DEPLOY SERVICES FASTER WITH DELL ACTIVE SYSTEM MANAGER

MORE EFFICIENT SERVICE DEPLOYMENTS

with Dell™ Active System Manager*

96% less admin time

94% fewer steps

*versus Lenovo® XClarity Pro

Deploying IT services with an inefficient management solution can be a tedious process. Repeating the same set of steps multiple times to deploy services or navigate several different interfaces demands your system administrator's time and attention to avoid making costly mistakes. This detracts from time your admin could spend streamlining IT processes and providing support for your staff—but it doesn't have to be this way. By selecting an efficient automated system manager like Dell Active System Manager (ASM), your administrator can eliminate unnecessary time spent completing repetitive tasks and address more pressing matters within your organization.

In the Principled Technologies datacenter, we found that using Dell Active System Manager required less administrative time and fewer steps to deploy services such as VMware® clusters when compared to a similar Lenovo management solution.

Dell ASM let us deploy a new VMware vSphere® service in just eight steps. Deploying the equivalent service with XClarity Administrator involved significantly more manual steps, requiring an additional 133 steps through multiple interfaces to complete an equivalent deployment. Dell ASM makes the routine and complex deployment tasks we tested easier, allowing administrators to provision and deploy servers and blades with less effort and time compared to Lenovo XClarity Administrator.

OCTOBER 2015

A PRINCIPLED TECHNOLOGIES TEST REPORT

Commissioned by Dell Inc.

DELL ACTIVE SYSTEM MANAGER

An automated services deployment solution

Dell ASM is designed to offer comprehensive IT services deployment, management, and automation within a single, unified environment.

Dell ASM provides a single interface for managing your physical and virtual infrastructure throughout its lifecycle, which can cut down on administrator time wasted on learning, managing, and navigating through different consoles during the deployment as well as lifecycle management. Dell ASM aims to give customers flexibility and choice in how they manage their IT resources:

- Published REST APIs allow applications and scripts to directly interface with ASM's key features and functionality.
- ASM supports Microsoft® Hyper-V® and VMware vSphere, enabling end-to-end automation of tasks extended through to the virtualization layer.

To learn more about Dell ASM, visit www.dell.com/asm.

A simplified experience

How much time can be saved by deploying a service in ASM versus a competitor, start to finish? And what can this mean for your business? As virtualized environments grow, deploying and managing sprawling infrastructure has become a challenge for IT administrators. These administrators find themselves striving for solutions that will help them save time and automate tasks. Principled Technologies set out to measure the administrator time and steps that could be saved by using Dell ASM and templates to deploy a VMware vSphere cluster versus another solution, Lenovo XClarity Administrator.

LESS TIME, FEWER STEPS, MORE INTUITIVE INTERFACE

Dell Active System Manager offered key features that made service deployment a much simpler process than Lenovo XClarity Administrator. For time and steps comparisons, we only measured the time and steps a technician spent *actively* working on a task.

Single pane of glass for management

Deploying new IT services can be a drain on your system administrators' time. It requires being familiar with multiple tools, and remembering when to switch between them. Dell ASM simplified the process to deploy a VMware vSphere cluster by allowing it to all be done directly from its own user interface. Lenovo XClarity Administrator required opening two additional management interfaces—VMware vCenter™ and Storwize® V7000 console—to finish the same service deployment while also requiring additional manual tasks.

A “one and done” approach to deployment

Automation can save significant administrator time in the datacenter by reducing the number of tedious, repetitive tasks required to complete a service deployment such as a vSphere cluster deployment. Dell ASM comes with built-in templates you can use to customize a service to meet your specific needs. While Dell ASM required administrator time and effort to configure the initial deployment templates, administrators can later use these templates repeatedly to deploy services with only a few steps. This ensures a consistent deployment process over time. XClarity Administrator lacks this template feature, which means you will have to repeat the deployment process from square one for each deployment, which can also increase your risk for variation and human error. With Dell ASM, once the template is created, you significantly reduce the amount of duplicate steps required to deploy services within your infrastructure.

In our representative service deployment, we used Dell ASM to create a ready-to-host VMware vSphere High Availability, Distributed Resource Scheduler (HA/DRS) cluster (see Appendix A for hardware details) by using the template editor. This tool in Dell ASM can simplify the individual configuration of both virtual and physical components. As Figure 1 shows, the vSphere cluster is represented along with physical server and storage resources. Administrators can publish and deploy templates as services, and add storage, servers, clusters, VMs, and applications through this single interface, with additional configuration options made available by clicking on each resource.

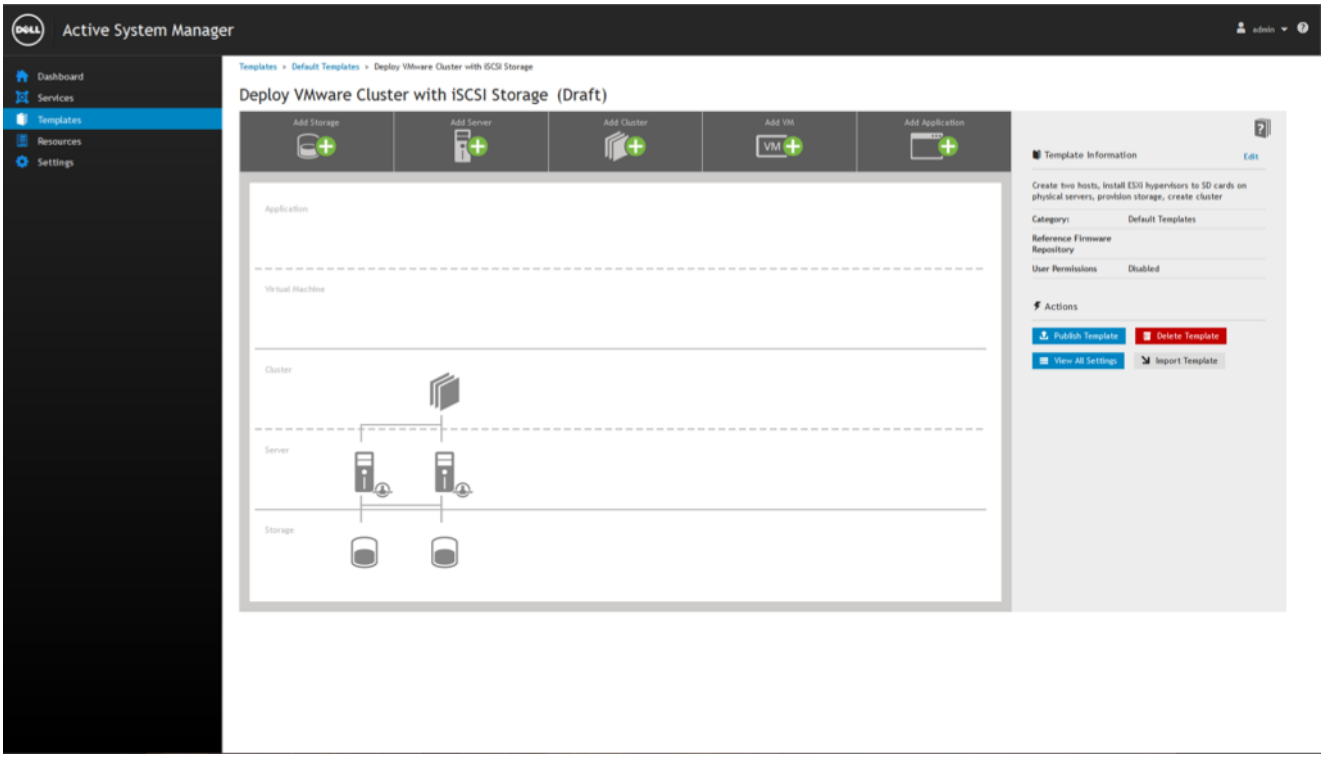

Figure 1: Creating and editing a service template with the template editor in Dell ASM.

Save administrator time and steps

After creating a template for our own environment, it took only eight steps and 22 seconds of administrator time to deploy the cluster on our chassis. Dell ASM automatically designated networking resources, including management and OS IP addresses, and installed the hypervisor OS (ESXi™ 5.5) without any additional administrative time or steps. By comparison, Lenovo XClarity Administrator required significantly more steps and time to complete the same tasks since it lacked the templating features of Dell ASM.

Figure 2 shows the number of steps to deploy the same service on both solutions. An administrator using Dell ASM was able to deploy the VMware HA/DRS cluster with 94.33 percent fewer steps than an administrator using XClarity Administrator.

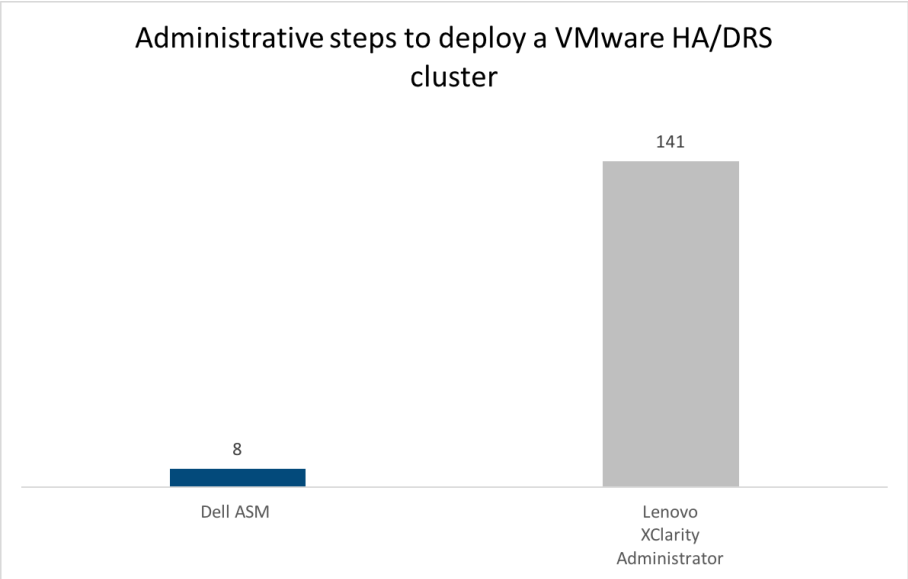

Figure 2: Dell ASM cut the number of steps to deliver a VMware vSphere service by 133 steps – 94.33 percent fewer steps – compared to the XClarity Administrator solution.

Figure 4 shows the difference in administrator time required to deploy a VMware vSphere HA/DRS cluster from each solution. An administrator using Dell ASM deployed a VMware HA/DRS cluster in 96.98 percent less time than it took to perform the same task with Lenovo XClarity Administrator.

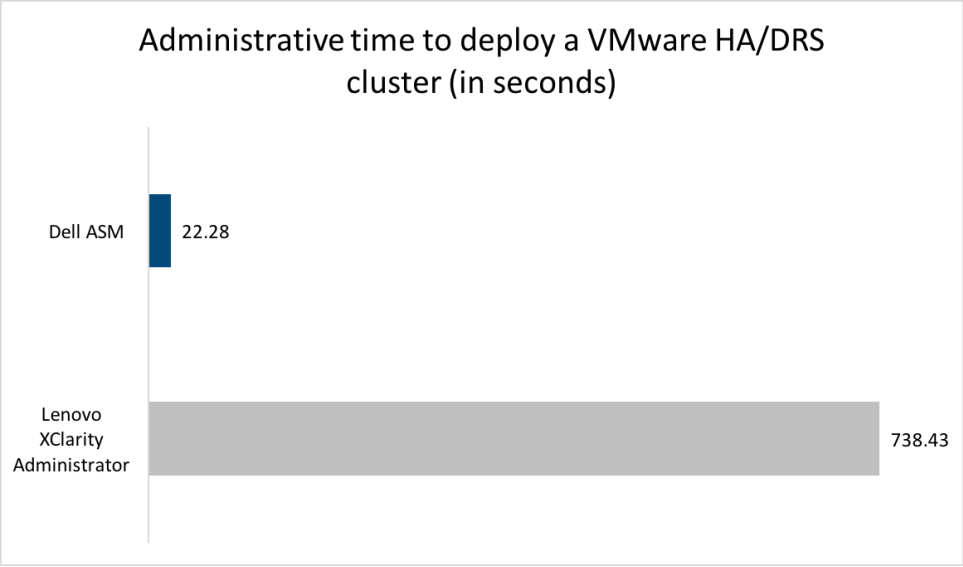

Figure 3: An administrator using Dell ASM took 96.98 percent less time deploying a VMware vSphere cluster compared to using XClarity Administrator.

It is also worth noting that in our tests, these time and steps savings are for a single deployment. In an environment where the same services must be deployed multiple times, you could expect the time and steps savings to multiply accordingly. With Dell ASM, deploying a VMware HA/DRS cluster can be done in the same 8 steps and 22 seconds of administrator time once the template is created. By contrast, the

process must be done manually from scratch on Lenovo XClarity Administrator regardless of how many times the same process must be repeated.

CONCLUSION

With new automation tools, tying up your administrator's time with repetitive processes can become a thing of the past. Our tests showed how Dell ASM, with the ability to build deployment templates, can save significant administrator time and steps compared to a solution that lacks these features. In an age where business IT demands grow rapidly, providing administrators with the right tools to manage their virtualized infrastructure is critical for keeping your datacenter running efficiently.

APPENDIX A – SYSTEM CONFIGURATION INFORMATION

Figures 4 and 5 provide detailed configuration information for the hardware we used in our tests.

System	Dell PowerEdge™ M1000e blade enclosure
Power supplies	
Number of power supplies	6
Vendor and model number	Dell E2700P-00
Wattage of each (W)	2,700
Cooling fans	
Total number of fan modules	9
Vendor and model number	Dell X46YM Rev. A00
Volts	12
Amps	5
Midplane	
Chassis midplane	1.1
Chassis firmware	
Chassis Management Controller firmware	4.31
iKVM firmware and hardware	01.00.01.01 A03
IOM firmware	11
IOM software	8.3.17.2
I/O modules	
Switch	Dell Networking MXL 10/40GbE
Occupied bay	A1, A2
Management modules	
Chassis Management Controller slot 1	Chassis Management Controller hardware
iKVM slot	Avocent® iKVM Switch (0K036D)
Chassis Management Controller slot 2	Chassis Management Controller hardware

Figure 4: Configuration information for the Dell blade server chassis.

System	Dell PowerEdge M620 blade server
Enclosure	
Blade enclosure	Dell PowerEdge M1000e
General	
Number of processor packages	2
Number of cores per processor	6
Number of hardware threads per core	2
System power management policy	Default
CPU	
Vendor	Intel®
Name	Xeon®
Model number	E5-2640
Stepping	C2
Socket type	FCLGA2011
Core frequency (GHz)	2.5
Bus frequency (GHz)	3.6
L1 cache	32KB + 32KB (per core)
L2 cache	256 KB (per core)
L3 cache	15 MB
Platform	
Vendor and model number	Dell PowerEdge M620
Motherboard model number	0VHRN7A03
BIOS version	1.6.0
BIOS settings	Default
Memory module(s)	
Total RAM in system (GB)	32
Vendor and model number	Micron® MT18KSF51272PDZ
Type	PC3L-10600R
Speed (MHz)	1,333
Speed running in the system (MHz)	1,333
Size (GB)	4
Number of RAM module(s)	8
Chip organization	Double-sided
Rank	Dual
RAID controller	
Vendor and model number	Dell PERC S110 Embedded
Firmware version	3.0.0-0139
Cache size (MB)	0
Ethernet adapters	
Vendor and model number	Broadcom® BCM57810 NetXtreme® II 10 GigE
Type	LOM

System	Dell PowerEdge M620 blade server
USB ports	
Number	2 external
Type	2.0
Firmware	
Integrated Dell Remote Access Controller	1.40.40
Broadcom NetXtreme II 10 Gb Ethernet BCM57810	7.4.8
BIOS	1.6.0
Lifecycle Controller, 1.1.5.165, A00	1.1.5.165
Enterprise UEFI Diagnostics	4217A4
OS drivers pack	7.2.1.4 7.2.1.4
System CPLD	1.0.2
PERC H310 Mini	3.0.0-0139

Figure 5: Configuration information for the Dell blade server we used in our tests.

APPENDIX B – HOW WE TESTED

Configuring Dell Active System Manager 8.1

Deploying Dell ASM OVF template

Before testing, extract the Dell ASM .zip file (Dell-ActiveSystemManager-8.1.0-4567_VMware.zip) to a location the VMware vSphere Client can access.

1. From the VMware vSphere Client, click File, and click Deploy OVF Template. The Deploy OVF Template wizard will open.
2. On the Source page, click Browse, select the OVF package, and click Open.
3. To continue, click Next.
4. Click Next.
5. Accept the License Agreement, and click Next.
6. Enter a name (`Active System Manager 8.1`), select the Inventory Location, and click Next.
7. Assuming a resource pool has been configured, select the storage volume to host the appliance virtual machine, and click Next.
8. On the Disk Format page, select Thin Provision, and click Next.
9. Verify the Destination Network for Network 1 is set to the management VLAN (mgmt vlan128), and click Next.
10. To run the deployment job, click Finish.

Configuring Dell ASM VM network adapters

1. Right-click the newly created VM (Active System Manager 8.1) from the host, and click Edit Settings…
2. Select Network adapter 1.
3. Verify the Network label is set to the management network (management vlan128), and click Add…
4. Select Ethernet Adapter, and click Next.
5. Under the Network Connection section, select the PXE network label (PXE vlan1076), and click Next.
6. Click Finish.
7. Click OK.

Defining Dell ASM appliance network

1. In the vSphere Client, right-click the Active System Manager virtual machine, and select Power On.
2. Click the Console tab.
3. When prompted, log in with the default ASM credentials (`delladmin`, `delladmin`).
4. Type `sudo su -` and press Enter.
5. Type the current admin password (`delladmin`), and press Enter.
6. Accept the License Agreement, and click Forward.
7. Click Network Configuration.
8. Select Auto eth0, and click Edit.
9. Change the connection name to `management-0`
10. Select the IPv4 Settings tab.
11. Change Method to Manual.

12. Click Add, and click the text field to enter the IPv4 address, the Netmask, and the Gateway (for our management network, we used `10.128.0.111`, `255.255.0.0`, and `10.128.0.1`).
13. Enter `10.128.0.10` as the DNS Servers.
14. Click Apply…
15. Select Auto eth1, and click Edit.
16. Change the connection name to `PXE-1`
17. Select the IPv4 Settings tab.
18. Change Method to Manual.
19. Click Add and click the text field to enter the IPv4 address, the Netmask, and the Gateway (for our PXE network, we used `192.168.76.1`, `255.255.255.0`, and `0.0.0.0`).
20. Click Apply…
21. Click Close.
22. Click Close again.

Using the Initial Setup Wizard

1. Open a browser on the workstation, and navigate to the ASM appliance IP (`10.128.0.111`).
2. Log in with the default credentials (`admin`, `admin`).
3. At the welcome screen, click Initial Setup.
4. Click Next.
5. Click Choose File, navigate to the license file location, upload the license file, and click Save and Continue.
6. Set the Time Zone ((UT-05:00) Eastern Time (US & Canada)) and Preferred NTP Server, and click Save and Continue.
7. Leave Use a proxy server unchecked, and click Save and Continue.
8. Check Enable DHCP/PXE Server.
9. Enter the Subnet (`192.168.76.0`), the Netmask (`255.255.255.0`), the DHCP Scope Starting IP Address (`192.168.76.100`), the DHCP Scope Ending IP Address (`192.168.76.200`), the Default Gateway (`192.168.76.1`), and click Save and Continue.
10. Review the summary, and click Finish.
11. Click Yes.

Adding network definitions

These steps continue from the Getting Started wizard described above.

1. Select Define Networks.
2. We used six networks in our setup: a hypervisor management network, a hypervisor migration network, a storage network, a PXE network, a data network, and a hardware management network. Click +Define.
3. Name the hypervisor management network (`Hypervisor Management`), and change Network Type to Hypervisor Management.
4. Enter the hypervisor management VLAN ID (`128`), the hypervisor management network Subnet Mask (`255.255.0.0`), the hypervisor management network Gateway (`10.128.0.1`), and the hypervisor management network Primary DNS (`10.128.0.10`).

5. Click Add IP Address Range.
6. Enter the Starting IP Address (10.128.30.1) and the Ending IP Address (10.128.30.254), and click Save.
7. Click +Define.
8. Name the hypervisor migration network (Hypervisor Migration), and change the Network Type to Hypervisor Migration.
9. Enter the hypervisor migration VLAN ID (200), and check the Configure static IP address ranges checkbox.
10. Enter the hypervisor migration network Subnet Mask (255.255.255.0).
11. Click Add IP Address Range.
12. Enter the Starting IP Address (192.168.200.150) and the Ending IP Address (192.168.200.199), and click Save.
13. Click +Define.
14. Name the storage network (Storage) and change the Network Type to SAN (Software iSCSI).
15. Enter the storage VLAN ID (201), and check the Configure static IP address ranges checkbox.
16. Enter the storage network Subnet Mask (255.255.255.0).
17. Click Add IP Address Range.
18. Enter the Starting IP Address (192.168.201.150) and the Ending IP Address (192.168.201.199), and click Save.
19. Click +Define.
20. Name the PXE network (PXE deployment).
21. Change Network Type to PXE.
22. Enter the PXE VLAN ID (1076), and click Save.
23. Click +Define.
24. Name the Data network (Data) and Change the Network Type to Private LAN.
25. Enter the data network VLAN ID (1080), and click Save.
26. Click +Define.
27. Name the hardware management network (Hardware Management), and change the Network Type to Hardware Management.
28. Check the Configure static IP address ranges checkbox.
29. Enter the hardware management network Gateway (10.128.0.1), the hardware management network Subnet Mask (255.255.0.0), and the hardware management network Primary DNS (10.128.0.10).
30. Click Add IP Address Range.
31. Enter the Starting IP Address (10.128.3.1), the Ending IP Address (10.128.3.254), and click Save.
32. Click Close.

Discovering the chassis, blade, storage, and vCenter

These steps continue from the Getting Started wizard described above.

1. Start the timer, and click Discover Resources to launch the discovery wizard.
2. Click Next.
3. Click Add Resource Type.

4. Change Resource Type to Chassis.
5. In the Starting IP Address field, enter the CMC IP address.
6. Change Select Chassis Credential to Dell chassis default, Select Blade Credential to Dell PowerEdge Default, and Select I/O Module Credential to Dell switch default.
7. Click +Add Resource Type.
8. Change Resource Type to Storage.
9. Enter the Group Mgmt IP of the EqualLogic Storage.
10. Next to Select Storage Credential, click + to create credentials.
11. Enter a Credential Name (`EqualLogic Storage`).
12. Enter the storage User Name, the storage Password, confirm the Password, and click Save.
13. Click +Add Resource Type.
14. Change Resource Type to vCenter.
15. Enter the vCenter Host IP.
16. Next to Select vCenter Credential, click + to create credentials.
17. Enter a Credential Name (`vCenter`).
18. Enter the vCenter User Name, the vCenter Password, confirm the Password, and click Save.
19. Click Next.
20. At the Initial Chassis Configuration screen, change the Chassis Credentials to Dell chassis default, the Blade Credentials to Dell PowerEdge Default, the I/O Module Credentials to Dell Switch Default, and click Next.
21. Click Finish.
22. When the warning dialog appears, click Yes.

Configuring resources

These steps continue from the Getting Started wizard described above.

1. Click Configure Resources.
2. Click Next.
3. Verify the Discovered Resources in your environment, and click Next.
4. Leave the Default ASM Minimum Required Firmware Repository selected, and click Next.
5. When the Firmware Compliance check completes, click Next.
6. At the Chassis Configuration screen, leave the default settings, and click Next.
7. If you wish to customize the Chassis Name, CMC DNS Name, System Input Power Cap, or Location Details, check Configure Unique Chassis Settings; otherwise, click Next.
8. If you wish to customize the blade iDRAC DNS names, check Configure Unique Server Settings; otherwise, click Next.
9. If you wish to customize the I/O Module host names, check Configure Unique I/O Module Settings and enter the names; otherwise, click Next.
10. If you wish to customize the I/O Module Uplinks, check Configure Uplinks; otherwise, click Next.
11. Review the Summary, and click Finish.
12. When the warning dialog appears, click Yes.

Creating a template

These steps continue from the Getting Started wizard described above.

1. Start the timer, and click Publish Templates.
2. Click +Create Template.
3. Change Template Type to Clone Existing, and select Deploy VMware Cluster with iSCSI Storage.
4. Enter a Template Name (`Test Cluster HA DRS`).
5. Change Template Category to Create New Category, enter the New Category Name (`Test Deployments`), and click Save.
6. Select the VMware Cluster, and click Edit.
7. Change the Target Virtual Machine Manager to the discovered vCenter Host.
8. Check Cluster HA Enabled and Cluster DRS Enabled, and click Save.
9. Select the first Server, and click Edit.
10. Expand the OS Settings, and change the OS Image to esxi-5.5.
11. Expand the Network Settings, and check the following Networks for each Partition:
    a. Hypervisor Management, PXE
    b. Hypervisor Migration
    c. Storage
    d. Data
12. Click Save.
13. Select the second Server, and click Edit.
14. Expand the OS Settings, and change the OS Image to esxi-5.5.
15. Expand the Network Settings, and check the following Networks for each Partition:
    a. Hypervisor Management, PXE
    b. Hypervisor Migration
    c. Storage
    d. Data
16. Select the first Storage, and click Edit.
17. Change the Target EqualLogic to the discovered EqualLogic, and click Save.
18. Select the second Storage, and click Edit.
19. Change the Target EqualLogic to the discovered EqualLogic, and click Save.
20. Click Publish Template.
21. When the warning dialog appears, click Yes.

Deploying Service from template

1. Click the Services tab.
2. Click Deploy New Service.
3. Change Select Template to the newly created template (`Test Deployment`).
4. Enter a service name (`Test Service 1`).
5. Click Next.

6. Name the first Server's OS Host Name, name Server 2's OS Host Name, and click Next.
7. Click Finish.
8. When the warning dialog appears, click Next.

Configuring XClarity Administrator

Deploying XClarity Administrator OVF

1. From the vSphere Client, click File, and click Deploy OVF Template.
2. When the Deploy OVF Template wizard launches, click Browse. Navigate to the XClarity Administrator OVA location, and click Open.
3. Click Next.
4. Review the OVF Template Details, and click Next.
5. Name the XClarity Administrator VM (`XClarityTest`), select the inventory location, and click Next. If you did not specify a Specific Host, at the next screen, select the Host, and click Next.
6. Select the destination storage for the virtual machine files, and click Next.
7. Select Thin Provision, and click Next.
8. Ensure the Destination Networks for the VM Network is set to the correct VLAN (for our test, we used our management VLAN), and click Next.
9. Review the Ready to Complete summary, check Power on after deployment, and click Finish.

Configuring networking for XClarity Administrator

1. From the vSphere Client, right-click the newly deployed appliance and click Edit Settings.
2. Select Network Adapter 2 and change it to the PXE network connection.
3. Click OK.

Completing initial setup for XClarity Administrator

For the following steps, we assume that the XClarity Administrator VM has been powered on.

1. From the vSphere Client, select the newly deployed appliance (XClarityTeest), and click the Console tab.
2. Record the IP address displayed on the XClarity Administrator console.
3. Using a web browser, navigate to the address of the XClarity Administrator.
4. Click Read and Accept Lenovo XClarity Administrator License Agreement.
5. Accept the license agreement.
6. Click Create User Account.
7. Enter the name for your administrator account and password, and click Create.
8. Click Return to Initial Setup. If you are warned to create a second user, click Skip and Return to Initial Setup.
9. Click Configure Network Access.
10. In Edit Network access, select Eth1 as the interface for operating system image management and deployment.
11. Insert the IP addresses for your Ethernet ports, and click Save.
12. When questioned, click Apply.
13. Click Configure Date and Time Preferences.
14. Select your time zone, enter your preferred NTP server, and click Save.

15. Click Start Managing Systems.
16. Click No, don't include Demo Data.

Discovering hardware in XClarity Administrator

1. Select your blade chassis and click Manage Selected.
2. Enter your user ID and password, and the backup password, then click OK.
3. When the chassis finishes configuring, click OK to close the progress window.

Creating server profiles using XClarity Administrator

1. When prompted, select the Initial Chassis Configuration option.
2. In the Initial Chassis Configuration, click Create and Deploy Configuration Patterns.
3. Click Create a new server pattern from an existing compute node.
4. In the New Server Pattern Wizard, click on the server you wish to draw from.
5. Type the name of your pattern, then click Next.
6. In the Local Storage tab, click Specific storage configuration.
7. Choose the following options:
   - Disk Type: Any type (try HDD first)
   - Raid Level: RAID 1 (Mirroring)
   - Number of drives: 2
8. And click Next.
9. In I/O Adapters, click Next.
10. In Boot, make sure that UEFI First, Then Legacy is checked, then click Next.
11. In Firmware Settings, leave defaults and click Save.

Assigning profiles to servers using XClarity Administrator

1. Select Provisioning → Patterns.
2. Select the server pattern you wish to deploy and click Deploy the selected server pattern.
3. In the Deploy Server Pattern window, check both servers and click Deploy.
4. In the confirmation window, click Deploy.
5. When you are notified that the deployment request was submitted, click Jump to Profiles page.

Updating driver repositories with XClarity Administrator

1. Select Provisioning → Repository.
2. Select Refresh Repository.
3. Check all items and click Download Selected.
4. Select Provisioning → Compliance Policies.
5. Click Create.
6. In Create a New Policy, name your policy, select the systems in your chassis, select the most recent compliance target, and click Create.

Applying driver repositories with XClarity Administrator

1. Select Provisioning → Apply / Activate.
2. Check all of your systems and click Assign Policy.
3. Click the dropdown box and select your new policy, then click OK.
4. Check all of your systems and click Perform Updates.
5. Choose to continue on failure, perform an immediate activation, and click Perform Update.

Deploying OS images with XClarity Administrator

1. Login to Lenovo XClarity Administrator.
2. Select Provisioning → Deploy OS Images.
3. Select Edit under Network Settings for the first server.
4. Fill out the relevant settings and click OK.
5. Select Edit under Network Settings for the second server.
6. Fill out the relevant settings and click OK.
7. Select both servers and click Deploy Images.
8. In Set Credentials, write the password for the root user and click OK.
9. In Deploy OS Images, click Deploy.

Manually creating a VMware vCenter cluster

This methodology uses the VMware vSphere Web Client, and assumes an existing vCenter infrastructure with an already created datacenter object.

1. Navigate to your infrastructure's existing VMware vCenter web client.
2. Provide the necessary login credentials, and click Login.
3. Select Hosts & Clusters.
4. Right-click the datacenter in which you would like to create a cluster, and select New Cluster.
5. Provide the Cluster a useful name.
6. Select the box next to DRS, and select the box next to vSphere HA.
7. Select OK.
8. Right-click the previously created cluster, and select Add Host.
9. Provide the IP address of the previously created vSphere 5.5U2 host. Click Next.
10. Provide the credentials for the ESXi 5.5U2 host, and click Next.
11. Verify the Host summary, and click Next.
12. Assign the correct licensure, and click Next.
13. Leave the default options for lockdown mode, and click Next.
14. Leave all the options for resource pooling at their default, and click Next.
15. Verify all settings, and click Finish.
16. Right-click the previously created cluster, and select Add Host.
17. Provide the IP address of the previously created vSphere 5.5U2 host. Click Next.
18. Provide the credentials for the ESXi 5.5U2 host, and click Next.

19. Verify the Host summary, and click Next.
20. Assign the correct licensure, and click Next.
21. Leave the options for lockdown mode at their default, and click Next.
22. Leave all the options for resource pooling at their default, and click Next.
23. Verify all settings, and click Finish.

Customizing ESXi networking

1. Select Hosts & Clusters.
2. Expand the left pane until you reach your newly added hosts and click on the first host.
3. Click Manage.
4. Click Networking.
5. Click Add Host Networking.
6. As your connection type, select VMkernel Network adapter and click Next.
7. Accept the existing switch and click Next.
8. Type your network label and VLAN ID and click Next.
9. Select Use static IPv4 settings, type your IP address, and click Next.
10. Review your settings and click Finish.
11. Click Add Host Networking.
12. As your connection type, select VMkernel Network adapter and click Next.
13. Accept the existing switch and click Next.
14. Type your network label and VLAN ID, check vMotion traffic, and click Next.
15. Select Use static IPv4 settings, type your IP address, and click Next.
16. Review your settings and click Finish.
17. Click on your second host
18. Click Networking.
19. Click Add Host Networking.
20. As your connection type, select VMkernel Network adapter and click Next.
21. Accept the existing switch and click Next.
22. Type your network label and VLAN ID and click Next.
23. Select Use static IPv4 settings, type your IP address, and click Next.
24. Review your settings and click Finish.
25. Click Add Host Networking.
26. As your connection type, select VMkernel Network adapter and click Next.
27. Accept the existing switch and click Next.
28. Type your network label and VLAN ID, check vMotion traffic, and click Next.
29. Select Use static IPv4 settings, type your IP address, and click Next.
30. Review your settings and click Finish.

Creating the initial iSCSI connections

1. Click on your first host.
2. Click Storage.
3. Click Add new storage adapter → Software iSCSI adapter.
4. When the popup appears, click OK.
5. Click on your new iSCSI Software Adapter.
6. Click Network Port Binding.
7. Click Add network port binding.
8. Check your iSCSI network and click OK.
9. Write down the iSCSI IQN for your first host.
10. Click on your second host.
11. Click Add new storage adapter → Software iSCSI adapter.
12. When the popup appears, click OK.
13. Click on your new iSCSI Software Adapter.
14. Click Network Port Binding.
15. Click Add network port binding.
16. Check your iSCSI network and click OK.
17. Write down the iSCSI IQN for your second host.

Configuring iSCSI storage for the Lenovo servers

1. Login to the IBM® Storwize V7000 disk controller.
2. Click Suggested Tasks → Configure Storage.
3. In Configure Internal Storage, click Select a different configuration.
4. In the configuration, select the following options:
   - Drive Class: (12) 1.09 TiB, Enterprise, 10000 rpm, io_grp0
   - Preset: RAID-10
   - Uncheck Automatically configure spares
   - Optimize for Capacity
   - Number of drives to provision: 12

   Then click Next.
5. Select Create one or more new pools.
6. Type your pool name and click Finish.
7. When the RAID is finished creating, click Close.
8. Click Hosts.
9. Click Create Host.
10. Click iSCSI Host.
11. Fill out the host name, type the IQN of the first host, and click Add Port to List.
12. Click Create Host.
13. When the Create Host task has completed, click Close.
14. Click Create Host.

15. Click iSCSI Host.
16. Fill out the host name, type the IQN of the second host, and click Add Port to List.
17. Click Create Host.
18. When the Create Host task has completed, click Close.
19. Click on Volumes.
20. Click Create Volume.
21. In Create Volume, select Generic, type the size of your volume, and click Create and Map to Host.
22. Click Continue.
23. In Modify Host Mappings, choose your first host.
24. Click Apply.
25. Choose your second host.
26. Click Apply.
27. Accept the warning about multiple hosts.
28. Click Close.

Adding iSCSI storage to the cluster

1. Navigate to your infrastructure's existing VMware vCenter web client.
2. Provide the necessary login credentials, and click Login.
3. Select Hosts & Clusters.
4. Expand the left pane and click on the first host.
5. Click Manage.
6. Click Storage.
7. Click Targets.
8. Click Add.
9. In Add Send Target Server, type the IP address of your iSCSI storage and click OK.
10. Click Rescan Storage.
11. Click OK.
12. Right-click on your host and select Storage → New Datastore.
13. Select VMFS and click Next.
14. Name your datastore, select your iSCSI storage, and click Next.
15. Select VMFS 5 and click Next.
16. In Partition configuration, select your datastore size and click Next.
17. Review your datastore and click Finish.
18. In the left pane, click on the second host.
19. Click on your iSCSI adapter.
20. Click Targets.
21. Click Add.
22. In Add Send Target Server, type the IP address of your iSCSI storage and click OK.
23. Click Rescan Storage.
24. Click OK.

ABOUT PRINCIPLED TECHNOLOGIES

Principled Technologies, Inc.
1007 Slater Road, Suite 300
Durham, NC, 27703
www.principledtechnologies.com

We provide industry-leading technology assessment and fact-based marketing services. We bring to every assignment extensive experience with and expertise in all aspects of technology testing and analysis, from researching new technologies, to developing new methodologies, to testing with existing and new tools.

When the assessment is complete, we know how to present the results to a broad range of target audiences. We provide our clients with the materials they need, from market-focused data to use in their own collateral to custom sales aids, such as test reports, performance assessments, and white papers. Every document reflects the results of our trusted independent analysis.

We provide customized services that focus on our clients' individual requirements. Whether the technology involves hardware, software, Web sites, or services, we offer the experience, expertise, and tools to help our clients assess how it will fare against its competition, its performance, its market readiness, and its quality and reliability.

Our founders, Mark L. Van Name and Bill Catchings, have worked together in technology assessment for over 20 years. As journalists, they published over a thousand articles on a wide array of technology subjects. They created and led the Ziff-Davis Benchmark Operation, which developed such industry-standard benchmarks as Ziff Davis Media's Winstone and WebBench. They founded and led eTesting Labs, and after the acquisition of that company by Lionbridge Technologies were the head and CTO of VeriTest.