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About the VIA User's Guide

The VIA User's Guide provides information about how to install VIA, manage software bundles, and image physical racks.

Intended Audience

This information is intended for anyone who wants to install or upgrade VIA and image physical racks. The information is written for experienced Windows or Linux system administrators who are familiar with virtual machine technology and datacenter operations.

Related Publications

The VMware Cloud Foundation Overview and Bring-Up Guide contains detailed information about the Cloud Foundation product, its components, and the network topology of a Cloud Foundation installation.

The Administering VMware Cloud Foundation provides information about how to manage a VMware Cloud Foundation™ system, including managing the system's physical and logical resources, managing users, configuring and deploying service offerings, and upgrading and monitoring the system.

VMware Technical Publications Glossary

VMware Technical Publications provides a glossary of terms that might be unfamiliar to you. For definitions of terms as they are used in VMware technical documentation, go to http://www.vmware.com/support/pubs.
About VIA

VIA is a virtual appliance used by system integrators or administrators deploying Cloud Foundation to image physical racks. During imaging, VIA pre-configures the Cloud Foundation software stack on the rack.

A physical rack consists of a management switch, two Top of Rack (ToR) switches and 4 to 32 physical servers. If you have multiple physical racks in your datacenter, the second rack must contain two spine switches for inter-rack connectivity.

For imaging the rack, VMware provides the VIA OVF template and the Cloud Foundation software bundle. The software bundle consists of SDDC components - vSphere, NSX, Virtual SAN and management tools vRealize Operations Manager, VMware Horizon with View, vRealize Log Insight, and App Volumes.

The imaging infrastructure at the customer or partner site includes a laptop running Workstation or Fusion, desktop, or ESXi host (referred to as the management host) and a supported 24-port 1GE Managed Switch with RJ45 ports and Cat 5/5E cables. The VIA OVA template is installed on the laptop or management host and the software bundle is uploaded on the VIA VM. The laptop or management host is connected to the corporate network as well as to the private network used by the VIA VM to image the individual hosts and switches. You use a browser (on the laptop) or jump VM (on the management host) to connect to the VIA VM and image the physical rack. The managed switch allows for multiple racks to be simultaneously by creating VLANs.
Figure 1-1. VIA Deployment

During imaging:
- The ToR and spine switches (if applicable) are configured
- The Hardware Management Service (HMS) is installed on the management switch
- VMware ESXi is installed on each server in the physical rack
- The Cloud Foundation software, SDDC Manager, is installed on the first host (node 0) of each physical rack.

After imaging is complete, VIA compiles a manifest file that provides an inventory of the physical rack components. The rack is now ready to be configured for Cloud Foundation.

This chapter includes the following topics:
- “Cloud Foundation Deployment Options,” on page 8
- “Software Bundle,” on page 9
- “VIA Components,” on page 10
- “Components of a Physical Rack,” on page 11

Cloud Foundation Deployment Options

Cloud Foundation provides flexibility in choosing on-premises deployment options.

Customers begin by sizing their Cloud Foundation deployment to determine the number of physical servers in their rack and number of racks. Each rack requires a minimum of 4 servers.
Customers have two deployment options for Cloud Foundation

- Deploy the Cloud Foundation software on ready systems in your datacenter.

  Customers can start with a ready system (set of qualified Virtual SAN nodes and switches) in their datacenter, wire it up, and deploy the Cloud Foundation software stack on the ready system. For information on qualified hardware, see VMware Compatibility Guide.

- Purchase a fully integrated system that combines software and hardware from select VMware partners.

  The partner works with a VMware representative to complete the Site Readiness document. This translates into a bill of materials (BoM) consisting of both hardware and software components. With this BoM in hand, the partner assembles the rack and images it. The partner then ships the system, consisting of physical racks, servers, server sub-components, power distribution units, switching infrastructure and the Cloud Foundation software, to customers.

  Deploying VMware Cloud Foundation on Qualified Hardware
  (http://link.brightcove.com/services/player/bcpid2296383276001?bctid=ref:video_deploy_cloud_foundation_hardware)

**Software Bundle**

The software bundle is a collection of all the software, configuration files, utilities, and tools used by VIA to image a physical rack. It contains a manifest file that lists the contents of the bundle. The bundle is based on a hardware bill-of-materials (BoM), that includes specific servers, switch models, and their component level configurations.

The bundle contains the following software:

- vSphere (vCenter Server and ESXi)
- NSX
- Virtual SAN
- vRealize Log Insight
- vRealize Operations
- SDDC Manager
- Platform Services Controller
- VMware Horizon with View
- App Volumes

See the VMware Cloud Foundation Release Notes for the software component versions.
VIA Components

VIA uses multiple components to track and perform the imaging process. This section describes these components, but you do not need to perform any configuration on them.

Database

VIA stores information about all activities during an imaging run in an HSQLDB database. This includes current imaging information as well as the previous imaging status. All entities utilized by the imaging process are stored as an entry in the database. These entities include the software bundle, imaged component, manifests, user information, and hardware information.

Inventory

VIA maintains a bundle inventory and a rack inventory.

The bundle inventory is an input to the imaging activity, and is created by VIA before it begins an imaging run. The bundle inventory is specific to a vendor and hardware type.

The rack inventory includes configuration details of the hardware imaged by VIA. The configuration details includes credentials to access both the data and the management interfaces of the imaged hardware, as well as the protocols to be used to access the interfaces of the imaged hardware.

Services

In order to handle disparate requests that may be required to service its components, VIA deploys multiple services. Each service has a specific goal, and is instantiated based on the state of the imaging activity.

Bundle Inventory Service

VIA deploys the bundle inventory service before starting an imaging activity. The service creates a bundle inventory using all the information in the bundle manifest. It ensures that the software bundle contains the files listed in the manifest and lists the manufacturer and hardware for which the bundle can be used.

The bundle inventory service includes a bundle manager and bundle controller. They manage the software bundles, mount the active bundle to be used for an imaging run, and set up TFTP and PXE Linux configuration to image the servers.

Device Manifest Service

The device manifest service creates a new manifest file when an imaging activity is performed for the first time. It also tracks changes to the device status and stores hardware information for the rack components.

Imaging Service

The imaging service can start, stop, or cancel an imaging run. It tracks the imaging workflow and maintains the state of the imaging run as well as details about the device being imaged. Details being tracked include the IP address of the device, imaging task being performed, status of the imaging task, and completion time of the imaging task.

DHCP Service

VIA deploys the DHCP service before starting an imaging run. The DHCP service discovers the physical rack components and their PXE images using the DHCP Protocol. It keeps track of the IP addresses allocated to the devices to ensure that a device can be provided with the same IP address in case it needs to be reimaged.
Cipher Service

The imaging service uses a cipher service to generate passwords to access the imaged rack components. The cipher service ensures that each imaged component is always associated with a unique password. However, all ESXi hosts have the same password.

Rack Inventory Service

The rack inventory service is deployed when the components have been successfully imaged. It collects access information for the imaged components such as connection protocol, IP address, and username and password and generates an inventory file. This inventory file is then transferred to the management switch.

Components of a Physical Rack

VMware recommends that you use a white cabinet that is 19” wide with 42 Rack Units (RU) for the physical rack. The cabinet must have a loading capacity of 2000 lbs and have adjustable levelling feet with heavy duty casters and seismic bracing. Since switches do not cover the full shelves, the cabinet must have a grill on one side for proper airflow.

Table 1-1. Rack Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Rack 1</th>
<th>Additional Racks</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDUs</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Console serial switch</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Spine switches</td>
<td>NA</td>
<td>2 (Rack 2 only)</td>
</tr>
<tr>
<td>TOR Switches</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Management switch</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Servers</td>
<td>Up to 32</td>
<td>Up to 32</td>
</tr>
</tbody>
</table>

- **PDUs**

  Each physical rack must have 4 PDUs (2 primary and 2 standby) even if it contains less than 32 servers. It is recommended that the primary PDUs be blue and the standby be red. The primary PDUs must be placed on the rear left side and the standby PDUs must be placed on the rear right side of the cabinet. The capacity requirements for each PDU are:

  - 208 V
  - 30 AMP
  - 3 phase
  - 60 Hz/50 H

  The plug type needs to be determined based on the customer’s environment.

- **Console serial switch**

  Each physical rack contains a 16-port console serial switch. The console serial switch is connected to all the other switches in the rack and is used for troubleshooting.

- **Spine switches**
Rack 2 in your Cloud Foundation system contains two 32 x 40 GE spine switches. These switches connect multiple racks by using uplinks from the Top of Rack switches.

Spine switches must not be connected to a corporate network. They are only used for ToR connectivity between physical racks.

- **Top of Rack (ToR) switches**
  Each rack contains two 1RU 48-port 10 GE ToR switches with four 40 GE uplinks. Servers in each rack are connected to both ToRs. The ToRs on rack 1 connect Cloud Foundation to the corporate network.

- **Management switch**
  Each rack contains a 1 GE management switch, which is used for IPMI access and access to the physical switches. The management ports of the ToR switches, Spine switches (on Rack 2 only), and the physical servers are connected to the management switch. The data ports of the ToR switches are also connected to the management switch. This enables the management switch to monitor the data from the servers from both the management network as well as the data network.

  The management switch provides out-of-band (OOB) connectivity for managing switches and servers. The hardware management service (HMS) runs on the management switch.

- **Servers**
A rack can contain up to 32 two-socket 1U or 16 two-socket 2U servers that are Virtual SAN certified.

All servers within a rack must be of the same model and type. It is recommended that the server disk size and storage configuration be identical. Memory between servers can vary. CPU must be two-socket but the cores can vary.

**Figure 1-2. Example Physical Rack Configuration**
Before You Install VIA

Before you install VIA, ensure that you have all of the required hardware components in place.

This chapter includes the following topics:

- “Requirements for VIA,” on page 15
- “Setting up your Environment,” on page 15

Requirements for VIA

VIA requires the following infrastructure.

- You need a laptop/desktop or an ESXi host (called management host) to run the VIA VM. A laptop works well for imaging a single rack while a management host is recommended if you are imaging multiple racks. The laptop need to be connected to the management switch of the rack being imaged. If there are multiple racks to be imaged, this would mean physically moving the laptop for imaging each rack. The management host is connected to all the management switches through an internal switch, so the connection to the rack being imaged can be managed remotely.

- Desktop or laptop (Windows or Mac) with 4 GB memory and a multi core processor to access the jump VM. A Windows laptop must have Workstation 8 or later and a Mac should have Fusion 4 or later installed on it. You also need a network adapter, a cable, and a 4-port unmanaged switch.

- Management host - a standalone VMware vSphere ESXi 6.0 or later server to host the Windows jump VM. The management host must have at least two NICs, with one NIC connected to the corporate network and one NIC connected to the private network.

- If you are using a management host for imaging, you need a jump VM to access VIA

- Private managed switch. Private indicates that it is being used only by you. A managed switch provides the ability to configure, manage, and monitor your LAN, which gives you greater control over how data travels over the network and who has access to it.

Setting up your Environment

You must inspect the components of the physical rack, verify cable connectivity, and validate BIOS settings before beginning the imaging process.

Review the Bill Of Materials (BOM) from VMware and ensure there are no discrepancies between the BOM and the equipment being used.
Rack Power

Ensure that rack power meets the following requirements.

- Verify that each device in the rack has a connection to each PDU.
- VMware recommends that you cable each server to the nearest power port so that the cable length can be kept to a minimum. Length of power cables should be as follows.
  - From the Physical Server: (9) .5m (3) 1m
  - From the Top-of-Rack Switch: 1.5m
  - From the Spine Switch: .5m

  It is common for power cables within a rack to be longer than required. However, if excess cabling is not managed properly, it may create electromagnetic interference. Avoid bundling of excess cables as this may lead to the cables being damaged due to bending.

- The power connector from the PDU must match the power connector in the Site Readiness Assessment.
- Power cables must be seated properly from each device to the PDU.
- The cables connect the primary PDUs to the other components must be blue and the cables from the secondary PDUs must be red.
- Power cables should not be in an area where there is a risk of touching sharp edges, excessive heat, or subject to pinching between sliding rails.

Network Cables

Proper management of network cables promotes the elimination of crosstalk and interference, cooler performance, improved maintenance, and easier upgrades. Incorrect cable management may result in damage or failure, which may lead to data transmission errors, performance issues, or system downtime. This section contains cable color and management recommendations. You can adapt the recommendations to suit your environment.

Regardless of the number of servers in each rack, cables must be in place for 32 servers. Ideally, data and power cables must be at opposite ends of the physical rack. If they are aggregated in a bundle or run parallel to each other, induction may introduce electromagnetic interference.

Cable Colors

Using specific colors for cables from each device makes for easier troubleshooting.

- All cables from the management switch (except those going to the ToRs): yellow
- Management switch ports 49 and 50 going to the ToRs: black
- ToR 1 cables to servers: blue
- ToR 2 cables to servers: red
- ToR 1 and ToR 2 connections to spine switches: orange
- Console serial switch connections: grey
Cable Type and Length

The Telecommunications Industry Association (TIA) and the Electronic Industries Association (EIA) structured cabling standards define how to design, build, and manage cabling systems. The specification is TIA/EIA-568-A. When used for 10/100/1000BASE-T Category 6 (Cat 6) cable length can be up to 100 meters (328 ft). This distance includes up to 90 meters (295 ft) of horizontal cabling between the patch panel and the wall jack, and up to 10 meters (33 ft) of patch cabling. When used for 10GBASE-T, Cat 6 cable length is reduced to 55 meters (180 ft) assuming minimal exposure to crosstalk. Category 6A (Cat 6A) does not have this limitation and can run at the same distances as 10/100/1000BASE-T.

Ensure that the cable type and length being used in your setup meet the following requirements.
- The cable connecting the physical server baseboard management controller (BMC) port to the management switch is 10 ft.
- The cable connecting the physical server 10 G interfaces to the ToR switches is 1-2 m (3.28-6.56 ft).
- The cable connecting the ToR switches 40G interfaces to the Spine switches is 1-2 m (3.28-6.56 ft).

Cable Bend Radius

Modifying the geometry of a cable can impair data transmission and affect performance. When a cable is tied or tightly looped, the pairs within the cable jacket can be separated impacting the integrity of the cable. Therefore, bend radius should be considered when verifying cable management.
- The minimum bend radius of a twisted pair patch cable is 4x the external cable diameter, and the minimum bend radius of an LC-type fiber optic cable is 0.8” (~2cm) and SC-type fiber optic cable is 1” (~3cm).
- Where articulated arms or rail slides are used, there must be sufficient slack in the cable to allow operation.
- No creases in the sheathing should be visible on any cable.

Cable Routing

Improperly routed cables can contribute to thermal issues, make field replaceable units difficult to access, or impact performance.

Cable ties can damage cables due to excessive over tightening or by violating the bend radius of a cable. Cable ties also increase service time when an add, move, or change request is received. Cables should be bundled with Velcro straps where possible to avoid damage, simplify addition or removal of cables, and reduce service times.
- Use velcro straps instead of cable ties.
- Network cables should not be in an area where there is a chance of contacting sharp edges, excessive heat, or subject to pinching between sliding rails.
- Cables must be free of tension. Where articulated arms or rail slides are used, there must be sufficient slack in the cable to prevent the cables from being stressed.
- Forced air cooling is recommended to draw cool air from the front of the rack and push warm air out the back.
- Ventilation slots, power supplies, and rear fans must be clear of cable obstructions.
- Field replaceable units such as power supplies must be clear of any cable obstructions that may prevent access for service.

Cable Labeling

Partners must label the cables in their datacenter. Properly labeled cables reduce troubleshooting time since it is easier to trace and validate connections.
Cable Testing

Cable testing ensures that the installed cabling links provide the transmission capability to support the data communication required.

Several tools are available for copper testing. Tests fall into three categories: Verification, Qualification, and Certification. Verification tools are used to perform basic continuity, cable length, and open connection verification. Qualification tools can provide information that details the cable capabilities, e.g. supports 10GBase-T. Certification tools determine whether the cable meets TIA standards such as TIA-568-B.

Options for testing SFP+ and QSFP+ cables are limited. Because handheld cable testers are not available, many network administrators typically reserve ports between two adjacent switches, then connect a suspect cable between active ports to determine if the cable is functional.

- Test cables from the physical server baseboard management controller (BMC) port and the management switch.
- Review the test print out to confirm that the cables passed the test.
- Cables from the physical server BMC port to the management switch must be seated properly.
- Cables from the physical server 10G interface to the ToR switches must be tested prior to installation. They must be seated properly.
- Each 10G interface must be connected to a separate ToR switch.
- Inter-switch SFP+ and QSFP+ cables must be tested prior to installation.
- Each 40G QSFP+ cable from the ToR switch must be connected to a separate Spine switch.
- There must be two 40G QSFP+ cable connections between each ToR switch and Spine switch.
- Inter-switch SFP+ and QSFP+ cables must be seated properly.
Rack Wiring

Download VCF wiremap from the Product Downloads page and connect the wires in your physical rack according to the wiremap. This section contains the logical views of the wiremaps.

Wiring for Rack with Dell Management Switch

Figure 2-1. Wiremap for rack 1 with Cisco ToR Switches and Dell Management Switch

16 switch serial console switch.
For Connections, see port connectivity table
Figure 2-2. Wiremap for rack 2 with Cisco ToR Switches and Dell Management Switch

Jump VM

Private Managed Switch

Spine 2

16 switch serial console switch.
For Connections, see port connectivity table

ToR 2

Spine 1

Management port

Management port

Node 1 Node 13

Node 2 Node 12 Node 24

30 40 42 48

Corporate network

Management port

Management port

Node 1 Node 13

Node 1 Node 13

Node 2 Node 12 Node 24

30 40 42 48

Corporate network

Management port

Management port

Management switch

Node 2 12 24 36 42 44 48 50

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Wiring for Rack with Quanta Management Switch

Figure 2-3. Wiremap for rack 1 with Cisco ToR Switches and Quanta Management Switch

- Jump VM
- Private Managed Switch
- 16 switch serial console switch. For Connections, see port connectivity table
- Spine 2 on Rack 2
- Spine 1 on Rack 2
- ToR 2
- ToR 1
- Management switch

Corporate network
Management port
Management port
Management port
Management port

Additional Racks

Rack 2 in the integrated system powered by Cloud Foundation must include two spine switches for inter-rack connectivity. The spine switches are connected during the physical environment inspection, but must be disconnected before imaging the rack.

Additional physical racks do not contain spine switches. ToR switches in the additional physical racks are connected to the two spine switches in rack 2.
Rack Component Ports

Refer to the tables below for port connectivity information using Cisco 9372PX as the illustrative example. Connections in your environment may vary based on the actual switches being used.

### Console Serial Switch

<table>
<thead>
<tr>
<th>Port Number</th>
<th>Connects To</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Management switch console port</td>
</tr>
<tr>
<td>2</td>
<td>ToR 1 console port</td>
</tr>
<tr>
<td>3</td>
<td>ToR 2 console port</td>
</tr>
<tr>
<td>4</td>
<td>Spine 1 console port</td>
</tr>
<tr>
<td>5</td>
<td>Spine 2 console port</td>
</tr>
<tr>
<td>6</td>
<td>PDU 1</td>
</tr>
<tr>
<td>7</td>
<td>PDU 2</td>
</tr>
<tr>
<td>8</td>
<td>PDU 3</td>
</tr>
<tr>
<td>9</td>
<td>PDU 4</td>
</tr>
<tr>
<td>10 - 16</td>
<td>Not connected</td>
</tr>
</tbody>
</table>

### Spine 2 (Rack 2 only)

<table>
<thead>
<tr>
<th>Port Number</th>
<th>Speed</th>
<th>Connects To</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>40 Gbps</td>
<td>Rack 2 ToR 1 port 50</td>
</tr>
<tr>
<td>2</td>
<td>40 Gbps</td>
<td>Rack 2 ToR 2 port 50</td>
</tr>
<tr>
<td>3</td>
<td>40 Gbps</td>
<td>Rack 1 ToR 1 port 50</td>
</tr>
<tr>
<td>4</td>
<td>40 Gbps</td>
<td>Rack 1 ToR 2 port 50</td>
</tr>
<tr>
<td>5</td>
<td>40 Gbps</td>
<td>Rack 3 ToR 1 port 50</td>
</tr>
<tr>
<td>6</td>
<td>40 Gbps</td>
<td>Rack 3 ToR 2 port 50</td>
</tr>
<tr>
<td>7</td>
<td>40 Gbps</td>
<td>Rack 4 ToR 1 port 50</td>
</tr>
<tr>
<td>8</td>
<td>40 Gbps</td>
<td>Rack 4 ToR 2 port 50</td>
</tr>
<tr>
<td>9</td>
<td>40 Gbps</td>
<td>Rack 5 ToR 1 port 50</td>
</tr>
<tr>
<td>10</td>
<td>40 Gbps</td>
<td>Rack 5 ToR 1 port 50</td>
</tr>
<tr>
<td>11</td>
<td>40 Gbps</td>
<td>Rack 6 ToR 1 port 50</td>
</tr>
<tr>
<td>12</td>
<td>40 Gbps</td>
<td>Rack 6 ToR 1 port 50</td>
</tr>
<tr>
<td>13</td>
<td>40 Gbps</td>
<td>Rack 7 ToR 1 port 50</td>
</tr>
<tr>
<td>14</td>
<td>40 Gbps</td>
<td>Rack 7 ToR 1 port 50</td>
</tr>
<tr>
<td>15</td>
<td>40 Gbps</td>
<td>Rack 8 ToR 1 port 50</td>
</tr>
<tr>
<td>16</td>
<td>40 Gbps</td>
<td>Rack 8 ToR 1 port 50</td>
</tr>
</tbody>
</table>
### Spine 1 (Rack 2 only)

<table>
<thead>
<tr>
<th>Port Number</th>
<th>Speed</th>
<th>Connects To</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>40 Gbps</td>
<td>Rack 2 ToR 1 port 49</td>
</tr>
<tr>
<td>2</td>
<td>40 Gbps</td>
<td>Rack 2 ToR 2 port 49</td>
</tr>
<tr>
<td>3</td>
<td>40 Gbps</td>
<td>Rack 1 ToR 1 port 49</td>
</tr>
<tr>
<td>4</td>
<td>40 Gbps</td>
<td>Rack 1 ToR 2 port 49</td>
</tr>
<tr>
<td>5</td>
<td>40 Gbps</td>
<td>Rack 3 ToR 1 port 49</td>
</tr>
<tr>
<td>6</td>
<td>40 Gbps</td>
<td>Rack 3 ToR 2 port 49</td>
</tr>
<tr>
<td>7</td>
<td>40 Gbps</td>
<td>Rack 4 ToR 1 port 49</td>
</tr>
<tr>
<td>8</td>
<td>40 Gbps</td>
<td>Rack 4 ToR 2 port 49</td>
</tr>
<tr>
<td>9</td>
<td>40 Gbps</td>
<td>Rack 5 ToR 1 port 49</td>
</tr>
<tr>
<td>10</td>
<td>40 Gbps</td>
<td>Rack 5 ToR 1 port 49</td>
</tr>
<tr>
<td>11</td>
<td>40 Gbps</td>
<td>Rack 6 ToR 1 port 49</td>
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<td>12</td>
<td>40 Gbps</td>
<td>Rack 6 ToR 1 port 49</td>
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<tr>
<td>13</td>
<td>40 Gbps</td>
<td>Rack 7 ToR 1 port 49</td>
</tr>
<tr>
<td>14</td>
<td>40 Gbps</td>
<td>Rack 7 ToR 1 port 49</td>
</tr>
<tr>
<td>15</td>
<td>40 Gbps</td>
<td>Rack 8 ToR 1 port 49</td>
</tr>
<tr>
<td>16</td>
<td>40 Gbps</td>
<td>Rack 8 ToR 1 port 49</td>
</tr>
</tbody>
</table>

### ToR 2 (e.g. Cisco 9372PX)

<table>
<thead>
<tr>
<th>Port Number</th>
<th>Speed</th>
<th>Connects To</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 32</td>
<td>10 Gbps</td>
<td>node 1 - node 32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>where port 1 connects to node 1, port 2 connects to node 2, and so on</td>
</tr>
<tr>
<td>33 - 38</td>
<td>NA</td>
<td>Not connected</td>
</tr>
<tr>
<td>39 - 42</td>
<td>10 Gbps</td>
<td>ToR 1 ports 39 - 42</td>
</tr>
<tr>
<td>43 - 47</td>
<td>10 Gbps</td>
<td>Corporate network as required (see note below table)</td>
</tr>
<tr>
<td>48</td>
<td>1Gbps</td>
<td>Management switch port 50</td>
</tr>
<tr>
<td>49</td>
<td>40 Gbps</td>
<td>Spine 1 port 2</td>
</tr>
<tr>
<td>50</td>
<td>40 Gbps</td>
<td>Spine 2 port 2</td>
</tr>
<tr>
<td>51 - 52</td>
<td>40 Gbps</td>
<td>Corporate network as required (see note below table)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Management</td>
</tr>
<tr>
<td></td>
<td>1 Gbps</td>
<td>Management switch port 42</td>
</tr>
</tbody>
</table>

**Note** Depending on the switches in your environment, connect two 40 Gbps ports or multiple 10 Gbps ports to your corporate network.

### ToR 1 (e.g. Cisco 9372PX)

<table>
<thead>
<tr>
<th>Port Number</th>
<th>Speed</th>
<th>Connects To</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 32</td>
<td>10 Gbps</td>
<td>Node 1 - node 32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>where port 1 connects to node 1, port 2 connects to node 2, and so on</td>
</tr>
<tr>
<td>33 - 38</td>
<td>NA</td>
<td>Not connected</td>
</tr>
<tr>
<td>Port Number</td>
<td>Speed</td>
<td>Connects To</td>
</tr>
<tr>
<td>------------</td>
<td>--------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>39 - 42</td>
<td>10 Gbps</td>
<td>ToR 2 ports 39 - 42</td>
</tr>
<tr>
<td>43 - 47</td>
<td>10 Gbps</td>
<td>Corporate network as required (see note below table)</td>
</tr>
<tr>
<td>48</td>
<td>1Gbps</td>
<td>Management switch port 49</td>
</tr>
<tr>
<td>49</td>
<td>40 Gbps</td>
<td>Spine 1 port 1</td>
</tr>
<tr>
<td>50</td>
<td>40 Gbps</td>
<td>Spine 2 port 1</td>
</tr>
<tr>
<td>51 - 52</td>
<td>NA</td>
<td>Corporate network as required (see note below table)</td>
</tr>
<tr>
<td>Management</td>
<td>1 Gbps</td>
<td>Management switch port 41</td>
</tr>
</tbody>
</table>

**Note**  Depending on the switches in your environment, connect two 40 Gbps ports or multiple 10 Gbps ports to your corporate network.

### Management Switch

<table>
<thead>
<tr>
<th>Port Number</th>
<th>Speed</th>
<th>Connects To</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 32</td>
<td>1 Gbps</td>
<td>Node 1 - Node 32 where port 1 connects to node 1, port 2 connects to node 2, and so on</td>
</tr>
<tr>
<td>33 - 40</td>
<td>NA</td>
<td>Not connected</td>
</tr>
<tr>
<td>41</td>
<td>1Gbps</td>
<td>ToR 1 management port</td>
</tr>
<tr>
<td>42</td>
<td>1Gbps</td>
<td>ToR 2 management port</td>
</tr>
<tr>
<td>43</td>
<td>1Gbps</td>
<td>Spine 1 management port</td>
</tr>
<tr>
<td>44</td>
<td>1Gbps</td>
<td>Spine 2 management port</td>
</tr>
<tr>
<td>45-47</td>
<td>NA</td>
<td>Not connected</td>
</tr>
<tr>
<td>48</td>
<td>1Gbps</td>
<td>Private managed switch</td>
</tr>
<tr>
<td>49</td>
<td>1Gbps</td>
<td>ToR 1 port 48</td>
</tr>
<tr>
<td>50</td>
<td>1Gbps</td>
<td>ToR 2 port 48</td>
</tr>
<tr>
<td>51-52</td>
<td>NA</td>
<td>Not connected</td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td>Private managed switch</td>
</tr>
</tbody>
</table>

**Note**  PDU ports are not reflected in the table above.

### Physical Servers

This section lists the recommended Rack Unit (RU) location of each device.

### Hardware Devices

**Table 2-1. Physical Device Location in Rack 1 and Rack 3 - Rack n**

<table>
<thead>
<tr>
<th>RU Location</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>42</td>
<td>Console serial switch</td>
</tr>
<tr>
<td>41</td>
<td>Blank</td>
</tr>
<tr>
<td>40</td>
<td>Management switch</td>
</tr>
<tr>
<td>39</td>
<td>Blank</td>
</tr>
<tr>
<td>38</td>
<td>ToR 2</td>
</tr>
</tbody>
</table>
### Table 2-1. Physical Device Location in Rack 1 and Rack 3 - Rack n (Continued)

<table>
<thead>
<tr>
<th>RU Location</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>Blank</td>
</tr>
<tr>
<td>36</td>
<td>ToR 1</td>
</tr>
<tr>
<td>33-35</td>
<td>Blank</td>
</tr>
<tr>
<td>1-32</td>
<td>Nodes 1-32</td>
</tr>
</tbody>
</table>

### Table 2-2. Physical Device Location in Rack 2

<table>
<thead>
<tr>
<th>RU Location</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>42</td>
<td>Console serial switch</td>
</tr>
<tr>
<td>41</td>
<td>Management switch</td>
</tr>
<tr>
<td>40</td>
<td>Spine 2</td>
</tr>
<tr>
<td>39</td>
<td>Blank</td>
</tr>
<tr>
<td>38</td>
<td>Spine 1</td>
</tr>
<tr>
<td>37</td>
<td>Blank</td>
</tr>
<tr>
<td>36</td>
<td>ToR 2</td>
</tr>
<tr>
<td>35</td>
<td>Blank</td>
</tr>
<tr>
<td>34</td>
<td>ToR1</td>
</tr>
<tr>
<td>33</td>
<td>Blank</td>
</tr>
<tr>
<td>1-32</td>
<td>Nodes 1-32</td>
</tr>
</tbody>
</table>

**Power**

All servers must have redundant power supplies and each power supply must be connected to a separate rack PDU.

**Airflow**

Install the servers to allow front-to-back airflow.

**BIOS Settings**

The Bill of Materials (BOM) specifies the BIOS settings for each device. Ensure that the settings on the physical devices in your environment match the BIOS settings in the BOM. See Chapter 8, “BIOS Settings,” on page 63.

During imaging, VIA verifies the BIOS settings of Dell components but not for components from other vendors.

**Firmware Settings**

Ensure that the firmware settings are set correctly as per the BoM.

**Network Switches**

**Power**

- All switches must have redundant power supplies.
- Each power supply must be connected to a separate rack power strip.
Airflow
Switches must be installed to allow front-to-back airflow.

ONIE version
Ensure that the correct ONIE version is installed as per the BOM.

Laptop or Management Host
You need a laptop or management host where you install VIA.

Laptop
You need a desktop or laptop (Windows or Mac) with 4 GB memory and a multi core processor to access the jump VM. A Windows laptop must have Workstation 8 or later and a Mac should have Fusion 4 or later installed on it. You also need a network adapter, a cable, and a 4-port unmanaged switch.

Management Host
If you are using a management host to image the rack, you need a standalone VMware vSphere ESXi 6.0 or later server to host the Windows jump VM. The management host must have at least two NICs, with one NIC connected to the corporate network and one NIC connected to the private network. You also need a 24-port private managed switch.

Table 2-3. VLAN Configuration of the Private Managed Switch

<table>
<thead>
<tr>
<th>Port</th>
<th>Access Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2,3,4</td>
<td>VLAN 2000</td>
</tr>
<tr>
<td>5,6,7,8</td>
<td>VLAN 2001</td>
</tr>
<tr>
<td>9,10,11,12</td>
<td>VLAN 2002</td>
</tr>
<tr>
<td>13,14,15,16</td>
<td>VLAN 2003</td>
</tr>
</tbody>
</table>
Table 2-3. VLAN Configuration of the Private Managed Switch (Continued)

<table>
<thead>
<tr>
<th>Port</th>
<th>Access Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>17,18,19,20</td>
<td>VLAN 2004</td>
</tr>
<tr>
<td>21,22,23,24</td>
<td>VLAN 2005</td>
</tr>
</tbody>
</table>

Figure 2-5. Management Host Connection

Private Managed Switch

If this is a multi-rack scenario and the private switch is being shared between racks, configure a private VLAN. For example, create two VLANs in a dual rack environment - VLAN 101 and VLAN 102. VLAN 101 is for rack 1 and VLAN 102 is for rack 2. Port 48 and the management port from the imaging management switch in rack 1 are connected to ports 2 and 3 on the private switch which is configured for VLAN 101. Port 48 and the management port from the imaging management switch in rack 2 are connected to ports 4 and 5 on the private switch which is configured for VLAN 102. The imaging management host is connected to Port 1 which is configured for both VLAN 101 and VLAN 102.
A print out of the VLAN configuration on the imaging management switch should look like this:

```
interface Vlan 1
  !untagged GigabitEthernet 0/0-1,6-47
  !untagged TenGigabitEthernet 0/48-49
  !untagged Port-channel 1-2
!
interface Vlan 2001
  no ip address
  tagged TenGigabitEthernet 0/48-49
  untagged GigabitEthernet 0/2-3
  no shutdown
!
interface Vlan 2002
  no ip address
  tagged TenGigabitEthernet 0/48-49
  untagged GigabitEthernet 0/4-5
  no shutdown
```

**Management Host Settings**

Configure the following settings on the imaging management host:

- Install ESXi on the local disk. For the supported version, see the VMware Cloud Foundation Release Notes.
- Enable the Allow virtual machines to start and stop automatically with the system option.
- Assign the IP address 10.1.0.200 to the vmk0 management network.
- Set the NTP server to 0.vmware.pool.ntp.org.
  
  It is important to ensure that the time on the management host is set correctly.
- Enable SSH on the management host.

In a multi-rack scenario, configure an additional vSphere Standard Switch (vDS) for each additional rack. In a dual rack scenario, vSwitch1 should use vmnic1 and should be configured with two Virtual Machine Port Groups (VIA1 and VIA2). The VIA1 port group should be tagged to use VLAN101, and the VIA2 port group should be tagged to use VLAN102. vmnic1 should be connected to the private switch on a port with VLAN101 and VLAN102 visible.

**Virtual Machines**

The VIA VM runs on the laptop or management host. A jump VM runs on the management host.

If you have multiple physical racks in your environment, you have the following options:

- Image the racks sequentially - image rack 1 first followed by the remaining racks one at a time.
- Image the racks in parallel by configuring a VIA VM per physical rack.

**Hardware Configuration**

**Table 2-4. Jump VM Hardware Configuration**

<table>
<thead>
<tr>
<th>Virtual Hardware</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>4 GB</td>
</tr>
<tr>
<td>vCPU</td>
<td>1 virtual socket, 2 cores per socket</td>
</tr>
<tr>
<td>Video card</td>
<td>1 display</td>
</tr>
</tbody>
</table>
Table 2-4. Jump VM Hardware Configuration (Continued)

<table>
<thead>
<tr>
<th>Virtual Hardware</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSCI Controller 0</td>
<td>LSI Logic SAS</td>
</tr>
<tr>
<td></td>
<td>bus sharing: none</td>
</tr>
<tr>
<td>Hard disk</td>
<td>120 GB, Thin Provision</td>
</tr>
<tr>
<td>CD/DVD</td>
<td>Client device</td>
</tr>
<tr>
<td>Floppy drive</td>
<td>Removed</td>
</tr>
<tr>
<td>Network adapters</td>
<td>2 VMXNET3 vNICs</td>
</tr>
<tr>
<td>Operating system</td>
<td>Microsoft Windows 7 64-bit or Win2K12</td>
</tr>
<tr>
<td>Virtual Machine</td>
<td>Hardware version 8</td>
</tr>
</tbody>
</table>

Navigate to Options > Advanced > General
- Disable logging
- keyboard.typematicMinDelay = “2000000”

Software Configuration

Perform the following tasks to prepare the jump VM.

- Install the Windows 2012 Essentials operating system on the VM.
- Install VMware Tools.
- Install the latest Windows patches.
- Enables Windows update using the VMware OS Optimization Tool.
- Install the following applications:
  - Firefox or Chrome web browsers
  - PuTTY
  - WinSCP
  - vSphere Web Client
  - VMware Ruby vSphere Console (RVC)
  - Java Runtime Environment
- If internet access is not available from the Access Virtual Machine, download the executables and binaries for the applications on the VM.
- Verify that Remote Desktop Connection is enabled on the Access Virtual Machine.
- Add a route to allow BMC access to the physical servers. For example,
  `route add 192.168.0.0 mask 255.255.255.0 192.168.100.1 if 16`
  where 16 is the ID for rack 1. To find the interface number, follow the steps below.
  a In a command window, type the command `netsh`.
  b Type the command `int ipv4 show interfaces`. 
Pre-Imaging Checklist

You must complete this checklist before beginning the imaging process. It is important that each item in the checklist is set to the specified value, otherwise imaging may fail. You may want to print this checklist and checkmark each row as you verify the setting.

Table 2-5. Pre-Imaging Checklist

<table>
<thead>
<tr>
<th>Setting</th>
<th>Verified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review the Bill of Materials (BOM) from VMware and verify that there are no discrepancies</td>
<td></td>
</tr>
<tr>
<td>between the BOM and the hardware being used. If there is a discrepancy, contact VMware</td>
<td></td>
</tr>
<tr>
<td>Support.</td>
<td></td>
</tr>
<tr>
<td>Validate that BIOS Settings for all components are correct. See Chapter 8, “BIOS Settings,” on</td>
<td></td>
</tr>
<tr>
<td>page 63.</td>
<td></td>
</tr>
<tr>
<td>During imaging, VIA verifies BIOS settings for DELL servers and makes appropriate adjustments.</td>
<td></td>
</tr>
<tr>
<td>But it is recommended that you ensure that they are set correctly before you begin imaging.</td>
<td></td>
</tr>
<tr>
<td>Ensure that the correct ONIE version is installed as per the BoM.</td>
<td></td>
</tr>
<tr>
<td>Verify that firmware settings are set correctly as per the BoM.</td>
<td></td>
</tr>
<tr>
<td>Connect each device in the rack to both PDUs.</td>
<td></td>
</tr>
<tr>
<td>Keep power and network cable lengths to a minimum.</td>
<td></td>
</tr>
<tr>
<td>Use specific colors for cables from each device. See “Network Cables,” on page 16.</td>
<td></td>
</tr>
<tr>
<td>Verify that the cable bend radius is proportionate to the external diameter. See “Network</td>
<td></td>
</tr>
<tr>
<td>Cables,” on page 16.</td>
<td></td>
</tr>
<tr>
<td>Verify that cables are properly routed and labeled.</td>
<td></td>
</tr>
<tr>
<td>Test cables to ensure that installed cabling links provide the transmission capability to support</td>
<td></td>
</tr>
<tr>
<td>the required data communication.</td>
<td></td>
</tr>
<tr>
<td>Verify that the physical racks are wired according to the wiremap. See “Rack Wiring,” on page</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td></td>
</tr>
<tr>
<td>Verify that each server has redundant power supplies and that each power supply is connected</td>
<td></td>
</tr>
<tr>
<td>to a separate rack PDU.</td>
<td></td>
</tr>
<tr>
<td>Ensure that servers and switches have the same airflow.</td>
<td></td>
</tr>
<tr>
<td>Verify that switches have redundant power supplies and each power supply is connected to a</td>
<td></td>
</tr>
<tr>
<td>separate power strip.</td>
<td></td>
</tr>
<tr>
<td>Ensure that a supported version of ESXi is installed. For the supported version, see the</td>
<td></td>
</tr>
<tr>
<td>VMware Cloud Foundation Release Notes.</td>
<td></td>
</tr>
<tr>
<td>Verify that the Allow virtual machines to start and stop automatically with the system option</td>
<td></td>
</tr>
<tr>
<td>is enabled.</td>
<td></td>
</tr>
<tr>
<td>Assign IP address 10.1.0.200 to the vmk0 kernel interface.</td>
<td></td>
</tr>
<tr>
<td>Verify that SSH is enabled on the management host.</td>
<td></td>
</tr>
<tr>
<td>Verify that the access VM, VIA VM, and jump VM meet the required hardware configuration.</td>
<td></td>
</tr>
<tr>
<td>See “Virtual Machines,” on page 29.</td>
<td></td>
</tr>
<tr>
<td>Verify that the required software has been installed on the VMs. See “Virtual Machines,” on</td>
<td></td>
</tr>
<tr>
<td>page 29.</td>
<td></td>
</tr>
</tbody>
</table>
Installing VIA

You can install VIA on a desktop, laptop, or an ESXi host, also referred to as the management host. A laptop or desktop is recommended when you are imaging a single rack. A management host is better suited for an environment where you have several physical racks in your datacenter.

This chapter includes the following topics:
- “Installing VIA on a Laptop or Desktop,” on page 33
- “Installing VIA on a Management Host,” on page 34

Installing VIA on a Laptop or Desktop

VIA is a virtual appliance. After you install the VIA VM on your laptop, you copy the software bundle to the VIA VM. You can then access the VIA user interface through a browser on the laptop.

Prerequisites
- Ensure that you have the infrastructure for VIA available and that you have set up your physical environment as described in Chapter 2, “Before You Install VIA,” on page 15.
- Download the VIA OVF file, Cloud Foundation software bundle, and the md5sum file on the laptop or desktop.

Procedure
1. Connect one port of the network adapter to your laptop and one port to the unmanaged switch.
2. Connect two ports of the unmanaged switch as follows:
   - one port to the ethernet management port of the management switch
   - one port to port 48 of the management switch
3. Deploy the VIA OVF file on your laptop.
   Follow the wizard prompts to specify where to save the OVF file and accept the license agreement.
4. Configure time settings on the laptop.
5. Upload the Cloud Foundation software bundle on to the VIA VM by pointing the CD/DVD drive to the bundle ISO. Ensure that the CD/DVD drive is connected.
6. Configure network settings on the laptop.
   a. Connect one NIC on the laptop to the corporate network and the other to the unmanaged switch.
   b. Manually assign a static IP address to the laptop in the range 192.168.100.151 to 192.168.100.199.
This allows for separation of network traffic between the corporate network and the private network that is established between the physical rack and VIA. It also helps ensure that the DHCP service which is part of is VIA is confined to the private network between the physical rack and VIA.

7 For the browser on the laptop that will be used to access VIA, make the following selections.
- In Network Connection, disable the proxy.
- Select Auto-detect proxy settings for this network so that the browser detects the proxy settings for your network.

8 Ensure that you can ping the VIA VM (IP address is 192.168.100.2) from the laptop.

9 Power on the VIA VM.

10 Ensure that you can ping the management switch (IP address 192.168.100.1) from the VIA VM.

Since the management switch is the first component to be imaged, the VIA VM must be able to talk to the management switch.

What to do next
Open a web browser on the laptop and type the following URL to connect to VIA:
http://192.168.100.2:8080/via/

Installing VIA on a Management Host

Prerequisites
- Ensure that you have the infrastructure for VIA available and that you have set up your physical environment as described in Chapter 2, “Before You Install VIA,” on page 15.
- Download the VIA OVF file, Cloud Foundation software bundle, and the md5sum file on your local file system.

Procedure
1 Deploy the VIA OVF file on the management host.
   a Login to the vSphere Web Client on the management host.
   b Right-click the management host and click Deploy OVF Template.
   c In source location, select Local file. Click Browse and select the VIA OVF from your local file system.
   d Click Next.
   e Review the OVF file details and click Next.
   f Accept the OVF license agreements and click Next.
   g Specify a name and location for the OVF and click Next.
   h Select a resource and click Next.
   i Select the disk format to store the VIA disks and the datastore to store the deployed OVF template and click Next.
   j On the Setup networks page, connect VIA to the private switch connected to rack 1.
   k Review the deployment details and click Finish.

2 Copy the Cloud Foundation bundle to the management host.
   a On the management host, create a single datastore named datastore1.
b In datastore1, create a folder named ISO bundle and copy the Cloud Foundation bundle file to this folder.

3 Configure time settings on the management host.
   a In the vSphere Web Client, navigate to the management host in the vSphere inventory.
   b Select Manage and then select Settings.
   c Under System, select Time configuration and click Edit.
   d Select Manually configure the date and time on this host.
   e Set the time and date manually.
   f Click OK.

4 Upload the software bundle on to the VIA VM.
   a Right-click the VIA VM and select Edit Settings.
   b Click the Hardware tab and select the CD/DVD drive.
   c Select the Connected check box to connect the CD.
   d Select Connect at power on so that the CD-ROM drive is connected when the virtual machine starts.
   e Select Datastore ISO under Device Type.
   f Click Select, browse to the ISO Bundle folder in datastore1 on the management host, and select the bundle.
   g Click OK.

5 Create a VM on the management host to serve as the jump VM.
   Connect one NIC on the jump VM to the network and the other to the private managed switch.
   The jump VM must have a static IP address. The IP range 192.168.100.151 to 192.168.100.199 is usually available for the jump VM. Verify the address that you want to use against the via.properties file in the bundle ISO to avoid any conflict.
   This allows for separation of network traffic between the datacenter network and the private network that is established between the physical rack and VIA. It also helps ensure that the DHCP service which is part of is VIA is confined to the private network between the physical rack and VIA.

6 Copy the md5sum file on the jump VM.

7 For the browser on the jump VM that will be used to access VIA, make the following selections.
   ■ In Network Connection, disable the proxy.
   ■ Select Auto-detect proxy settings for this network so that the browser detects the proxy settings for your network.

8 Ensure that you can ping the VIA VM (IP address is 192.168.100.2) from the jump VM.
   If you cannot ping the VIA VM, check the route on the jump VM.

9 Power on the VIA VM.

10 Ensure that you can ping the management switch (IP address 192.168.100.1) from the VIA VM.
   Since the management switch is the first component to be imaged, the VIA VM must be able to talk to the management switch.
What to do next

Open a web browser and type the following URL to connect to VIA:

http://192.168.100.2:8080/via/
When you image a physical rack, the software in the manifest bundle is loaded onto the physical rack.

In a multi-rack environment, you can either image all racks in parallel, or image rack 1 first followed by the other racks one at a time. To image multiple racks in parallel, you need a vSphere Distributed Switch and VIA VM for each rack.

This chapter includes the following topics:

- “Image a Physical Rack,” on page 38
- “Retrieve SDDC Manager Password and Rack Thumbprint,” on page 49
Image a Physical Rack

VIA images the rack components in a pre-determined order, which is determined by the availability of network route to the different components of the rack. All switches are imaged first. This enables VIA to access the servers through the switches for imaging. The imaging order is as follows.

1. Management switch
   The management switch is the main access gateway through which the Cloud Foundation management data is routed. The management ports of the ToR switches, Spine switches, and the physical servers are connected to the management switch. The data ports of the ToR switches are also connected to the management switch. This enables VIA to communicate with the servers over both management and data network through the management switch. VIA is also connected to the rack through a designated port on the management switch. It is therefore required that the management switch is the first component imaged by VIA in order to obtain access to the other components of the rack. VIA currently uses an IPMI connection to image the management switch.

2. Spine switches (rack 2 only) and ToR switches
   Spine and ToR switches are imaged in parallel.
   Spine switches inter-connect multiple racks enabling a scale out architecture for the datacenter. They create an stretched L2 backplane between racks.
   ToR switches provide connectivity to servers in each rack out to spine switches. The first pair of ToR switches provide connectivity to your datacenter network.

3. Servers
   The management ports on the servers become accessible to the management switch during the course of imaging/configuration, which in turn make the management ports accessible to VIA through the management switch. Once all the switches are imaged and configured, the data ports of the servers become accessible to VIA through the ToR switches, which then proceeds to image the servers in parallel.

For each component that is being imaged, the following tasks are performed.

1. Discovery
   Rack components are discovered using the DHCP service running on the VIA VM. The DHCP Service uses the device type information to identify the device being discovered. Apart from the device type information, the DHCP service also uses hardware vendor specific strings to determine whether the switch being imaged is a management, ToR, or Spine switch.
   The first component to be discovered is the management switch. The DHCP service hands out a pre-determined IP address for the management switch followed by a PXE image specific to the management switch.
   After the management switch is imaged, the ToR and Spine switches are discovered and imaged. The management switch also discovers the IPMI network of the servers. This allows VIA to initiate imaging of the servers. The ToR switch enables discovery of the data network of the servers which is used to receive the installation image delivered by the DHCP service.

2. Image installation
   Image installation refers to installing software on the components to make them operational. The software depends on the component type - an Operating System for switches and a Hypervisor for servers.
Configuration

This step in the imaging process ensures that the components of the rack work like a homogenous system. Configuration of each rack component is different. If any configuration step fails for the management, ToR, or spine switches, imaging stops at that point and cannot proceed. If a configuration step fails for the server, imaging for that server cannot be completed but the remaining servers in the rack can be imaged.

Table 4-1. Management Switch Configuration

<table>
<thead>
<tr>
<th>Number</th>
<th>Step Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Apply license</td>
<td>Apply the relevant license to the installed image</td>
</tr>
</tbody>
</table>
| 2      | Configure ports      | 1 Configure the ports which allow the management switch to connect to the management interfaces of the ToR and spine switches and the servers.  
2 Bridge the ports connected to VIA with the ports connected to the management interfaces of the ToR and spine switches.  
3 Create separate subnets for the management network and data network of the rack. |
| 3      | Update interface     | Ensure that only the management interfaces of ToR and spine switches are enabled while the management interfaces of the servers and the data network interfaces of the ToR switches are disabled before initiating the imaging of ToR switches. |
| 4      | Setup persistent network | 1 Wait till all ToRs are imaged and bridge the ports connected to VIA with the ports connected to the management interfaces of the ToR and spine switches and servers to enable VIA to listen to DHCP requests.  
2 Setup Spanning Tree Protocol (STP) on the IPMI management interfaces of the ToR and spine switches and servers.  
3 Setup STP on the Cloud Foundation management interfaces of the ToR switches and the interfaces connected to VIA.  
4 Enable LACP on ToR data interfaces.  
5 Create separate subnets for the management network and data network for the rack. |
| 5      | Setup IPMI DHCP      | Set up a DHCP service to discover the IPMI network of the servers.          |
| 6      | Host Power Cycle     | Discover all servers and ensure that the minimum required servers are available to ensure that SDDC Manager can be deployed. If the requirement is met, VIA initiates a power cycle of all servers to initiate their imaging. If the required number of servers are not detected, imaging is aborted. |
| 7      | Change Password      | Change the default password to connect to the switch and stores the new password in a password store. |
| 8      | Generate Manifest    | Generate device manifest, which contains the current state of the imaging activity for each rack component. |

Table 4-2. ToR Switch Configuration

<table>
<thead>
<tr>
<th>Number</th>
<th>Step Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Apply license</td>
<td>Apply the relevant license to the installed image</td>
</tr>
<tr>
<td>2</td>
<td>Configure ports</td>
<td>Configure all ports on the switch to operate in Full Duplex mode with auto negotiation enabled and at 1000Mb/s.</td>
</tr>
<tr>
<td>6</td>
<td>Change password</td>
<td>Change the default password to connect to the switch and stores the new password in a password store.</td>
</tr>
<tr>
<td>7</td>
<td>Generate Manifest</td>
<td>Generate device manifest, which contains the current state of the imaging activity for each rack component.</td>
</tr>
</tbody>
</table>
### Table 4-3. Spine Switch Configuration

<table>
<thead>
<tr>
<th>Number</th>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Apply license</td>
<td>Apply the relevant license to the installed image.</td>
</tr>
<tr>
<td>5</td>
<td>Change password</td>
<td>Change the default password to connect to the switch and stores the new password in a password store.</td>
</tr>
<tr>
<td>6</td>
<td>Generate Manifest</td>
<td>Generate device manifest, which contains the current state of the imaging activity for each rack component.</td>
</tr>
</tbody>
</table>

### Table 4-4. Node 0 Configuration

<table>
<thead>
<tr>
<th>Number</th>
<th>Step</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wait for kickstart delivery.</td>
</tr>
<tr>
<td>2</td>
<td>Check host status.</td>
</tr>
<tr>
<td>3</td>
<td>Install VIBs.</td>
</tr>
<tr>
<td>4</td>
<td>Run storage configuration script.</td>
</tr>
<tr>
<td>5</td>
<td>Check VSAN setup.</td>
</tr>
<tr>
<td>6</td>
<td>Reboot host.</td>
</tr>
<tr>
<td>7</td>
<td>Post-ESXi installation configuration.</td>
</tr>
<tr>
<td>8</td>
<td>Verify disk status.</td>
</tr>
<tr>
<td>9</td>
<td>Create user task.</td>
</tr>
<tr>
<td>10</td>
<td>Check VSAN status after reboot.</td>
</tr>
<tr>
<td>11</td>
<td>Deploy LCM.</td>
</tr>
<tr>
<td>12</td>
<td>Shutdown LCM.</td>
</tr>
<tr>
<td>13</td>
<td>Take LCM snapshot.</td>
</tr>
<tr>
<td>14</td>
<td>Deploy LCM backup VM.</td>
</tr>
<tr>
<td>15</td>
<td>Shutdown backup LCM VM.</td>
</tr>
<tr>
<td>16</td>
<td>Take backup LCM snapshot.</td>
</tr>
<tr>
<td>17</td>
<td>Deploy ISVMs.</td>
</tr>
<tr>
<td>18</td>
<td>Shutdown ISVMs.</td>
</tr>
<tr>
<td>19</td>
<td>Take ISVM snapshot.</td>
</tr>
<tr>
<td>20</td>
<td>Deploy VRM.</td>
</tr>
<tr>
<td>21</td>
<td>Post VRM installation configuration.</td>
</tr>
<tr>
<td>22</td>
<td>Set VM startup shutdown order.</td>
</tr>
<tr>
<td>23</td>
<td>Upload bundle ISO.</td>
</tr>
<tr>
<td>24</td>
<td>Add ISO to VRM.</td>
</tr>
<tr>
<td>25</td>
<td>Collect inventory.</td>
</tr>
<tr>
<td>26</td>
<td>Import SSH public keys.</td>
</tr>
<tr>
<td>27</td>
<td>Copy PRM manifest.</td>
</tr>
<tr>
<td>28</td>
<td>Copy HMS IB inventory.</td>
</tr>
<tr>
<td>29</td>
<td>Create VRM snapshot.</td>
</tr>
<tr>
<td>30</td>
<td>Reboot VRM.</td>
</tr>
</tbody>
</table>
Table 4-5. Configuration on Remaining Nodes

<table>
<thead>
<tr>
<th>Number</th>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Install Custom VIBs</td>
<td>Install any custom VIBs that may be necessary to enable vendor specific devices on the server.</td>
</tr>
<tr>
<td>2</td>
<td>Reboot server</td>
<td>Reboot the server to complete the installation process.</td>
</tr>
<tr>
<td>3</td>
<td>Apply licence</td>
<td>Apply ESXi licence.</td>
</tr>
<tr>
<td>4</td>
<td>Create user</td>
<td>Create a new ESXi user with Administrator role.</td>
</tr>
<tr>
<td>5</td>
<td>Generate manifest</td>
<td>Generate device manifest, which contains the imaging status of the device, the IP address assigned, the software used to image it, etc. This is performed on all components irrespective of whether the previous steps were successful or not. This allows VIA to track the status of imaging of any given component during any stage of the imaging process.</td>
</tr>
</tbody>
</table>

Imaging is a multi-step process.

1 **Upload the Software Bundle** on page 41
   The software bundle ISO file contains the software bits and scripts to be imaged on the physical rack. You can upload multiple bundles at a time and activate the bundle that is to be used for imaging.

2 **Specify Imaging Details** on page 44
   At the Details step of an imaging run, you provide a name and description for the imaging run as well component and port information for the rack.

3 **Monitor Imaging** on page 47
   In the Monitor Imaging step of the imaging workflow, you can see the imaging status on all devices in your physical rack.

4 **Verify Inventory** on page 48
   In the Verify step of the imaging workflow, the system collects inventory information for each device in the rack.

5 **Post Imaging Checks** on page 49
   In the final step of the imaging workflow, VIA creates a rack inventory file.

**Upload the Software Bundle**

The software bundle ISO file contains the software bits and scripts to be imaged on the physical rack. You can upload multiple bundles at a time and activate the bundle that is to be used for imaging.

The bundle contains the following software:

- vSphere (vCenter Server and ESXi)
- NSX
- Virtual SAN
- vRealize Log Insight
- vRealize Operations
- SDDC Manager
- Platform Services Controller
- VMware Horizon with View
- App Volumes
Prerequisites

- Download the Cloud Foundation software bundle and the md5sum file on your laptop, desktop, or jump VM.
- If you are re-purposing hosts in your datacenter, backup the data on the hosts. They are wiped clean during imaging.
- Ensure that the KVM console is closed.
- For Dell servers only, install the Dell RACADM utility on VIA.
  b. Unzip the tarball.
     ```
     tar -xzf filename
     ```
  c. Navigate to the RPM location.
     ```
     cd linux/rac/SLES11/x86_64/
     ```
  d. Install the package.
     ```
     rpm -Uvh *.rpm
     ```
  The RACADM utility sets most of the BIOS parameters for Dell servers automatically except for DHCP and IPMI.
- For Dell servers only, set the following BIOS parameters.
  - Enable DHCP on the iDRAC/BMC port.
  - Enable IPMI over LAN on BMC.
- For servers from other vendors, all BIOS settings need to be set manually. See Chapter 8, “BIOS Settings,” on page 63.

Procedure

1. In a browser window on the jump VM, type http://192.168.100.2:8080/via.
2. Click Bundle.

   ![VIA User's Guide](image)

   **Upload Bundle**

   - **Bundle Location**
     - **CD/DVD Drive:** CD mounted successfully
     - **Bundle Hash**
       - **MD5SUM File:**

   ![Upload Bundle](image)

3. In the **Bundle Location** area, click **Refresh**.
   Wait for the message **CD mounted successfully** to be displayed.
4 In the **Bundle Hash** area, click **Browse**, navigate to the directory that contains the MD5SUM file, select the file, and click **Open**.

5 Click **Upload Bundle**.

The bundle upload can take several minutes. After the upload is complete, the message **Bundle uploaded successfully** is displayed in the Upload Bundle area.

6 In the **Bundle Info** area, select the bundle in **Available Versions** and click **Activate Bundle**.

The selected bundle is now the active bundle for imaging and is ready to be used. Active bundle details are displayed next to **Active Bundle**.

7 (Optional) Verify that the ISO file and **manifest.xml** file are copied to the VIA VM.
   a In a console window, SSH to the VIA VM.
      
      ```
      ssh root@192.168.100.2
      
      The password is root123.
      ```
   b Navigate to the `/mnt/cdrom/` directory.
   c Confirm that the bundle directory and **manifest.xml** are in this directory.
Specify Imaging Details

At the Details step of an imaging run, you provide a name and description for the imaging run as well component and port information for the rack.

Prerequisites

- Software bundle must have been uploaded and activated.
- iDRAC and KVM consoles must be closed. If an iDRAC console is open, imaging may fail.

Procedure

1. In the VIA user interface, click Imaging.

2. (Optional) Type a name and description for the imaging run.

3. In Deployment Type, select Cloud Foundation Full Deployment.

4. In Rack Type, select Primary Rack if you are imaging rack 1. For additional racks, select Add-On Rack.

5. For the management switch and ToR switches, select the vendor and model. The IP address for each switch is displayed.

6. Type the MAC address of each switch.

7. If the physical rack contains spine switches (rack 2 only), type the number of spine switches in the Number field in the Spine Switch section.

Ensure that you are in the Details tab.
8 Select the vendor and model number of the spine switches.

9 In the Server section, type the number of servers in the physical rack.

10 Select the vendor and model number of each server. The IP address for each server is displayed.

**Note** Ensure that you have selected the component models correctly. VIA enforces a strict matching of the server models selected during imaging against what is discovered by VIA. If they do not match, imaging fails.

11 Type the MAC address of each server.

12 Click in any section to view the VIA properties file.

The VIA properties file displays rack specification values from the activated software bundle.

- If required, edit the file as appropriate. For example, delete the ToR OOB ports that you are not using to speed up the imaging process.
- Ensure that the **ESXi Disk-Type** value matches the actual boot device name (scroll to the bottom of the page to see this field). Edit the value if required.

13 Click **Save**.
14 Click **Start Imaging**. The wiring diagram for the rack is displayed.

Review the wiring diagram to check if your rack is wired according to displayed wiremap. See “Rack Wiring,” on page 19.

Click **Confirm** if it is accurate. If you need to make any wiring changes, click **Cancel**.

**What to do next**

Once imaging starts, notifications (errors, warnings, and information) are displayed in the top right corner of the VIA window. Click the **icon to review the messages so that you can take the appropriate steps to complete the imaging successfully.**
Monitor Imaging

In the Monitor Imaging step of the imaging workflow, you can see the imaging status on all devices in your physical rack.

Procedure

1. Click the Imaging > Imaging tab.

The run details, rack details, and imaging status for the rack are displayed. The devices in the physical rack are displayed in the order in which they will be imaged.

**Note** Note the Run ID. You will need it to retrieve the rack thumbprint after imaging is completed.

2. Click a device to see information about the imaging tasks completed and in-progress tasks.

It can take approximately 95 minutes for rack 1 to be imaged. After the imaging is completed successfully, the Imaging > Verify tab is displayed.

**Note** During imaging, the password of all rack components except SDDC Manager is set to EvoSddc! 2016. The SDDC Manager password is set to a random string, which can be retrieved by an API call.

**Note** For VCE racks, the ScaleIO VIB needs to be manually installed.
For information on next steps if a device fails to be imaged, see “Resume Imaging,” on page 50.

**Verify Inventory**

In the Verify step of the imaging workflow, the system collects inventory information for each device in the rack.

**Procedure**

1. Click the **Imaging > Verify**

   ![Verify Inventory Interface](image1)

   The status of inventory collection on each device in the rack is displayed.

2. Click a device to see its inventory information. You can expand a component to see more details.

   ![Inventory Details](image2)
Post Imaging Checks

In the final step of the imaging workflow, VIA creates a rack inventory file.

Procedure

1. Click the Imaging > Finish tab.

Post imaging tasks are displayed.

2. If a task is not completed successfully, click Rerun.

3. After each displayed task has a ✓ icon next to it, click Finish.

The rack inventory file is created for the customer. This file includes the SDDC Manager password generated during imaging. The imaged rack is now ready to be shipped to the customer.

4. Power down the primary rack.

It is important to power down the rack even if you are deploying Cloud Foundation on a ready system so that the management switch is rebooted.

Retrieve SDDC Manager Password and Rack Thumbprint

During imaging, VIA generates a password for the root account of SDDC Manager and a thumbprint for the imaged rack. Both of these are required by the customer.

Procedure

1. Open a new tab in the browser where you were imaging the rack.
2 Type the following:

192.168.100.2:8080/via/ipsecThumbprint/runId

The browser displays the SDDC Manager password, bootstrap password, and rack thumbprint.

3 Print the output.

If you are a partner imaging the rack for a customer, send this print out to the customer along with the imaged rack.

If you are imaging your own rack, keep this print out. You will need this password during bring-up.

Resume Imaging

A device may fail to be imaged because of possible hardware faults or mis-configuration, or network issues. You can take a number of actions that can help in continuing with the imaging run.

Fix Issues During the Monitor Imaging Step

During the monitor step in the imaging workflow, you can identify imaging failures by looking at the progress bar on the components in the Imaging > Imaging tab. An icon indicates that it has been imaged successfully. An icon indicates that one or more imaging tasks on that devices failed.

1 Click the component to display the imaging task list for that device. Then do one of the following:

- Click Retry to re-start imaging on that device.

- Click Remove to remove that device from the VIA UI and database and then click Yes to confirm. The removed device is grayed out and it is not imaged. Ensure that you remove this device from the physical rack before shipping it to the customer. To add a removed device back to the VIA UI, click the device and click Add to Inventory. The device is added back to the VIA UI and database.

2 If you need to resolve a hardware issue before re-trying imaging on that device, close the task list dialog box. In the Imaging > Imaging window, click Stop.

3 If you are able to resolve the hardware problem, click Resume. Imaging is resumed from the state where it had stopped. If you need additional time to resolve the hardware issue or there are other hardware problems, click Abort. The imaging run is discarded.

If you are unable to resolve the hardware issues, contact VMware Support.
4 Click Next to proceed to the next step in the workflow.

**Fix Issues During the Verify Imaging Step**

During the verify step in the imaging workflow, you can identify imaging failures by looking at the progress bar on the components in the Imaging > Verify tab. An "ok" icon indicates that inventory information has been collected successfully. An "x" icon indicates that the tasks on that device failed.

1 Click the component to display the verification task list for that device.

2 Click Retry

3 Once the device displays an "x" icon, click Next.
Fix Issues During the Finish Imaging Step

During the finish step in the imaging workflow, failed post-imaging tasks are displayed with an icon.

1. Click **Rerun** to run the failed task again.
2. After all tasks display an icon, click **Complete**.

Opening an Aborted Run

If you had accidentally aborted an imaging run, you can re-open it.

1. In the VIA user interface, click **History**.
2. In the **Select Run ID** drop-down, select the run ID you want to open.
3. Click **Reopen**.

The selected run is opened in the state it was at the time the run had been aborted.

Image Additional Racks

Follow this procedure for each additional rack if you are imaging racks incrementally in a multi-rack environment.

**Procedure**

1. Disconnect port 48 of the management switch on rack1 from the private managed switch.
2. Connect port 48 of the management switch on the next rack to the private managed switch.
Imaging Individual Devices

You can image a server or management switch as an individual device.

This chapter includes the following topics:

- “Image Individual Server,” on page 53
- “Image New Management Switch,” on page 54

**Image Individual Server**

You can use the individual server imaging feature in the following scenarios:

- Imaging fails on a server in a rack
  
  You can image that server as an individual device rather than re-imaging the complete rack.

- You are adding a new host to a Cloud Foundation rack or replacing a dead host.
  
  You can image the new or replacement host with this feature.

**Prerequisites**

If this is a new or replacement host, do the following.

- Mount the host in the appropriate slot in the physical rack. For a replacement host, mount it in the same slot as the previous host and wire it according to the same wiring connections.

- Depending on whether VIA is installed on a laptop or management host, the NIC port on the laptop must be connected to port 48 of the management switch. Or the management host must be connected to a private managed switch that is connected to port 48 of the management switch.

- VIA must have access to ESXi OOB network (192.168.0.x) and inband network (192.168.100.x).

- Software bundle must have been uploaded.

- BIOS settings must have been set on the server to be imaged.

- In a multi-rack scenario, disconnect the spine switches temporarily while imaging is in progress. This prevents hosts on the other rack from being impacted by the imaging process.

For both use cases, ensure that:

- Server is in ONIE mode.

- iDRAC consoles are closed. If an iDRAC console is open, imaging may fail.

**Procedure**

1. In the VIA user interface, click Imaging.

   Ensure that you are in the Details tab.
2 (Optional) Type a name and description for the imaging run.

3 In Deployment Type, select Cloud Foundation Individual Deployment.

4 In Device Type, select ESXi_SERVER.

5 In Rack Type, select Primary Rack if you are imaging a server in rack 1. For a server in an additional racks, select Add-On Rack.

6 Select the vendor and model number of the server. The IP address of the server is displayed.

7 If you want the displayed IP address to be assigned only to the host being imaged, type the MAC address of the server.

8 Click Start Imaging.

9 Power on the server.

The server is discovered and the imaging process begins.

10 Open the KVM console to the server.

11 For a Dell server, change the boot device for the next boot to Local SD.

Do not power cycle or reset the server.

12 Monitor the ESXi installation on the console.

The server is rebooted after ESXi installation is complete. Ensure that ESXi is booting from the installed copy of ESXi and not from the network.

After the server boots from the installed copy of ESXi, VIA continues imaging the server.

13 After imaging is completed, disconnect VIA and shutdown the laptop or management host.

**Image New Management Switch**

Imaging the new management switch with VIA installs the necessary software on the switch.

**Prerequisites**

- Management switch must be connected to the laptop or management host where VIA is installed.
  - If VIA is installed on a laptop, the NIC port on the laptop must be connected to port 48 of the management switch.
  - If VIA is installed on a management host, the management host must be connected to a private managed switch that is connected to port 48 of the management switch.
- Identify the Cloud Foundation version in your environment and ensure that the appropriate bundle and md5sum file is uploaded on VIA.

**Note** Do not connect the management switch to any host before or during imaging.

**Procedure**

1 In the VIA user interface, click Imaging.

Ensure that you are in the Details tab.

2 (Optional) Type a name and description for the imaging run.

3 In Deployment Type, select Cloud Foundation Individual Deployment.

4 In Device Type, select MGMT_SWITCH.

5 Select the vendor and model number of the switch. The IP address is displayed.
6 Click Start Imaging.

Imaging fails at collect BMC-IP information task. This is expected behavior.

7 Disconnect the switch from the laptop or management host.
Viewing the VIA Log File

The log file displays information for all VIA services.

Procedure

- On the left navigation bar in the VIA user interface, click Logs.

A consolidated log of VIA services is displayed sorted by the time stamp. A maximum of 500 entries is displayed at a time.

You can filter the logs by typing a search string and clicking Submit. For example, you can search for activities on the primary ESXi server.

To display the complete log file, click Open a new window.

The Auto Refresh option is selected by default where the log file automatically scrolls to display the most current information.
You can view the imaging history for an imaged rack or the status of individual devices on an imaged rack.

This chapter includes the following topics:

- “View Imaging History,” on page 59
- “View Inventory,” on page 60

View Imaging History

You can view the status of an imaging run by specifying its run ID. If you imaged multiple racks using the same VIA VM, you can view the imaging history of each rack by specifying its run ID.

Prerequisites

Verify that an imaging run is not in progress.

Procedure

1. In the VIA user interface, click **History**.

![In VIA user interface, select History tab and specify run ID.](image)
2. In **Select Run ID**, select the run ID for which you want to view the imaging history. Imaging history appears for all devices that are imaged during the specified run.

3. To view details for a device, click the expand icon next to the device.

4. To reopen a previous run, select the run ID and click **Reopen**. You can continue imaging an aborted run by reopening it.

**View Inventory**

The Inventory page displays a consolidated report of the rack inventory. You can view device details by expanding the appropriate device.

**Prerequisites**

Verify that an imaging run is not in progress.

**Procedure**

1. In the VIA user interface, click **Inventory**.
2 In Select Run ID, select run ID.

The device inventory for the selected imaging run is displayed.

3 To view details for a device, click the expand icon next to the device.

4 To download the rack inventory click **Download** and specify the directory where the file is to be saved.

   The device inventory is saved as a JSON file.
The BIOS settings for each device in the physical rack must match the values given below.

This chapter includes the following topics:

- “Quanta Settings,” on page 63
- “Dell Settings,” on page 64
- “Hewlett Packard Settings,” on page 65

**Quanta Settings**

**Table 8-1. All components**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Path to Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set BIOS clock to current time</td>
<td>Main &gt; BIOS Information &gt; System Time</td>
</tr>
</tbody>
</table>

**Table 8-2. Servers**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Path to Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boot order</td>
<td>System BIOS Settings &gt; Boot &gt; Fixed Boot Order Priorities</td>
<td>Network first</td>
</tr>
<tr>
<td></td>
<td>1 Use arrow key to reach the correct boot order number.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 Press Enter.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The boot devices are displayed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 Use arrow key to highlight Network.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 Press Enter to select it.</td>
<td></td>
</tr>
<tr>
<td>HDD order</td>
<td>System BIOS Settings &gt; Boot &gt; Hard Disk Drive BBS Priorities</td>
<td>SATADOM first</td>
</tr>
<tr>
<td></td>
<td>1 Press Enter.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 Press Enter again.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The boot devices are displayed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 Use arrow key to highlight SATADOM.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 Press Enter to to make it the first device in the boot order.</td>
<td></td>
</tr>
<tr>
<td>Hyperthreading</td>
<td>Navigate to System BIOS Settings &gt; Advanced &gt; CPU Configuration &gt; Hyper-threading.</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td>2 Press Enter to enable.</td>
<td></td>
</tr>
<tr>
<td>IPMI credentials</td>
<td></td>
<td>Default credentials</td>
</tr>
<tr>
<td>IPMI Network Settings</td>
<td></td>
<td>DHCP</td>
</tr>
</tbody>
</table>
Table 8-2. Servers (Continued)

<table>
<thead>
<tr>
<th>Setting</th>
<th>Path to Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode</td>
<td>Legacy</td>
<td></td>
</tr>
<tr>
<td>NUMA</td>
<td>1 Navigate to System Bios Settings &gt; Chipset &gt; North Bridge &gt; Num a . 2 Press Enter to enable. Disabling node interleaving enables NUMA</td>
<td>Enabled</td>
</tr>
<tr>
<td>Power management</td>
<td>System BIOS Settings &gt; Advanced &gt; CPU Power Management Configuration</td>
<td></td>
</tr>
<tr>
<td>EIST (P-states)</td>
<td></td>
<td>Enabled</td>
</tr>
<tr>
<td>Turbo Mode</td>
<td></td>
<td>Enabled</td>
</tr>
<tr>
<td>CPU C3 report</td>
<td></td>
<td>Disabled</td>
</tr>
<tr>
<td>CPU C6</td>
<td></td>
<td>Enabled</td>
</tr>
<tr>
<td>CPU Advanced PM Tunning / Energy Per BIAS</td>
<td>Balanced performance</td>
<td></td>
</tr>
<tr>
<td>PXE on 1G</td>
<td>1 Navigate to System BIOS Settings &gt; Advanced &gt; Onboard Device Configuration . 2 Select Enabled Without PXE for both the 1G NICs.</td>
<td>Disabled</td>
</tr>
<tr>
<td>PXE on 10G</td>
<td>10G NICs set by default to PXE. To verify, press Ctrl+s while the server is booting to enter the BIOS.</td>
<td>Enabled</td>
</tr>
<tr>
<td>VT</td>
<td>System BIOS Settings &gt; Advanced &gt; Cpu Configuration &gt; Intel Virtualization Technology Press Enter to enable.</td>
<td>Enabled</td>
</tr>
</tbody>
</table>

Dell Settings

During imaging, VIA verifies the BOM settings of Dell components. The values here are for your reference only.

Table 8-3. All components

<table>
<thead>
<tr>
<th>Setting</th>
<th>Path to Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set BIOS clock to current time</td>
<td>1 Navigate to BIOS &gt; System BIOS Settings &gt; Miscellaneous Setting &gt; System Time. 2 Click on the right panel to set time.</td>
<td></td>
</tr>
</tbody>
</table>

Table 8-4. Servers

<table>
<thead>
<tr>
<th>Setting</th>
<th>Path to Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter BIOS</td>
<td>Press F2</td>
<td></td>
</tr>
<tr>
<td>System BIOS Version</td>
<td>1.36</td>
<td>BIOS</td>
</tr>
<tr>
<td>Boot Mode</td>
<td>System BIOS Settings &gt; Boot Settings &gt; Boot Mode BIOS</td>
<td>BIOS</td>
</tr>
<tr>
<td>Boot sequence</td>
<td>1 Navigate to System BIOS Settings &gt; Boot Settings &gt; Boot Sequence . 2 Use arrow key and + to move both Integrated NIC ports to the top. Hard drive C should be on bottom.</td>
<td>Network first</td>
</tr>
<tr>
<td>Hard-Disk Drive Sequence</td>
<td>1 Navigate to System BIOS Settings &gt; Boot Settings &gt; Hard-Disk Drive Sequence . 2 Use the arrow key and + to move Internal SD:IDSDM to the top.</td>
<td>Internal SD: Internal Dual SD</td>
</tr>
<tr>
<td>PXE on 10G</td>
<td>1 Navigate to System BIOS Settings &gt; Boot Settings &gt; Boot Option Enable/Disable. 2 Select both Integrated NIC ports and hard drive C.</td>
<td>Enabled</td>
</tr>
</tbody>
</table>
Table 8-4. Servers (Continued)

<table>
<thead>
<tr>
<th>Setting</th>
<th>Path to Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>VT</td>
<td>System BIOS Settings &gt; Processor Settings &gt; Virtualization Technology Enabled.</td>
<td>Enabled</td>
</tr>
<tr>
<td>Hyperthreading</td>
<td>System BIOS Settings &gt; Processor Settings &gt; Logical Processor Enabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>NUMA</td>
<td>System BIOS Settings &gt; Memory Settings &gt; Node Interleaving Disabled</td>
<td>Disabled</td>
</tr>
<tr>
<td></td>
<td>Disabling node interleaving enables NUMA</td>
<td></td>
</tr>
<tr>
<td>SD Card Mirroring</td>
<td>System BIOS Settings &gt; Integrated Devices &gt; Internal SD Card Redundancy &gt; Mirror</td>
<td>Enabled</td>
</tr>
<tr>
<td>System Profile Settings</td>
<td>1 Navigate to System BIOS Settings &gt; System Profile Settings .</td>
<td>System Profile = Custom CPU Power Management = Maximum Performance Memory Frequency = Maximum Performance C1E = Disabled C States = Disabled</td>
</tr>
<tr>
<td></td>
<td>2 Change System Profile to Performance.</td>
<td></td>
</tr>
<tr>
<td>iDRAC Settings - Network</td>
<td>iDRAC Settings &gt; Network &gt; Enable NIC</td>
<td>Enable NIC</td>
</tr>
<tr>
<td>iDRAC Settings - Network</td>
<td>NIC Selection &gt; Dedicated &gt; iDRAC Settings &gt; Network &gt; NIC Selection &gt; Dedicated</td>
<td></td>
</tr>
<tr>
<td>iDRAC Settings - Network</td>
<td>iDRAC Settings &gt; Network &gt; IPV4 Settings &gt; Enable DHCP &gt; Enabled</td>
<td>DHCP</td>
</tr>
<tr>
<td>iDRAC Settings - Network</td>
<td>iDRAC Settings &gt; Network &gt; IPMI Settings &gt; Enable IPMI Over LAN &gt; Enabled</td>
<td>Enable IPMI Over LAN</td>
</tr>
<tr>
<td>iDRAC Credentials</td>
<td>1 In web UI, navigate to iDRAC SettingsUser AuthenticationEnable User</td>
<td>Use default values</td>
</tr>
<tr>
<td></td>
<td>2 Use default user root and password calvin.</td>
<td></td>
</tr>
<tr>
<td>PXE on 1G</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Integrated RAID Controller Mode</td>
<td>Device Settings &gt; Integrated RAID Controller &gt; Controller Management &gt; Controller Mode &gt; HBA</td>
<td>HBA</td>
</tr>
<tr>
<td>Non RAID Disk Mode</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Physical Disk Status</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>

**Hewlett Packard Settings**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Path to Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firmware Version</td>
<td>HP Network First SD card 1st</td>
<td></td>
</tr>
<tr>
<td>Mode</td>
<td>BIOS/Platform Configuration (RBSU) Boot Options &gt; Boot Mode [Legacy BIOS Mode]</td>
<td>Legacy</td>
</tr>
<tr>
<td>Boot order</td>
<td>BIOS/Platform Configuration (RBSU) Boot Options &gt; Legacy BIOS Boot Order</td>
<td>Network first</td>
</tr>
<tr>
<td>HDD order</td>
<td></td>
<td>SD Card first</td>
</tr>
<tr>
<td>Setting</td>
<td>Path to Setting</td>
<td>Value</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>PXE on 1G</td>
<td>BIOS/Platform Configuration (RBSU) Boot Options &gt; Network Boot Options Order</td>
<td>Disabled</td>
</tr>
<tr>
<td>PXE on 10G</td>
<td>BIOS/Platform Configuration (RBSU) Boot Options &gt; Network Boot Options Order</td>
<td>Enabled</td>
</tr>
<tr>
<td>VT</td>
<td>BIOS/Platform Configuration (RBSU) System Options &gt; Virtualization Options &gt; Virtualization Technology</td>
<td>Enabled</td>
</tr>
<tr>
<td>Hyperthreading</td>
<td>BIOS/Platform Configuration (RBSU) System Options &gt; Processor Options &gt; Intel(R) Hyperthreading</td>
<td>Enabled</td>
</tr>
<tr>
<td>IPMI credentials</td>
<td></td>
<td>Default credentials (admin/admin)</td>
</tr>
<tr>
<td>IPMI Network</td>
<td>iLO 4 Configuration Utility &gt; Network Options &gt; DHCP Enable [ON]</td>
<td>DHCP</td>
</tr>
<tr>
<td>Settings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuning /Energy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per BIAS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Troubleshooting VIA

This chapter includes the following topics:

- “Host failed to be imaged with error Unable to Establish IPMI v2 / RMCP+ Session,” on page 67
- “ESXi Server has Incorrect BIOS Settings,” on page 67
- “ESXi Server has Bad SD Card,” on page 68
- “Management Switch Boots into EFI Shell,” on page 68

Host failed to be imaged with error Unable to Establish IPMI v2 / RMCP+ Session

VIA was not able to power on a host and failed to image it.

Problem

After a host was powered off, VIA was unable to power it on. The following error was displayed.

Unable to establish IPMI v2 / RMCP+ session Unable to set Chassis Power Control to Up/On

Cause

VIA was unable to establish an IPMI v2 or RMCP+ session with the host.

Solution

1. Manually power on the host through DRAC.
2. On the Imaging tab, click the host that displayed the red icon and click Retry.

VIA continues imaging the rack.

ESXi Server has Incorrect BIOS Settings

Problem

Host failed to be imaged with the message Post install reboot ESXi task failed.

Cause

ESXi server has incorrect BIOS settings.

Solution

1. Check the ESXi server console.
2 If the console displays a gray screen with the message Unable to find boot device, check that the BIOS setting is SATADOM for Quanta servers and SD card for Dell servers.

3 Fix the hardware problem.

4 On the Imaging tab, click the host that displayed the red icon and click Retry.

**ESXi Server has Bad SD Card**

**Problem**
Device failed to be imaged with the message *Kickstart image not delivered.*

**Cause**
ESXi server has bad SD card.

**Solution**
1 Replace the SD flash card in the ESXi server.
2 On the Imaging tab, click the host that displayed the red icon and click Retry.

**Management Switch Boots into EFI Shell**

**Problem**
After rebooting, the management switch boots into EFI shell instead of ONIE mode.

**Cause**
The switch was not in ONIE mode and after rebooting, it boots into an EFI shell.

**Solution**
1 Connect to the management switch with a console cable.
2 Press DEL to change the boot order.
3 Select P0.
4 Select Save changes.
5 Select Save changes and restart.
6 To wipe the switch login as cumulus, type `sudo cl-image-select -k`.
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