Evaluation of HP OneView

Evaluation report prepared under contract with HP

Introduction

As enterprises deploy increasing numbers of complex systems, managing these systems can be cumbersome. HP has introduced a new management software platform known as HP OneView. OneView attempts to simplify management of these complex systems by providing a dashboard view of these systems and providing automation of typical installation and daily maintenance tasks.

HP commissioned Demartek to compare HP OneView management software and Cisco UCS Manager management software with respect to deploying and maintaining their respective blade server platforms.

Executive Summary and Key Findings

For our tests, we divided the tasks into those that would typically be performed once during an installation and those ongoing maintenance tasks that would be performed more frequently, in some cases, daily. We found that for the initial deployment steps, the two products were similar in time to completion, but HP OneView took less time in both cases, 40% less time in use case 1.

However, we found that for daily maintenance tasks performed frequently over the useful life of the hardware, HP OneView took considerably fewer numbers of steps and significantly less time than Cisco UCS Manager in equivalent blade server environments. This focus on improving the ability of support personnel to effectively and efficiently manage daily maintenance activities has significant business benefits for improved customer satisfaction, increased revenue opportunities due to enhanced reliability, and the ability of staff to support new profitable services rather than maintenance tasks.

We believe that functions used in daily operations over months and years of use have the most impact on administrator activities and therefore are more important than those that happen only on the first day during an installation. For these daily operations, HP OneView makes many of the management tasks easier to complete than the equivalent tasks with Cisco UCS Manager.

Use Case Comparison

Several use cases of the respective management software applications were tested. These can be divided into those that are performed during the initial installation and those that are performed on an ongoing, sometimes daily basis or for maintenance purposes after the initial installation.

Initial Installation Procedures
◆ Use Case 1: Initial Deployment of 16 servers
◆ Use Case 2: Deployment of 32 servers

Ongoing Operational Procedures
◆ Use Case 3: Error Tracking
◆ Use Case 4: Track MAC Address
◆ Use Case 5: Network Retirement

For each use case, we recorded the elapsed time to complete and the number of individual steps to complete.

Product Names and Application Types

Cisco UCS Manager GUI is the Java application that provides a Graphical User Interface (GUI) to Cisco UCS Manager. In this report, we generally used the Cisco UCS Manager GUI and refer to it generically as Cisco UCS Manager or simply UCS Manager.

HP OneView is delivered as an OVF (Open Virtual Format) package for installation on a vSphere Hypervisor host. For this testing, we maintained a separate ESXi environment with the open virtualization format (OVF) for the HP OneView appliance stored on an all-flash array. With the latest release, HP OneView v1.10 virtual appliance is now supported on Microsoft Server 2008 and Server 2012 Hyper-V platforms.

Blade Server Hardware and Software Environments
The following blade server environments were tested:
◆ Cisco UCS Manager 2.1(2a) with Cisco UCS 5108 blade chassis and Cisco UCS B200 M3 server blades
◆ HP Oneview 1.0 with HP BladeSystem c7000 chassis and HP ProLiant BL460c Gen8 server blades
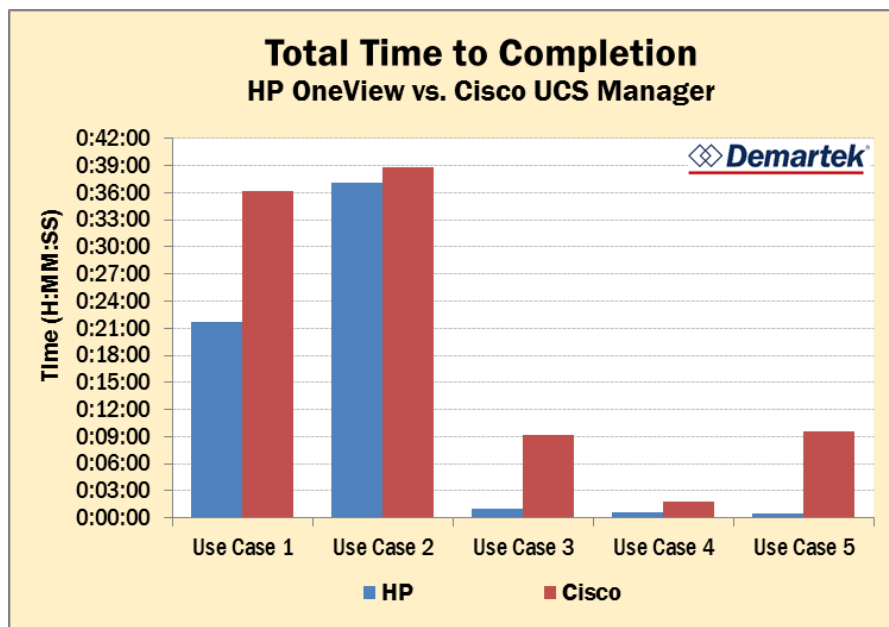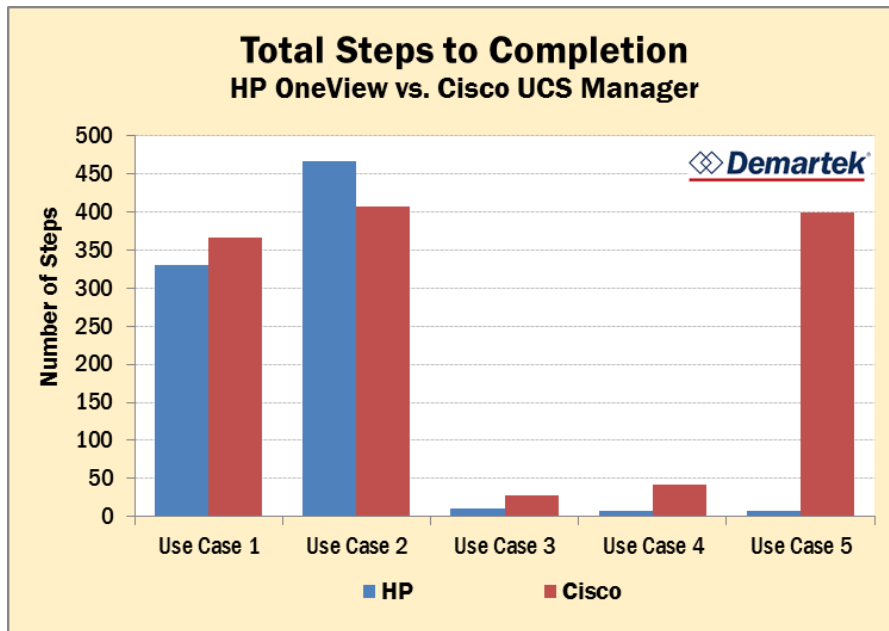
Product Documentation
For several of the processes described, reading the product documentation, though quite long in some cases, is essential for successful completion of these tasks.
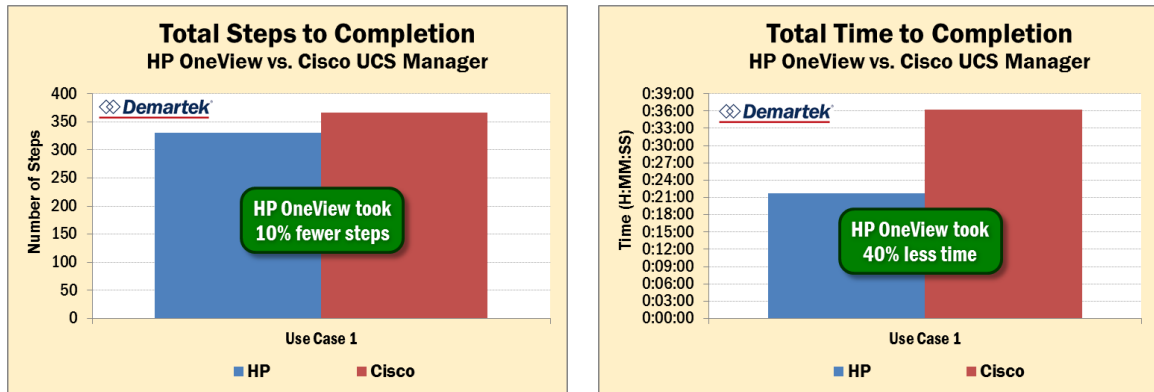
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Total Number of Steps and Time to Completion

The total steps and time to complete each use case are shown below. The details for each use case are explained in sections following these charts. For all the use cases, it took less time to complete the tasks when using HP OneView. For most of the use cases, it also took fewer steps to complete the tasks using HP OneView.

The daily operational function use cases (3, 4 and 5) are typically performed many times over the useful life of the hardware can be accomplished in significantly less time and with fewer steps using HP OneView.

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Use Case 1: Initial Deployment of 16 Servers

Total Steps to Completion
HP OneView vs. Cisco UCS Manager

HP OneView took 10% fewer steps

Total Time to Completion
HP OneView vs. Cisco UCS Manager

HP OneView took 40% less time

For this use case, we deployed each of the two blade server systems using the respective management software for each system. Each system was reset to factory defaults and deployed. The clock starts when the system is plugged in and/or with any prep work that has to be done before the system is plugged in (such as deploying HP OneView).

Each system was set up with 19 networks and 16 server profiles that use these networks. The following assumptions were made:

◆ Each blade system has identical server blades in the first and subsequent chassis
◆ One server/service profile template is applied to all the blade servers

The clock stops when all networks/etc. are set up and running, all blades have a service profile, and all blades have been given the signal to power on.

The networks are configured as follows for all Blades:

◆ Interface 1: Network_A
◆ Interface 2: Networks B,C,D,E,F,G (in HP OneView this uses a Network Set)
◆ Interface 3: Networks H,I,J,K,L,M (in HP OneView this uses a Network Set)
◆ Interface 4: Networks N,O,P,Q,R,S (in HP OneView this uses a Network Set)

It is necessary to mention here that a full HP BladeSystem chassis has 16 blades in a 10U chassis, while a full Cisco UCS chassis has 8 blades in a 6U chassis. Cisco also requires 2 separate Fabric Interconnects to deploy the first chassis, for a total of 8U. When a full chassis of blades is deployed, there will be half as many Cisco servers as there are HP servers.

Rack Configuration Information	HP	Cisco
Rack units – single chassis solution	10	8
Number of servers - single chassis solution	16	8
Number of servers in 42U rack	64	48

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HP OneView

To deploy a chassis of 2 servers with the appropriate networks and profiles, from initial power on to completion, was 21:40 minutes, 289 steps.

Initial Deployment of Two Servers with HP OneView

Step	For Step		For Entire Process	
	# of Steps	Time	# of Steps	Total Time
Deploy OVF	12	0:25 (to start process)	12	0:25
Power on, initial configuration at Insight Display	21	3:28	33	3:53
First Time Setup Wizard for Enclosure	68	4:43	101	8:36
HP OneView Setup Prior to Adding Enclosure – Networks and FCoE	87	5:22	188	13:58
Add Enclosure, continue to setup more networks while enclosure is added	49	3:18	237	17:16
Setup Server Profile Template and profiles	52	4:24	289	21:40

HP OneView setup finished in 21:40 minutes after 289 steps when server profiles only had to be applied to 2 servers. After each server profile is created, the system briefly locks the screen as the profile is saved but then frees the user to continue working while the rest of the configuration is completed.

Deployment of 16 servers

HP OneView applies the profiles in parallel to each blade server, so the time to complete the process is the same regardless of the number of blade servers. For chassis full of 16 blade servers, we would need to add 60 steps (42 steps for powering off servers before profiles are applied and 28 steps for powering on servers after profiles are applied), but no additional time. This would bring us to a projected time of 21:40 minutes and 331 steps.

Summary	For Entire Process	
	# of Steps	Total Time
Deploy 16 HP blade servers using HP OneView	331	21:40

Configuration Notes and Comments

The "Deploy OVF" step procedure begins before powering on the chassis and the OpenView OVF is set to power on the VM at the end of deployment. The VM deploys and starts while we configure Insight Display and the First Time Setup Wizard.

When the "Setup Server Profile Template" step begins, the enclosure is not completely added yet, but the hardware types are available for selection when configuring the server profile, which enables the connections to be configured without assigning to a particular blade as this feature is not yet available. After 14 profiles are set up, we set up and apply 2 profiles to servers once the hardware is available and the enclosure is fully imported.

We turned the blades off in the HP Onboard Administrator (OA) while waiting for HP OneView to load, so that the profiles could be applied faster when HP OneView was up and running. OneView requires the blade server to be off before allowing the user to apply the profile, so we simply turned off all the blades at this point. In this example we turned off 2 blades. If we were to do this for an entire chassis, we would have to turn off 14 more blades. One might think that this would add time to total deployment, but it required no additional time, as the setup for HP OneView took longer than it did to issue the commands to turn off the other blade servers.

HP OneView has a "Create+" version that creates one copy of the object being created, and then immediately opens up a new creation page. The new dialogue has copied the non-unique settings from the last object created, allowing a new object to be created by entering unique attributes (such as name) and then clicking create or create+. This saves some time and steps. Also on most screens like this, after the initial first object is created, "create+" is already selected. The user can enter the name and then press enter to "Create+" instead of lifting his hands from the keyboard to move the mouse over to the button. Both are time savers and step savers. In this exercise, entering a name and then the Enter key was counted as all one step.

There is currently no automated function to import the enclosure information into HP OneView. Because of this, the user could perform the OneView configuration steps in the wrong order, for example attempting to import an enclosure before creating the logical interconnect group, and may have to trace back dependencies to learn what to do first (or read documentation). However, the HP OneView Deployment and Management Guide describes the correct order for these procedures.

Cisco UCS Manager

To deploy an initial chassis of 2 servers with the appropriate networks and profiles, (including some setup for subsequent deployments to auto-discover blades), from initial power on to completion, was 24:49 minutes, 347 steps.

Initial Deployment of Two Servers with Cisco UCS Manager

Step	For Step		For Entire Process	
	# of Steps	Time	# of Steps	Total Time
Power on, Initial configuration of first Fabric Interconnect	3	4:47	3	4:47
Continued Configuration in browser for First Fabric Interconnect	18	1:05	21	5:52
Initial Configuration of second Fabric Interconnect	2	0:50	23	6:42
Continued configuration in browser for second Fabric Interconnect	7	1:03	30	7:45
Add enclosure by configuring server ports. While waiting for blade discovery, setup networks, setup FCoE and perform base UCS setup tasks	198	8:58	228	16:43
Create Service Profile Template and Service Profiles	88	4:13	316	20:56
Configure Ethernet and FC uplinks while blades are being associated	31	1:00	347	21:56
*Wait for uplinks to finish (turn green)	0	2:53	347	24:49

Deployment of 16 servers

In order to deploy 16 Cisco blade servers with Cisco UCS Manager, two UCS chassis are required. The second chassis uses auto-discovery policies set during the deployment of the first chassis, completing discovery and profile assignment without user intervention after the server ports were configured.

Step	For Step		For Entire Process	
	# of Steps	Time	# of Steps	Total Time
Login and configure new server ports in second chassis	20	1:17	20	1:17
Wait while blades are auto-discovered and profiles are assigned.	0	10:05	20	11:22

The steps and times from the deployment of the second UCS chassis are added to the first table to provide the final total.

Summary	For Entire Process	
	# of Steps	Total Time
Deploy 16 Cisco blade servers using Cisco UCS Manager	367	36:11

Configuration Notes and Comments

Based on previous experience, we know that Fabric Interconnects (FI) need some time after they are configured before they are ready to accept connections. In order to determine when the FIs were ready to accept connections, we setup a ping loop during the wait time to report when the FIs were ready to accept connections. In our opinion, the UCS Manager needs a way of signaling to the user when it is ready for use.

Based on previous experience, we knew that UCS chassis and blade discovery takes some time and starts as soon as the server ports are configured. When discovering a blade, UCS does not need a server profile set up to apply to that blade. As such, we configure the server ports first and then go about creating the pools and service profiles necessary. Secondly, assigning a service profile to a blade can also take some time, so we create a service profile template and start the service profile creation before creating the FI uplinks. We did have to reboot the FIs to configure the FC ports, but the server profile assignment did not seem to be disturbed by this process.

The order of operations is important to achieve the most optimal time. If the user creates pools first, creates templates, configures the FC ports, etc., and then configures the server ports last, then the user would have to wait for chassis discovery, server discovery, and service profile assignment to happen after the completion of the user-input.

The UCS system does not routinely lock the screen while configuring, preventing the user from moving on. As such, this lack of pauses contributes to the fact that UCS has more steps to complete the setup but only takes 3:09 minutes more to configure.

Also it may be of note that the UCS had additional initial deployment steps due to setting up the auto-discovery for the next chassis, without which it would have been fewer steps and less time. This saves time in the second deployment.

The UCS turns the blades off automatically before the service profiles are associated, and powers on the blades automatically after the profiles are associated. When a profile is applied, UCS Manager warns the user that the blade will be turned off. There are no extra steps for telling blades to power on and off, either for the initial chassis or for subsequent chassis. Because of this and the fact that all blade profile associations begin when the profile template is associated with a server pool, requiring no user input, we can conclude that the time to deploy a full chassis of blades would be the same as it was to deploy the 2 blades that we did: 347 steps and 24:49 minutes.

In addition to setting up networks, FCoE, etc., UCS requires the user to create an IP Pool for ext-mgmt (KVM access) (34 seconds, 12 steps), a MAC address pool for it to pull from when creating vNICs (10 seconds, 6 steps), WWNN and WWPN pools for it to pull from when creating VHBAs (23 seconds, 12 steps), and UUID Suffix Pool blocks for assigning to blades (9 seconds, 6 steps). Without creating these pools assigning a server profile to a blade will fail. This adds extra steps that are not necessary in HP OneView, however, the steps are not too time consuming. The real issue that can occur with these steps is the learning curve. A novice user will not be able to determine what is needed to get the system running, but will instead keep trying to assign profiles to blades and getting errors until he figures out which pool type has not yet been allocated. While the additional pool setup steps only add 36 steps and 1:16 to our setup in this example, a real first deployment may add many more steps and time for learning which pools need to be setup in order for service profile assignment to work. This learning would occur either by trial and error or by reading through the **copious UCS literature. The Cisco UCS Manager GUI Configuration Guide, Release 2.0 is a 764 page document and the newer versions are larger The Cisco UCS Manager CLI Command Reference, Release 2.0 is 1798 pages, and the newer versions are larger.** By comparison, the HP OneView Deployment and Management Guide is a 111 page document which describes the correct order for the steps that should be taken (there is a first time setup section in the document).

Also of note is the fact that the UCS defaults to end host mode. To change it to switch mode requires another reboot of the FIs.

Change to Fabric Interconnect to FC Switch Mode

Additional time is required to change the Fabric Interconnect to FC switch mode after deploying the first chassis.

Step	For Step		For Entire Process	
	# of Steps	Time	# of Steps	Total Time
Change to FC switch mode	3	0:10	3	0:10
Wait for reboot (monitor cluster IP)	3	6:52	6	7:02
Re-Login twice (After initial login get booted and login again)	7	1:13	13	8:15

It should be noted that the same thing would have to be done yet again to change the UCS Ethernet from end-host mode to switching mode. While it is unlikely that the user would need these in switch mode, the problem is there.

If the user needed Ethernet and FC in switching mode after initial deployment, this would add 16:30 and 26 steps onto the initial deployment time with Cisco UCS Manager.

It should be noted that for initial deployment, a serial connection to both Fabric Interconnects is required. Historically a laptop with serial port would be connected to the system and a terminal program run, however, most laptops no longer come with a serial port. A serial to USB device and/or MOXA Nport would have to be obtained and configured prior to starting UCS initial setup. Documentation would have to be consulted for baud rate, etc. On the other hand, HP has the Insight Display on the front of the chassis, where push-buttons can be used to give the system an initial IP address and make other configuration changes without using any serial connections, without needing a laptop or needing to exit the lab to access a desktop connecting to a MOXA.

UCS also has extra setup steps where the connection is identified as Untrusted for each FI and then again for the cluster IP address, for a total of three exceptions that have to be added. For HP OneView, only one exception would have to be added for the untrusted connection. In addition, if the UCS Fabric Interconnects are running an older firmware, newer browsers may not compatible with UCS and may require changes to the Java environment.

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Java Runtime Environment (JRE) Requirements and Java Security Issues

UCS Manager requires Java JRE 1.6 or higher. **Many users are choosing not to run Java due to security concerns and may not want to run Java on some systems.** They will not feel any better when Java states that the web site certificate cannot be verified and then Java refuses to launch the application the first try. **The newest Java update (used for this test) warns that due to security concerns, future versions of Java will not allow the user to open UCS. Soon the newest Java update will permanently break UCS**.

The Cisco UCS release notes provide a work-around for the Java-related security issues that involve lowering Java security settings or adding the Cisco UCS Manager host IP address to the Java exception site list.

Other Setup Issues

Also of note in UCS is the GUI FI setup screen. The textboxes are crudely done. For example, the user cannot click in the IP address text box and then enter the IP using the decimal key. Instead he must click or tab between boxes. The cursor does not automatically forward to the next textbox unless a full 3 digit number is entered in the previous box.

UCS does not have the equivalent of the "create+" button. Upon creating an object, one must click again on the button to open subsequent creation boxes. However, it does have the ability that, once all the data is entered, the OK button is selected and pressing enter on the keyboard will press enter without the user having to move the mouse over. This is a step and time saver, as again steps requiring data to be entered in a textbox and then the Enter key pressed to close the creation box were counted as just one step.
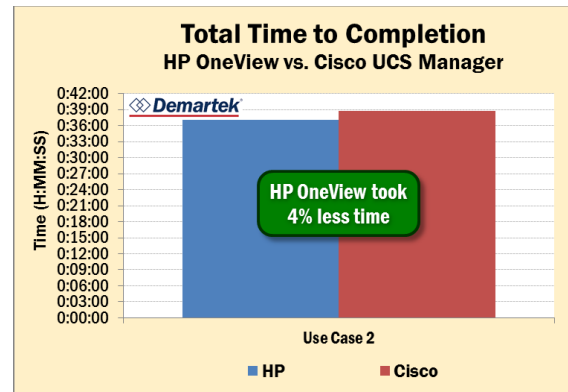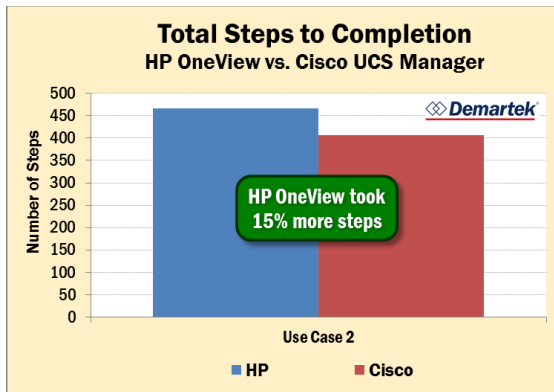
Another eccentricity is that for VSANs a separate FCoE VLAN ID must be created in addition to the VSAN ID. This adds extra steps. Also Cisco limits names to 16 characters, limiting the self-documentation available in names, and then requires the user to remember these names and input them in various sections without having a dropdown list of names to choose from (For example the boot policy needs a vHBA to use to connect to the SAN. After naming the vHBA, the user must remember to name an HBA in the Service Profile Template to match. There is no dropdown menu of vHBAs to choose from unless a vHIC Template is used. One typo on the name and your blade server will not boot.) Also the screen where VLANs are selected for each vNIC only displays 4 VLANs at one time. The rest you will have to scroll to. Subsequent vNICs that

are created do not remember where you had scrolled to in the list when creating the previous vNIC, but put you back at the beginning of the list of vLANS forcing the user to scroll to the appropriate one each time.

Cisco does automatically generate Service Profiles from template, each with an incrementing number, however, when the Service Profiles are displayed, they will display out of order because no leading zeroes are added to the numbers with fewer digits. For example, the order will go Profile1, Profile 10, Profile 100… Profile 2, Profile 20… This will make it harder to find the servers the user is looking for, or require the user to rename service profiles after they have been automatically generated. HP OneView requires the user to enter each Server Profile name, but that kind of control allows the user to name the profile once and for all with leading zeroes so that profiles will be displayed in the correct order: Profile001, Profile002…Profile100, Profile 101…

The Configure Unified Ports Action is counterintuitive. This action is used to configure uplink ports for FC. However, it is not found by clicking on the port in question. Instead the Fabric Interconnect must be clicked on. A picture is displayed with the fixed or expansion module ports highlighted the appropriate colors, but clicking on the other module (if required) or clicking on a port that the user wants to change to FC does not open up any dialogue box. Instead the user must click on a button at the bottom of the screen to toggle between modules, and must find a scrollbar underneath the pictured module (easily mistaken as a line or other part of the formatting), and move the scrollbar to change where the divide between Ethernet ports and FC ports is on that module. In addition, simply configuring ports for FC causes the FI to have to completely reboot, potentially disrupting traffic. Even more confusing is the fact that the FI's can be accessed while rebooting. The user will see during reboot that the FC ports they configured are not showing up, and does not necessarily know that the reboot has not yet completed until he notices the new FC ports appearing and a few minutes later, coming online.

Use Case 2: Deployment of 32 Servers

Total Steps to Completion
HP OneView vs. Cisco UCS Manager

Number of Steps

HP OneView took
15% more steps

Use Case 2

■ HP ■ Cisco

Total Time to Completion
HP OneView vs. Cisco UCS Manager

Time (H:MM:SS)

HP OneView took
4% less time

Use Case 2

■ HP ■ Cisco

Each chassis was removed from its management program, reset to factory defaults (as needed) and then redeployed. We are assuming that the subsequent chassis could be turned on at the same time as the first chassis, so we are not counting the time to boot as the boot would have completed before we got to the chassis. Networks and Services that were already configured in the management program were left in place and the chassis was re-added and blades were re-discovered and associated with service profiles.

HP OneView

The enclosure was removed from HP OneView and reset to factory defaults (The chassis does have configuration details in the VC Domain that needed to be cleared out). The system was then set up using the Insight Display and First Time Setup Wizard. A script was created during the first setup, which was used by the First Time Setup Wizard during the second chassis deployment to speed deployment. However, the IP addressing, etc., had to be changed after the script was run so that the IPs were not identical to the first chassis. This approach only works in our example as the first enclosure that would be using the same IP addresses is nonexistent. It would be more pragmatic to edit the script before deploying it to the chassis. The script is a text file, but the formatting is not very user friendly and most likely the search and replace function would have to be used to find the appropriate IPs to edit.

Step	For Step		For Entire Process	
	# of Steps	Time	# of Steps	Total Time
Initial configuration using Insight Display	20	1:44	20	1:44
Use FTSW to run setup script	8	1:23	28	3:07
Login to HP OneView while waiting for FTSW script	8	2:21	36	5:28
Tweak the results of the FTSW script to get new IPs, etc.	22	1:20	58	6:48
Add enclosure, create server profiles (we have to wait for the servers to be added this time, although we don't have to wait for the whole enclosure to be added. Waiting to start server profiles took about 3 minutes), and power on servers	36	6:48	94	13:36

HP OneView took 13:36 with 94 steps to deploy the second chassis containing 2 servers. As before, the 2 servers had to be turned off from the OA before their profiles could be applied. The process is short, due to the aforementioned "Create+" feature, 3 steps per server in the OA, and took 16 seconds for 2 servers. If we were doing this for the entire chassis, we would have to do this 14 more times. At 8 seconds and 3 steps per server, this would take 112 more seconds and 42 more steps for an entire chassis of 16 servers. We cannot include this time in the HP OneView setup because HP OneView is already setup and running, so we have to add this on to the total deployment time. Therefore the estimated time to deploy a full second chassis of 16 servers would be 15:28 and 136

steps. This deployment process for the second chassis would be added to the first chassis to arrive at the total, shown in the table below.

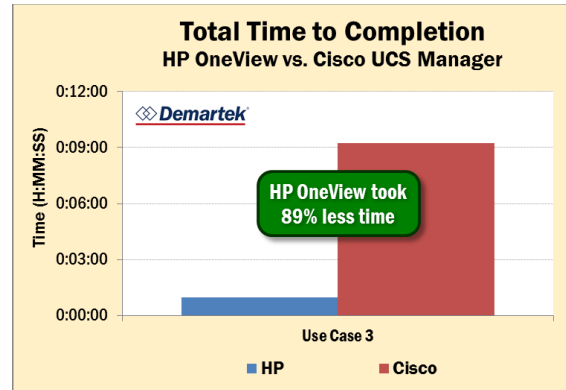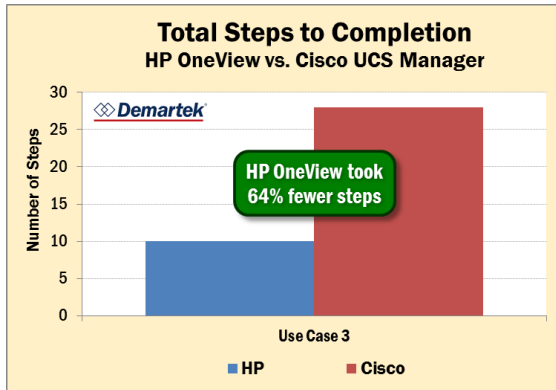| Summary	For Entire Process	
	# of Steps	Total Time
Deploy 32 HP blade servers using HP OneView	467	37:08

Cisco UCS Manager

The procedure to add multiple chassis to the Cisco UCS environment follows the same procedure as described in the previous section. In order to deploy 32 Cisco UCS servers, a total of four chassis would need to be configured and deployed. Based on our observations of the previous deployments, we can calculate the totals for repeating the second UCS chassis deployment for two additional chassis. There are 20 steps and an incremental amount of time for each additional UCS chassis added to the environment.

Step	For Entire Process	
	# of Steps	Total Time
Totals for first UCS chassis deployment (first 8 servers)	347	24:49
Adding second UCS chassis (8 additional servers)	20	11:22
Adding second and third UCS chassis (16 additional servers)	40	12:39
Adding second, third and fourth UCS chassis (24 additional servers)	60	13:56

Summary	For Entire Process	
	# of Steps	Total Time
Deploy 32 Cisco blade servers using Cisco UCS Manager	407	38:45

It is worth noting here that the additional Cisco blade chassis, 6U, has only 8 blades in it. The Fabric Interconnects used to deploy the first chassis would be connected to the second chassis as well, no new Fabric Interconnects would be deployed. So at the end of deploying the second, third and fourth chassis, we have 2 fabric interconnects and 4 chassis containing a total of 32 blades.

Use Case 3: Error tracking

Total Steps to Completion
HP OneView vs. Cisco UCS Manager
HP OneView took 64% fewer steps

Total Time to Completion
HP OneView vs. Cisco UCS Manager
HP OneView took 89% less time

Two downlink server connections were manually disabled using the HP OneView or UCS software prior to the beginning of these use cases. These use cases start with a fresh login to check on the chassis, and are followed by an attempt to ascertain the next appropriate step based on the errors and suggestions given by the software.

HP OneView

In HP OneView it was 10 steps and 59 seconds to identify and resolve the error. In HP OneView the error is displayed on the dashboard when the user logs in, and can be accessed by clicking on the link on the dashboard. The error text clearly states that it is a networking error "The overall status of the system network is critical." The Resolution recommendation text of the error advises the user to check the iLO Integrated Management Log (IML) for additional details, while the Overview screen for the server hardware in question has already been brought up for the user with the appropriate iLO link ready. iLO tells us that a link is down (Slot 0, Port 0). The user then returns to HP OneView and checks the logical interconnects. The user finds another error message "Connection status on interconnect "OA-10604BA3942D, interconnect 1, downlink port 1 subport "a" (MAC Address=3A:DC:35:30:00:10 has changed to failed." A quick look at the port in question shows that it is disabled. The user re-enables the port, and checks for other downlink ports with problems, finding the same problem on Interconnect 2, port 2. The user re-enables this as port as well. The user returns to the dashboard and finds the original network error and returns to the appropriate iLO IML to find the Network Adapter Link is listed as being repaired. The user then clears the error messages in HP OneView and has a Dashboard with no errors displayed.

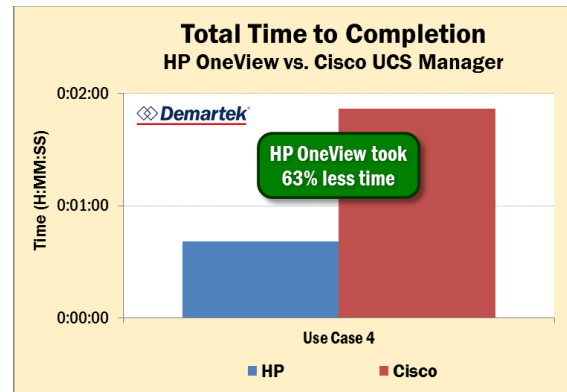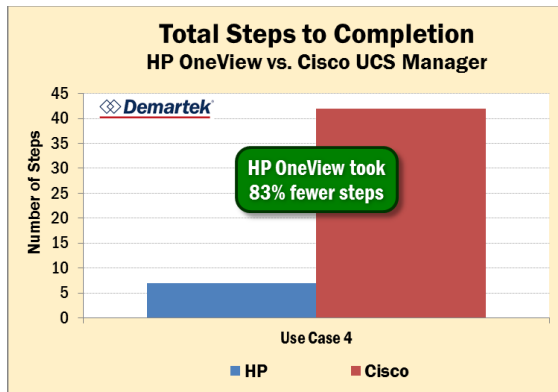| Step	For Step		For Entire Process	
	# of Steps	Time	# of Steps	Total Time
Login	1	0:06	1	0:06
Find error	1	0:05	2	0:11
Get more details	3	0:14	5	0:25
Resolve error	5	0:34	10	0:59

Cisco UCS Manager

In UCS, it was 28 steps and 9:13 minutes to identify and resolve the error. Upon login the user finds 1 critical error and 49 major errors. The user clicks on the critical error first, which states that the left IOM 1/1 (b) is inaccessible. The user clicks on the provided link to find out more, which tells the user that IOM is "IO Module," also known as a fabric extender, which is part of the Chassis. The user checks the Chassis and finds a major error "Adapter uplink interface 1/1/1/1 link state: down. Please verify connectivity to Fabric Interconnect. Acknowledging chassis might be required." The user attempts to resolve the error by re-acknowledging the Chassis, as suggested. The user waits while the re-acknowledgement happens, and in the meantime checks UCSFaultsErrorsRef.pdf online to find the error code. The page tells the user to wait a few minutes to see if the fault clears. **This kind of error is common in UCS**. **Often critical errors will appear simply because the UCS is configuring something and will self-clear after some time.** Should the user try to intervene too early, they may create problems with their troubleshooting. In addition, if the user wants to see if an error is resolved by their intervention, the user may have to wait a significant amount of time to make sure the error(s) are or are not resolved before moving on to the next potential solution. This can add a lot of time to resolving errors in UCS. In this example, **the user is misled**: the error clears while the chassis is being re-acknowledged, letting the user believe that the issue is resolved, only to re-appear later as the chassis gets further along in the acknowledgement process. The user, initially thinking the fault has cleared, then attempts to tackle the 49 other major errors. The user checks the server error 209 adapter uplink interface error. He checks the uplink for blade 1 (assuming that one of the 1's in 1/1/1/1 refers to the bay of the server containing the interface. Had the interface had any different numbers, the user would have to refer to documentation to figure out which bay and interface the error was really on. This brings up the fact that **the naming convention is unfriendly**. Cisco would do better to label as such: chassis 1, bay 1, interface 1, port 1.) Cisco also does not provide a link to the server profile. The user has to find the appropriate server profile for bay 1, and then clicks the network tab. He returns to the chassis later to find that the critical error has returned while he was attempting to resolve the network interface problem. Wanting to see why this error has returned, the user re-acknowledges the chassis again and immediately goes to the FSM tab to see what causes the critical error during chassis acknowledgement. The FSM tab lists out step by step what is happening. Bored, the user happens to click on the Fabric Interconnects and notices that some server ports are down. The user re-enables the server ports and then waits to see if this remedy fixes the problem and clears the other errors, which it ultimately does.

Error resolution in UCS is problematic for many reasons. **The UCS error texts lead the user in the wrong direction**. The labels (1/1/1/1) are not helpful for discovering which bay/etc. contains the error, and require the user to look up documentation to find out what it means. Perhaps a locator LED would be helpful? **The Cisco documentation advises the user in many cases, including this one, to just wait and see if the error clears, adding a lot of idle time to the troubleshooting process.** In addition, the wait is so long that the user may not know if the error is chronic or if he should just wait longer for resolution or to see if the error returns before moving on. Failure to wait long enough will put the user in a tight spot of wondering – did something I do cause the error to come back, or would it have come back on its own? Ultimately the user may have to undo what he just did (if he can remember) and then wait again to see if the error disappears, so that he may know if he caused the error in question. **The problems with errors taking so long to appear or resolve can continue for some time. In addition, the UCS has different error classifications, such as flapping, etc., which require the user to look up the terms in order to understand.**

Step	For Step		For Entire Process	
	# of Steps	Time	# of Steps	Total Time
Login	1	0:21	1	0:21
Find error	2	0:08	3	0:29
Get more details	7	0:49	10	1:18
Resolve error	18	7:55	28	9:13

Demartek®

Use Case 4: Track MAC Address

Total Steps to Completion
HP OneView vs. Cisco UCS Manager

Demartek

HP OneView took
83% fewer steps

Number of Steps

45
40
35
30
25
20
15
10
5
0

Use Case 4

■ HP ■ Cisco

Total Time to Completion
HP OneView vs. Cisco UCS Manager

Demartek

HP OneView took
63% less time

Time (H:MM:SS)

0:02:00

0:01:00

0:00:00

Use Case 4

■ HP ■ Cisco

Each system was set up with 640 server profiles, each profile containing four Ethernet ports and four Fiber Channel ports. The system assigns MAC addresses as needed for each interface. In the case of the Cisco UCS, MAC addresses are assigned to each Ethernet port from the user-supplied MAC address pools. The HP OneView system does not require the user to create a pool of MAC addresses. In the case of HP OneView, MAC addresses are assigned to each Ethernet port as well as each Fibre Channel (FCoE) port. In the case of Cisco UCS, MAC addresses are only assigned to vNIC and not FCoE ports, yielding half as many MAC addresses.

Note: HP Virtual Connect automatically assigns two MAC addresses to each VC-Enet connection in the server profile, a primary address for the Ethernet NIC, and a secondary MAC address for use by the multi-function gigabit server adapters. Only the primary MAC address is used by standard (not multi-function) Ethernet devices.

HP OneView

The time to open a KVM for the owner of the MAC address in question was 41 seconds, 7 steps. The search process entailed clicking on search and typing in the MAC address in question. The server profile that uses the MAC address in question is displayed and it's just a case of scrolling to find the appropriate connection from that profile's list of connections to verify. After this the hardware can be brought up and a KVM session opened.

| Step	For Step		For Entire Process	
	# of Steps	Time	# of Steps	Total Time
Login	1	0:06	1	0:06
Search for MAC address	4	0:21	5	0:27
Open KVM	2	0:14	7	0:41

Cisco UCS Manager

The time to open a KVM for the owner of the MAC address in question was 1:52 minutes, 42 steps. The search for the MAC address contained two parts. First the user clicks on the LAN tab to try to find a place to search for the MAC address. In our example this took 6 seconds, but depending on how long one searches for this function this could take longer. After giving up, as UCS does not offer this feature, the user clicks on the MAC Pools. The user clicks on the + to expand all the MAC pools, so the Blocks of MAC addresses in each MAC pool is displayed. There are 11 MAC pools (1 Default Pool and 10 User Defined Pools) used in this example. UCS does not list them in order. When the MAC pools are expanded so their ranges of MAC addresses are listed, all MAC pools fit on the screen. It took the user 23 seconds to find the necessary MAC address range listed in the 10th MAC pool displayed. The user then clicked on the MAC Pool and then clicked on the MAC Address tab to list the MAC addresses in the MAC pool. The MAC pool in question contained 350 MAC addresses. It took the user 19 seconds to find the correct MAC address in the MAC pool. The MAC address table has a column called "Assigned To." Clicking on the "Assigned To" link does not bring up the Service Profile corresponding to this MAC address. Instead it brings up the actual interface with no link back to the containing Service Profile. However, the user can see from the format of the link "org-root/ls-ESXi_Profile_320/ether-2-fabric-B" that the interface belongs to ESXi_Profile_320. The user can then click on the Servers tab and scroll to Profile_320 in order to then bring up a KVM for the server in question.

Step	For Step		For Entire Process	
	# of Steps	Time	# of Steps	Total Time
Login	3	0:21	3	0:21
Search for MAC address	38	1:15	41	1:36
Open KVM	1	0:16	42	1:52

The ease with which one can find a MAC address in the UCS system is directly dependent on how much forethought was put into the setup by the user who initially created the MAC address pools. If certain pools of addresses are allocated to specific networks or server types in an orderly fashion, search time could be decreased. If, however, the user creates many small pools randomly, or if the user creates one big pool of MAC addresses, there would be a lot more scrolling – either while searching for the

correct MAC pool or searching for the correct address within a pool. Ultimately, though, there is the addition of user effort and possibility of user error introduced that is not present as much in the HP search solution. The only user error in the HP search function is where the user types in the MAC address. However in the Cisco solution the user must constantly check a range of MAC addresses or list of MAC addresses against the MAC address in question. The user could easily accidentally skip over the MAC address in question, searching through the entire range of addresses without finding it, and have to start over or incorrectly conclude that the address in question is not part of the UCS system.

Use Case 5: Network Retirement
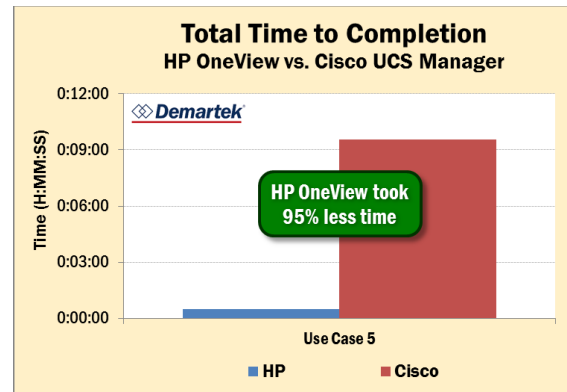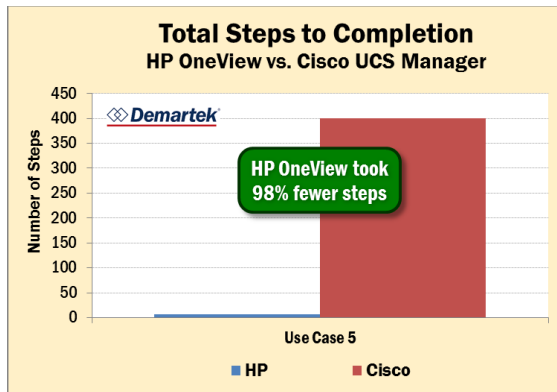
Network retirement would be a common request in cloud infrastructure environments. In this case, users are assigned infrastructure resources and then these resources are reassigned when the service is complete. A related use case is in a development environment where once again resources are provisioned, de-commissioned and redeployed on a daily basis. This ability supports the Infrastructure as a Service and business agility needs for today and in the future.

Prior to the test, each system was setup with 60 server profiles and 4 different networks.

HP OneView

To find and record which server profiles use Network_Test_C to find out the impact of retiring that network, starting from launching HP OneView in the browser was 30 seconds, 7 steps. The majority of the time was due to copying down the profiles affected. Finding the information was only 4 steps and 9 seconds from login. The steps entailed logging in, going to Networks, clicking on the Network in question, and then clicking on the link that says it is used by "30 Server Profiles." The profiles are then listed on the left hand side of the HP OneView Screen, filtered to show only those who use Network_Test_C.

Step	For Step		For Entire Process	
	# of Steps	Time	# of Steps	Total Time
Login	1	0:04	1	0:04
Select appropriate network	2	0:03	3	0:07
Find Server Profiles from network	1	0:02	4	0:09
Copy down profiles	3	0:21	7	0:30

Prevention of Accidental Deletion

As the number of servers grow in a production environment, it is important to ensure that changes are made carefully so that outages can be minimized. When deleting a network or VLAN, HP OneView identifies how many server profiles might be affected by a change in the specified network. HP OneView asks for confirmation from the administrator if the specified network is in use by any server profiles before proceeding with the deletion of the network.

The following HP blog provides an example of this feature of HP OneView:
http://h30507.www3.hp.com/t5/Converged-Infrastructure/Tips-to-manage-your-converged-infrastructure-with-confidence/ba-p/149197#.U7FxvNFOWUl

Cisco UCS Manager

To find and record which server profiles use Network_Test_C to find out the impact of retiring that network, starting from launching UCS in the browser was 9:32 minutes, 400 steps. The steps entailed logging into UCS and then going to the LAN tab to select the Network in question, then tabbing through the properties of the network and not finding a list of Service Profiles that the network applies to. The user then goes to the servers tab and expands every service profile to see what networks it uses.

Step	For Step		For Entire Process	
	# of Steps	Time	# of Steps	Total Time
Login	3	0:25	3	0:25
Select appropriate network	3	0:14	6	0:39
Try to find server profiles from network	12	0:28	18	1:07
Use server profiles to find each profile using Network_Test_C and copy it down	382	8:25	400	9:32

No Prevention of Accidental Deletion

Unlike HP OneView, Cisco UCS Manager does not provide any protection from accidental deletion of networks. Cisco does provide the following warning on page 15 of the *Cisco UCS Manager Configuration Common Practices and Quick-Start Guide*:

> "Updating templates should be used with great awareness and caution. Updating templates can save considerable time during a scheduled maintenance window. However, they could also have **unfortunate results** if configuration changes are made at scale during normal operations."

In May 2014, a cloud provider in the USA suffered a major outage due to an operator error that resulted in the simultaneous reboot of all the compute nodes in one of their datacenters. Although the specific cause of this failure was not published, it would make sense for management software to provide safeguards to confirm changes that have the potential to disrupt many systems, rather than depending on administrators to read and understand warnings posted in the product documentation.

Conclusion

For long term use, HP expects that HP OneView will be the better value, as it has streamlined a lot of maintenance tasks, such as the use cases studied here. HP stated its intent for HP OneView to not only manage its family of blade servers, rack and tower servers, but other products such as HP storage products. The recent release of HP OneView v1.10 supports that direction with additional support for HP ProLiant rack and tower servers, and 3PAR Storage arrays.

HP OneView was designed with daily operational tasks in mind, as this is where administrators spend most of their time. HP OneView is a solid tool for managing the HP BladeSystem environment today, and is expected to mature and expand in scope.

The most current version of this report is available at
http://www.demartek.com/Demartek_HP_OneView_Evaluation_2014-07.html on the Demartek website.

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