs and vApps as OVF.
- Identify the name and purpose of the files used by VMs. For example, identify the configuration file (VMX), disk data file (flat VMDK), disk metadata file (VMDK), swap file (VSWP), and the BIOS (NVRAM) file.
- Identify steps to non-disruptively increase the size of a VM's virtual disk. For example, to increase the size a partition in a Windows 2008 R2 server, where the partition currently consumes the entire disk, the first main step is to use the vSphere Web Client to edit the settings of the VM and increase the size of the virtual disk. The second main step includes going to Disk Management in Windows to rescan disks and extend the volume.
- Identify possible root causes for a VM not starting, such as insufficient unreserved resources, HA admission control violation, insufficient permissions, and insufficient disk space to create VSWP file.
- Identify the boot options that are available for VMs and identify the steps to change the boot options. In vSphere 5.5, the boot options include *Firmware*, *Boot Delay*, *Force BIOS setup*, and *Failed Boot Recovery*.
- Explain the purpose for storage policies and tags in vSphere 5.5 (which effectively replaced storage profiles and storage capabilities in vSphere 5.1). Describe the steps to use the vSphere Web Client to implement storage policies, which includes:
    - Create and assign tags to datastores
    - Select **Home** > **Monitoring** > **VM Storage Policies**

- Select the **New VM Storage Policy** button
- Supply a name for the policy and configure the rule set. For example, choose the **Add tag-based rules** button and select the categories and storage tags to include in the policy.
- Right click on a VM, choose **All vCenter Actions** > **VM Storage Policies** to assign policies to the VM and its disks

- Identify and explain the available settings for VMware HA Admission Control, which includes disabled, number of tolerated host failures, CPU and memory reservation, and failover hosts.

- Explain the requirements for implementing Distributed Power Management.

- Identify the types of monitoring that VMware HA provides, which include *Host Monitoring*, *VM Monitoring* (VMware Tools heartbeat monitoring), and *VM and Application Monitoring* (application heartbeat monitoring).

- Identify the requirements and steps for configuring and testing VMware Fault Tolerance (FT).

- Identify the requirements and use cases for vMotion, storage vMotion, and cold migrations.

- Explain how to modify the VM swap file location.

- Identify the benefits for VMware Data Protection (VDP) Advanced vs. VDP, which includes support for 8 TB deduplicated storage per appliance (vs. 2 TB) and agents for SQL Server, Exchange and SharePoint. VDP Advanced also provides off-site replication of backup data.

- Describe vSphere Replication architecture, requirements, and functionality. Identify the steps to protect VMs, perform a re-protect, and failback.

- Identify the steps to create, edit, and attach host profiles. Explain how to check for compliance and remediate using host profiles.

- Describe the steps to export examine logs and diagnostic data.

- Identify potential root causes for storage related issues, such as misconfigured virtual network (IP based storage), misconfigured IQN (iSCSI), misconfigured multi-pathing (iSCSI and fiber channel), and misconfigured NFS exports.

- Describe the purpose for vCenter Operations Manager (vCOPs) and explain the implementation steps including deploying the vCOPs vApp.

- Identify the main badges in vCOPs, such as health, workload, anomalies, and faults. Identify the meaning of various badge colors, such as green indicates a normal score.

- Explain the main purpose and features of Auto Deploy, such as stateless booting, stateless caching, and stateful installs. Describe the main components of Auto Deploy.

- Explain the purpose and functionality of Image Builder, which is implemented as a snap-in to VMware PowerCLI.

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About the Author

John A. Davis has been a VMware Certified Instructor (VCI) and VMware Certified Professional (VCP) since 2004, when only a dozen or so VCIs existed in the U.S. Traveling to many cities throughout the world to teach, John splits his time between teaching and delivering professional consulting on VMware technology. He was a recently named vExpert for 2014 and is a co-author of the newly released official VCAP5-DCA Cert Guide.