vCloud Suite 5.1 Solution Upgrade Guide

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Introduction

vCloud Enterprise Suite 5.1

By now you’ve probably heard all the hype around the 5.1 releases of VMware’s vSphere and vCloud platforms – and the vCloud 5.1 Suite, which bundles the latest versions of several VMware key IaaS-focused technologies and delivers a comprehensive cloud solution. The suite comes in 3 flavors – Standard, Advanced, and Enterprise.

If you’re an existing (active) customer of any of these products, there’s an upgrade and/or entitlement path to the suite for you – and it’s highly recommended that you take advantage of it. Or, at the very least, you can upgrade your individual products to 5.1 as you ponder the suite. Whether or not you choose to upgrade and take advantage of the latest and greatest features is up to you. But if you’re looking for increased scale, performance, efficiency, and capability while taking advantage of end-to-end advancements in VMware’s leading cloud technologies, then I would place upgrade at the top of your to-do list. (some of my peers suggest I’m drinking the Kool-Aid via fire hose….really?). Learn more about the suite here: http://www.vmware.com/products/datacenter-virtualization/vcloud-suite/overview.html.

This guide will walk you through, in detail, the upgrade steps and procedures for moving to vCloud Suite 5.1.
Upgrade Overview

Speaking of upgrade - and to get back on topic - I thought it would be beneficial to publish a how-to guide of sorts to help with upgrading from previous versions of the core infrastructure stack to version 5.1, taking in consideration the many co-dependencies of an active cloud deployment (VMware’s pubs and guides cover the process for individual products with plenty of detail, but not so much as a whole solution...yet).

I’ll specifically focus on upgrading from previous (pre-5.1) versions to 5.1. The approach will go something like this (in this order):

1) vCloud Director 1.5.x -> vCloud Director 5.1
2) vShield Manager 5.0.x -> vCloud Networking & Security 5.1
3) vCenter 5.0.x (windows) -> vCenter 5.1 + required add-ons
4) vSphere (ESXi) 5.0.x -> ESXi 5.1
5) vShield Edge (vSE’s) 5.0.x -> Edge Gateway 5.1

Note: Many issues encountered during the upgrade are contributed to lack of planning, upgrading components out of order, or skipping steps. To ensure a successful upgrade and continuity of services, it is critical that the steps highlighted in this document are followed closely. In other words, avoid shortcuts!
Things to Consider

Before we get started, let’s set expectations and discuss some caveats. At first glance, upgrading to a “dot” release doesn’t seem that significant, but if you have followed VMware’s versioning strategy in the past, you’ll know that a “.1” release is typically a major update that adds a significant set of capabilities and functionality. This one upgrade path is no exception. And with that comes several considerations…

• Take advantage of snapshots – take one of every VM you’re touching and **make sure you have good backups of the configs any associated databases.**

• Understand the implications of upgrading your vCenter server, especially in environments that of other products and 3rd-party solutions installed that depend on it (see: VMware View).

• If you plan on migrating from vCenter Server on Windows to the vCenter Server Virtual Appliance (VCVA), this guide isn’t going to help you much. The upgrade procedure to follow is for a Windows-installed vCenter. But, by all means, download the VCVA and give it a run – works great. Just note that you can’t currently migrate from one platform to another.

• vCenter Server 5.1 adds a significant set of new features, some of which that will require special attention during this upgrade...specifically for the new single-sign on (SSO) function. To ensure the upgrade goes smoothly, be sure the follow the installation steps IN ORDER. This ensures all service dependencies will be in place as new features are installed.

• Be sure all vCenter certificates are valid before upgrading – if your vCenter server certificates have expired you’ll to renew them BEFORE the upgrade. More info can be found here: [http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=2035413](http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=2035413)

• vCloud Director 5.1 is backwards compatible with vSphere 5.0.x, but not the other way around. You can upgrade vCD and sub-components now and wait to get vCenter and ESXi up to 5.1 later...just understand this may limit some of the new features in vCD that depend of vSphere 5.1. See VMware’s compatibility matrix for more details: [http://partnerweb.vmware.com/comp_guide2/sim/interop_matrix.php](http://partnerweb.vmware.com/comp_guide2/sim/interop_matrix.php)

• The upgrade procedure for vCloud Director 1.5.x highlighted in this doc assumes a single instance (cell) is installed. As such, upgrading the only cell will result in a vCD outage (not the running vApps, just vCD UI access). See VMware’s guide, [vcd_51_install.pdf](http://example.com/vcd_51_install.pdf), to upgrade a multi-cell environment...it’s just a few extra steps.

• The new version of vCloud Connector (2.0) is not yet available (as of this writing). While the majority of the cloud suite’s components have been upgraded and
converged on 5.1 versioning, the latest vCC 2.0 appliance is expected to go live by the end of the year. If you’re currently using vCC 1.x, upgrading to vCD 5.1 may break it. Stay tuned for the 2.0 release if this is something you depend on.

- If you’re running vCenter Operations (vCOps) 5.0.x and are planning on upgrading the rest of your environment, you might as well take the time to update your appliance to version 5.0.3 to take advantage of some minor new enhancements that will compliment the vCloud 5.1 suite – vCenter Operations Suite 5.6 was announced at VMworld Barcelona and will be available for download/upgrade soon.

Now that we’ve got that out of the way, let’s get upgrading! Upgrading to 5.1 is not difficult, but it does take some planning, cautions (see above), and an organized approach to ensure all goes well...especially in a production environment. Speaking of that, here’s my disclaimer:

**DISCLAIMER:** This document is not an ‘official’ VMware publication, nor are the author (that’s me) or VMware responsible for any outcomes, outages, late nights in the datacenter, or complete system meltdowns. This document and its forthcoming upgrade procedures were created as reference material to help you get your environment upgraded so you can enjoy all the wonders of the vCloud 5.1 Suite. As a precaution, do this in a test/dev environment prior to attempting the process in a production deployment. On the other hand, please feel free to share your successful upgrade stories!

**Backup Everything First!**
Upgrading vCloud Director 1.5.x to 5.1

The first component to be upgraded is vCloud Director (vCD). Since vCD 5.1 is backwards-compatible with vSphere 5.0.x (but not visa-versa), it makes perfect sense to start here. This upgrade procedure is for a single vCD cell (instance) running on a supported guest OS. If your environment includes multiple, load-balanced vCD cells, see the detailed upgrade guide.

1) Download the latest vCD 5.1 .bin file (currently vmware-vcloud-director-5.1.0-810718.bin) from vmware.com and copy it to the /opt directory in the vCD RHEL machine (note: make sure the file is executable by root with the following rights: rwxr-xr-x).

2) Disable access to the vCD cell and verify that there are no active tasks on the cell. Use the cell maintenance tool to gracefully shut it down:
   a) Log into the vCD cell (SSH or console) as root/superuser and switch to /opt/vmware/vcloud-director/bin directory
   b) Check to make sure there are no running tasks:
      root@vcd01]# ./cell-management-tool -u [cloudadmin] -p [password] cell --status
   c) If there are any active tasks, you'll need to first quiesce the cell:
      root@vcd01]# ./cell-management-tool -u [cloudadmin] -p [password] cell --quiesce true
   d) Shutdown the cell:
      root@vcd01]# ./cell-management-tool -u [cloudadmin] -p [password] cell --shutdown

3) Execute the .bin file to begin the software upgrade process and verify you want to upgrade the existing software.
   a) Change directory to /opt (or wherever your .bin file is)
   b) Execute the install file:
      root@vcd01]# ./vmware-vcloud-director-5.1.0-810718.bin
4) Watch as checks are done and the update is applied. After the upgrade completes, you are prompted to run the database upgrade procedure. DO NOT start vcloud services until the database has been upgraded:

5) Upgrade the Database by running the upgrade script:
   a) root@vcd01# /opt/vmware/vcloud-director/bin/upgrade
   b) Enter “Y” for each prompt…be patient while the DB is upgraded

6) Enter “Y” when prompted to start vCloud Director services (this is prerequisite for the vShield Manager upgrade).
7) You’re done! You should be able to log back into vCloud Director and see the updated UI. Log in to verify all is well:

We’re going to come back to vCD prior to upgrading the ESXi hosts backing your cloud resources (Provider Virtual Datacenters or PvDCs) and again after we successfully upgrade vCenter to run through some post-upgrade tasks.
Upgrading vShield Manager to vCloud Networking & Security 5.1

This procedure entails upgrading the vShield Manager appliance and can be accomplished entirely within the manager’s UI. We’ll upgrade just the vShield Manager in this procedure and revisit upgrading any deployed vShield Edge appliances later.

1) Download the latest upgrade bundle for vCloud Networking and Security 5.1, (“VMware-vShield-Manager-upgrade-bundle-5.1.0-807847.tar.gz” at the time of this writing). The upgrade bundle is a tar.gz file that can be downloaded from the same page as the full appliance. You cannot upgrade vShield by using the full .ova download.

![Upgrade bundle download](image)

*Note:* some web browsers will strip the “.tar” extension and save the file with only .gz – this will not work. Make sure your upgrade bundle has the full extention: .tar.gz after it’s been downloaded.

2) Connect to vShield Manager -> log in using an account with full admin privileges.

3) Select “Settings and Reports” from the Inventory menu -> go to the “Updates” tab:

![Settings and Reports](image)

4) Check the currently installed version to ensure it is supported (should be 5.0.x).

5) Go to “Upload Settings” tab, select “Choose File” and find the TAR (.tar.gz) file previously downloaded:
6) Select “Upload File” and confirm the upload:

![Upload File Confirmation]

Note: you can track the upload status (by % uploaded) from the bottom-left corner of the browser window.

7) When the upload is complete, you will have the option to Install it. Click on “Install” then “Confirm” to start the update:

![Update Confirmation]

![Update Status]

![Confirm Install]
8) Track the Installation Steps for status:

9) Once the update has been applied, the manager will reboot. Give it ample time (~3 mins) prior to logging back in.

10) Log into the vShield Manager UI to verify all is well (and upgraded). Click on “About” in the top-right corner of the vShield Manager to verify:
Once the vShield Manager upgrade is complete, the new version will register with vCenter and notify the freshly-updated vCloud Director of the upgrade. Note that this procedure does not disable or reboot any deployed vShield Edge (vSE) appliances or associated networks, so access to any workloads behind a vSE-protected network will not be interrupted. Once we upgrade the rest of the stack we’ll come back and upgrade those vSE’s.

**Note:** There are a few configurations that need to be addressed with the new version. The new vCloud Networking & Security manager can take advantage of several new features added by vCloud 5.1 Suite, such as the updated Lookup Service and Single Sign-on. Once the rest of the stack is upgraded to 5.1 (specifically vCenter), you’ll need to log back into the manager to update the config for these services. See the “Next Steps” section for more details.
Upgrading vCenter Server (Win) 5.0.x to vCenter Server 5.1

vCenter 5.1 introduced the new Single Sign On (SSO) service, which allows users to authenticate one time into the environment while using a trusted token exchange to authenticate with the rest of the cloud stack. Another change in 5.1 is the separation of the Inventory Service. This allows for greater scale and supports installing each of these services on separate servers (VMs)...or not. For the sake of this upgrade, I’m going to assume we’re installing into a small environment so we can install the SSO server on the same Windows VM as the Inventory Service and vCenter server. These are all core services and are required components of the vCenter 5.1 installation. Additional tools, such as VMware Update Manager (VUM) are optional and can be installed on the same server as well – but that’s up to you and will depend on how much you plan on scaling this environment. We will be using the new VUM to update the ESXi hosts later in this guide.

Note (again): the following procedures are specifically for a Windows-based vCenter Server installation. You cannot upgrade from a Windows installation to the vCenter Virtual Appliance (VCVA).

Preparing for the Upgrade

1) Download the latest vCenter Server 5.1 build from vmware.com (the 5.1 GA release is VMware-VIMSetup-all-5.1.0-799735.iso). Since this file is an ISO so go ahead and upload it to a datastore accessible by the vCenter VM.

2) Mount the ISO file to the existing vCenter Server VM to be upgraded:

3) Use your favorite RDP client to log into the vCenter server using an account that has Administrative privileges.

4) Double-click on the mounted CD/DVD drive in “My Computer” to get started. The installation menu shows all the options available with this upgrade – pay close attention to the prerequisites. The VMware vCenter Simple Install will install all the core components on the local server in the appropriate order (ideal for small
environments). For the sake of this guide, I will walk through the install of each individual service. Read the descriptions on the right to familiarize you with each.

We’ll install each service in the red box – **in this exact order:**

![vCenter Single Sign On installation](image)

**Install vCenter Single Sign On**

1) From the install menu, select “vCenter Single Sign On” on the left, and click “Install” on the right. The installation wizard will launch and get you on your way:
2) Walk through the guided wizard, accepting all the defaults. The following screenshots are all defaults except the passwords required for the local SQL Express DB and SSO service:

![Screenshot of the guided wizard](image1.png)

Setup will automatically install a local MS SQL Server 2008 Express for the SSO service. Optionally, you can use an existing DB instance – have it ready to go prior to selecting this option:

![Screenshot of the database configuration](image2.png)
Local server FQDN (it is auto filled):

Use the default HTTPS port setting (7444):

3) Continue through the wizard and wait for SSO to complete the install.
Install vCenter Inventory Service

1) From the install menu, select “vCenter Inventory Service” on the left, and click “Install” on the right. The installation wizard will launch and get you on your way:

Enter the SSO info. The username “admin@System-Domain” is automatically filled in. Be sure to use the PW used when setting up the SSO service in the previous step:
Pretty painless. Finish:
Install VMware vCenter Server

1) From the install menu, select “VMware vCenter Server” on the left, and click on “Install” on the right. The installation wizard will launch and get you on your way:

The install wizard will detect an earlier version of vCenter Server. To upgrade the existing installation, select Next:
EULA. Thoroughly read and take lots of notes. Then Agree:

Since the existing installation utilized a local SQL Express DB, we won’t identify a username or password here, just hit Next:
You’ll want to upgrade the existing vCenter Server database to ensure all you retain all the existing data and settings. Make sure you back up the DB first:

This option automatically updates the vCenter Agent on all managed hosts. Doing this now makes perfect sense:
I’m using the SYSTEM account to start the vCenter Service. Optionally, you can specify an account (local or domain) for this service – just make sure it has the appropriate permissions:
Port configuration – all defaults:

Sizing – keeping it small:
SSO Info again. Use the same password you used when setting up SSO:

Auto-filled, select Next:
Select Next:

Ready to go. Select Install and sit back...this will take 5 mins or so:
Install the vSphere Web Client:

The vSphere Web Client is one of the biggest additions to vCenter 5.1. It provides a totally new interface and is accessible by any flash-enabled web browser. Although you can still use the latest vSphere C# ("fat") client with 5.1, you might as well start getting comfortable with the web client. Future plug-ins and integrations will focus on the web client...some exclusively.

1) From the install menu, select “VMware vSphere Web Client” on the left, and click “Install” on the right. The installation wizard will launch and get you on your way:
Use the default HTTP and HTTPS ports, click “Next...”:

SSO Info again. Use the same password you used when setting up SSO:
Click “Install”:

Install VMware Update Manager (VUM)

VMware Update Manager is a great tool to help you keep your vSphere environment updated. We’re installing as part of this update to take advantage of one of its most useful features: host upgrades, which will do in the next section. VUM will also help you batch-update all your existing VMs to the latest virtual hardware and VMware Tools version.

1) From the install menu, select “VMware Update Manager” on the left, and click “Install” on the right. The installation wizard will launch and get you on your way:
Support Info. I’m not going to download updates immediately after installation since I’m primarily using VUM to upgrade (using an ISO) the hosts to 5.1. I can choose to download other updates later:
Enter vCenter's IP or FQDN and a username and password that has appropriate permissions to vCenter. Click Next:

Again, small install so I’m choosing to use a local SQL Express DB. Setup will automatically install it on the local machine. You can choose to utilize an external DB as well – make sure you have already set it up and created a DSN using the local ODBC manager:
Use the drop-down to identify VUM to the network – you can select IP address or FQDN. Port numbers are all defaults:

...Next:
2) Install the vSphere Update Manager Client. The VUM client can be installed on a windows-based client running the C# (“fat”) client, including the vCenter Server itself. The following steps will be done in the vCenter Server since we’re already RDP’d into it:

   a) Use the vSphere (C#) client to log into the vCenter Server (locally)
   b) From the “Plug-ins” menu, select “Manage Plug-ins”
   c) Select “VMware vSphere Update Manager” under “Available Plug-ins” (if it doesn’t show up here, go back and make sure you installed VUM properly)
d) Select “Download and Install” and run through the setup wizard.

You're now ready to upgrade the ESXi hosts to vSphere 5.1 using VUM. The process will be detailed in the next section.
Upgrading vSphere (ESXi) 5.0.x Hosts to vSphere 5.1

We will be using VMware Update Manager (VUM) to upgrade all the ESXi hosts from vSphere 5.0.x to vSphere 5.1. Hosts can also be upgraded by installing vSphere 5.1 locally (using media), or by using Auto Deploy. I find VUM to be the easiest way to do accomplish the upgrade...but your preference may differ.

My cloud is backed by a dedicated resource cluster for all vCloud-based workloads. I have an additional cluster dedicated to all things management – all the “Core” VMs, appliances, and tools that run my cloud. If you followed VMware best practices while planning and deploying your cloud, you likely have a similar configuration. It is important to consider the role of the ESXi host being upgraded due to some additional tasks that need to be completed for the hosts backing vCloud PvDC’s. Upgrade all the hosts in my management cluster first then tackle the cloud cluster(s). In the following section, I’ll walk through the process of upgrading the ESXi hosts being utilized by vCloud Director’s PvDC’s since they require a couple extra steps prior to upgrading.

Managing Hosts in vCloud Director

1) Refresh the connection to vCenter Server to ensure vCD recognizes the upgrade to 5.1:
   a) Log into VMware vCloud Director
   b) Select “Manage & Monitor” from the “Home” section
   c) Select vCenters from the left menu:
d) Right-click your vCenter Server listed and select “Refresh”:

![Image of vCloud Director interface showing vCenters section with refresh option highlighted]

```
Right-click your vCenter Server listed and select “Refresh”:
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e) Select “Yes” to confirm the operation:

![Image of vCloud Director interface showing refresh confirmation dialog]

```
Select “Yes” to confirm the operation:
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(Insert any relevant technical details or additional steps here)

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f) Verify that your vCenter displays the proper version (5.1.0):

![vCenter Displaying Version](image)

2) Disable PvDC Hosts to be upgraded:
   a) Select “Hosts” under “vSphere Resources”

![Hosts Selection](image)

b) Right-click the hosts that need to be upgraded and select “Disable Host”. Do this for all the hosts:
**Note:** If you have running VMs or vSE appliances in the PvDC, be sure to do this in stages and allow for an appropriate set of resources to be available. I’m able to shut everything down and upgrade the all the hosts at once since this is a lab environment.

**Upgrading Hosts with VUM**

1) Use VUM to upgrade the hosts to ESXi 5.1
   a) In the vSphere client, select the cluster containing your hosts and click on the “Update Manager” tab.
   
   ![vSphere Client](image1.png)

   c) If you haven’t already done so, place your to-be-upgraded hosts in maintenance mode. If you’re performing a rolling upgrade, do this only to the hosts that have already been disabled in vCloud Director during the previous step:

   ![vSphere Client](image2.png)

   d) Select “Admin View” from the “Update Manager” tab to bring up the VUM admin interface. From here, select “Import ESXi Image”: 

![VUM Admin Interface](image3.png)
e) Browse to and select the ESXi 5.1 ISO you downloaded from vmware.com, currently VMware-VMvisor-Installer-5.1.0-799733.x86_64.iso

f) Wait for the ISO to upload then hit Next:
g) Follow the prompts for name/description and import the update into the admin console:
h) Return to Hosts and Clusters view. With the appropriate cluster selected on the left, select “Attach...” in the “Update Manager” tab:

i) Select the Upgrade Baseline you defined earlier:
j) Once the baseline is attached, select “Remediate...” to kick off the upgrade process:

k) The Remediation wizard will walk you through the next several steps:
If you have any 3rd party agents installed on your hosts, it's a good idea to remove them in this steps. Chances are they won't be compatible with vSphere 5.1:

Name your task. Be sure “Immediately” is selected to kick the upgrade process off right away...unless you have a reason to schedule this step for a later time:
Defaults:

Confirmation:
l) Wait for the hosts to be upgraded – this can take some time depending on many factors. You’ll know they’re done when they reregister in vCenter. If an exorbitant amount of time has passed without hosts returning, check to make sure they’re not stuck at a “press enter to reboot” state. Once they come back to life, verify the build is “VMware ESXi, 5.1.0,799733”:

m) Take all your upgraded hosts out of Maintenance mode.

2) Now we need to go back into vCloud Director to upgrade the Host Agent and re-enable the upgraded hosts:
   a) Log into vCloud Director using an account with SYSTEM privileges
   b) Go to “Manage & Monitor” and select “Hosts” on the left
   c) Right-click each host and select “Upgrade Host Agent”: 
d) Once all the host agents are upgraded right-click and select “Enable Host”:

At this point you should see green checks across the board:

Almost there! The final step is to ensure your [legacy] vShield Edge devices, now called Edge Gateways, get upgraded to 5.1. We previously upgraded the vShield Manager to vCloud Networking & Security (i.e. the new vShield Manager), but haven’t done anything to the deployed vSE’s. We now need to use the new manager to upgrade any and all vSE’s.
Upgrading Legacy vShield Edge appliances to Edge Gateways (5.1)

1) Log into the vShield Manager

2) From the “View” drop-down, select “Edges”:

3) On the left you’ll see a list of all the vSE’s previously deployed (they’ll all start with “dvs.”). Select the first one in the list and go to the “Edge” tab on the left.

4) The configuration overview will provide several details about the vSE. Verify that this is the device you want to upgrade then select “Upgrade” on the right. You’ll also see a notification that an upgrade is available:

5) Wait a moment while the vSE is upgraded (~2 mins). Once complete, you’ll get a confirmation:
Note: after the upgrade the Edge device is moved under “Edge Gateways”.

6) Rinse & Repeat -- do this to all the vSE’s in your environment.

7) Test everything

Next Steps

At this point you have successfully upgrade vCloud Director, vShield Manager (and vSE’s), vCenter Server, and all your vSphere Hosts to the latest builds of each. Take some time to read the admin documentation associated with each of these components to familiarize yourself with the new integrations and capabilities of the vCloud Suite. You’ll want to make sure to address the following:

• Configure vCenter Lookup Services in vCloud Director and vShield Manager
• Configure vCenter’s SSO server using the new vSphere Web Client and update vCloud Director to take advantage of it
• Configure SSO users and associated roles
• Test each of these components to ensure everything is in a good state of operations
• Download and deploy the new vCenter Orchestrator appliance from vmware.com

I will be publishing additional guides for next steps beyond the vCloud Suite, including the new Cloud Management tools and Cloud Automation. And, as always, feedback is always welcome. Enjoy!
Resources

- VMware vCloud Suite, Info & Documentation:

- Replacing default vCenter 5.1 and ESXi Certificates (VMware KB):

- VMware Compatibility Guide:
  http://www.vmware.com/resources/compatibility/search.php