

Cisco UCS Common Platform Architecture (CPA) for Big Data with Cloudera

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Building Architectures to Solve Business Problems



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Cisco UCS Common Platform Architecture (CPA) for Big Data with Cloudera

Overview

Today's enterprise must store and analyze massive amounts of unstructured data to uncover crucial insights that can lead to competitive advantage. Cisco and Cloudera offer high-performance infrastructure for big data analytics that is cost effective, flexible, and scalable.

While the competitive pressure on enterprises vastly increases, the amount of data being ingested and managed has exploded and is accelerating quickly. At the same time, the need for timely and more accurate analytics has also increased. As a result, the need for a cost-effective, flexible, and scalable infrastructure to store and process data has never been greater. Cisco and Cloudera have partnered to deliver tested and certified Hadoop infrastructure solutions and ongoing support that help take the time and risk out of deploying Hadoop. These solutions provide a comprehensive, enterprise-class platform for Hadoop applications powered by Cloudera Enterprise, tested by Cisco and certified by the Cloudera Certified Technology program to streamline deployment and reduce risk.

Audience

This document describes the architecture and deployment procedures of Cloudera Enterprise on the Cisco UCS CPA for Big data. The intended audience of this document includes, but is not limited to, sales engineers, field consultants, professional services, IT managers, partner engineering and customers who want to deploy Cloudera Enterprise on the Cisco UCS CPA for Big Data.

Big Data and Apache Hadoop

The volume, variety, and velocity of unstructured data coming from a profusion of inter-connected devices are unprecedented. "Big Data" refers to data that just doesn't fit easily into traditional relational models because it's often a mix of structured and unstructured data, it comes in too fast, and it's too expensive to store in a way that's accessible. The ability to leverage big data requires a new type of data



management platform that can adequately capture and extract value from all of it. Apache Hadoop is the open source framework that lets organizations mine the insights of new and emerging types of information, a capability that simply did not exist before.

Unlike relational databases that are designed exclusively for SQL, the operations that need to be performed on this "Big data" are as diverse as the data itself. SQL is no longer the only desired method to prosecute data. The power of Hadoop is the ability to bring multiple computation frameworks to a single pool of data (within a single set of system resources), depending on what needs to be done: batch processing/transformations, interactive SQL, search, machine learning, statistical computation, and others. Previously doing each of these things required copying data sets into separate specialized systems, which added cost and complexity while diluting data integrity.

Moving beyond its roots in Web 2.0 technology, Apache Hadoop is rapidly emerging as an essential enterprise platform. Consumer and commercial industries are all finding applications for big data analytics, particularly as they are faced with new challenges in today's web and social content and interaction models. But taking advantage of Hadoop is not simple – it's a complex distributed system comprised of a dozen different open source projects.

Together, Cisco and Cloudera are well positioned to help organizations exploit the valuable business insights in all their data, regardless of whether it's structured, semi structured or unstructured. Cloudera is the leading provider of enterprise-grade Hadoop infrastructure software and services, and the leading contributor to the Apache Hadoop project overall. Cloudera provides an enterprise-ready Hadoop-based solution known as Cloudera Enterprise, which includes their market leading open source Hadoop distribution (CDH), their comprehensive management system (Cloudera Manager), and technical support. Cisco has been the leader in networking for decades, providing proven solutions that meet critical business requirements. Cisco UCS C-Series Rack-Mount Servers based on Intel® Xeon® processors complete these offerings, delivering an integrated Hadoop infrastructure.

Cisco UCS Common Platform Architecture (CPA) for Big Data

The Cloudera Hadoop Reference Configuration is based on Cisco UCS Common Platform Architecture (CPA) for Big Data, a highly scalable architecture designed to meet a variety of scale-out application demands with seamless data integration and management integration capabilities built using the following components:

- Cisco UCS 6200 Series Fabric Interconnects: The Cisco UCS 6200 Series Fabric Interconnects are a core part of Cisco UCS, providing both network connectivity and management capabilities across Cisco UCS 5100 Series Blade Server Chassis as well as Cisco UCS C-Series Rack-Mount Servers. Typically deployed in redundant pairs, the Fabric Interconnects offer line-rate, low-latency, lossless, 10 Gigabit Ethernet connectivity and unified management with Cisco UCS Manager in a highly available management domain.
- **Cisco UCS 2200 Series Fabric Extenders**: Cisco UCS 2200 Series Fabric Extenders behave as remote line cards for a parent switch and provide a highly scalable and extremely cost-effective unified server-access platform.
- Cisco UCS C-Series Rack Mount Servers: Cisco UCS C240 M3 Rack-Mount Servers are 2-socket servers based on Intel Xeon E-2600 series processors and supporting up to 768 GB of main memory. 24 Small Form Factor (SFF) disk drives are supported in performance optimized option and 12 Large Form Factor (LFF) disk drives are supported in capacity option, along with 4 Gigabit Ethernet LAN-on-motherboard (LOM) ports.

- Cisco UCS Virtual Interface Cards (VICs): Unique to Cisco, Cisco UCS Virtual Interface Cards incorporate next-generation converged network adapter (CNA) technology from Cisco, and offer dual 10-Gbps ports designed for use with Cisco UCS C-Series Rack-Mount Servers. Optimized for virtualized networking, these cards deliver high performance and bandwidth utilization and support up to 256 virtual devices.
- **Cisco UCS Manager**: Cisco UCS Manager resides within the Cisco UCS 6200 Series Fabric Interconnects. It makes the system self-aware and self-integrating, managing all of the system components as a single logical entity. Cisco UCS Manager can be accessed through an intuitive graphical user interface (GUI), a command-line interface (CLI), or an XML application-programming interface (API). Cisco UCS Manager uses service profiles to define the personality, configuration, and connectivity of all resources within Cisco UCS, radically simplifying provisioning of resources so that the process takes minutes instead of days. This simplification allows IT departments to shift their focus from constant maintenance to strategic business initiatives.

Solution Overview

The current version of the Cisco UCS CPA for Big Data offers two options depending on the compute and storage requirements:

- High Performance Configuration—Offers balance of compute power with IO bandwidth optimized for price/performance is built using C240 M3 rack servers powered by two Intel Xeon E5-2665 processors (16 cores) with 256 GB of memory and 24 1TB SFF disk drives.
- High Capacity Configuration—Optimized for low cost per terabyte, is built using C240 M3 rack servers powered by two Intel Xeon E5-2640 processors (12 cores) with 128GB of memory and 12 3TB LFF disk drives.

The solutions are offered in single rack and multiple rack scale. The single rack configuration consists of two Cisco UCS 6296UP 96-port Fabric Interconnects (supports up to 10 racks, 160 servers), two Cisco Nexus 2232PP 10GigE Fabric Extenders and 16 Cisco UCS C240 M3 Rack-Mount Servers (High-Performance Configuration or High-Capacity Configuration). Each server in the configuration connects to the unified fabric through two active-active 10-GigE links using a Cisco UCS VNIC.

Multi-rack configurations include two Cisco Nexus 2232PP fabric extenders and 16 Cisco UCS C240 M3 Rack-Mount Servers for every additional rack.



This document provides Cisco Validated Design of deploying Cloudera Enterprise on single rack High Performance Configuration.

The configuration consists of:

- Two Cisco UCS 6296UP Fabric Interconnects
- Two Cisco Nexus 2232PP Fabric Extenders
- Sixteen Cisco UCS C240M3 Rack-Mount Servers
- Two vertical PDUs, country specific
- Cisco R42610 standard 42U Rack

Figure 1 Cisco UCS CPA for Big Data Rack Front and Rear View



The High Performance Rack and High Capacity Rack configurations are available through the Cisco SmartPlay program in single SKU bundles. PDUs and Rack is not included in the bundle.



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Contact your Cisco representative for country specific PDU information.

Rack and PDU Configuration

The configuration consists of two vertical PDUs, two Cisco UCS 6296UP Fabric Interconnects, two Cisco Nexus 2232PP Fabric Extenders and sixteen Cisco UCS C240M3 Servers are connected to each of the vertical PDUs for redundancy; thereby, ensuring availability during power source failure.

The rack configuration is shown in Table 1.

Cisco 42U Racks	Components
42	Cisco UCS FI 6296UP
41	
40	Cisco UCS FI 6296UP
39	
38	Cisco Nexus FEX 2232PP
37	Cisco Nexus FEX 2232PP

 Table 1
 Rack Configuration Details

Ciese A211 Deeke	Componente
36	Unused
35	Unused
34	Unused
33	Unused
32	Cisco UCS C240M3
31	
30	Cisco UCS C240M3
29	
28	Cisco UCS C240M3
27	
26	Cisco UCS C240M3
25	
24	Cisco UCS C240M3
23	
22	Cisco UCS C240M3
21	
20	Cisco UCS C240M3
19	
18	Cisco UCS C240M3
17	
16	Cisco UCS C240M3
15	
14	Cisco UCS C240M3
13	
12	Cisco UCS C240M3
11	
10	Cisco UCS C240M3
9	
8	Cisco UCS C240M3
7	
6	Cisco UCS C240M3
5	
4	Cisco UCS C240M3
3	
2	Cisco UCS C240M3
1	

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Table 1 Rack Configuration Details

Server Configuration and Cabling

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The C240 M3 rack server is equipped with Intel Xeon E5-2665 processors, 256 GB of memory, Cisco UCS Virtual Interface Card 1225 Cisco, Cisco LSI MegaRAID SAS 9266-8i - storage controller, and 24 x 1TB 7.2K SATA disk drives.

Figure 3 illustrates the physical connectivity of Cisco UCS C240M3 Servers to Cisco Nexus 2232PP Fabric Extenders and Cisco UCS 6296UP Fabric Interconnects.

Figure 2 Cisco Hardware Connectivity



Cisco UCS C240 M3 Server

Figure 3 shows the ports of the Cisco Nexus 2232PP Fabric Extender connecting the Cisco UCS C240M3 Servers. 16 Cisco UCS C220M3 Servers are used in the rack configuration offered by Cisco.

Figure 3 Connectivity Diagram of Cisco Nexus 2232PP FEX and Cisco UCS C220M3 Servers



For more information on configuring single-wire management, see:

http://www.cisco.com/en/US/docs/unified_computing/ucs/c-series_integration/ucsm2.1/b_UCSM2-1_C-Integration_chapter_010.html

For more information on physical connectivity illustrations and cluster setup, see:

http://www.cisco.com/en/US/docs/unified_computing/ucs/c-series_integration/ucsm2.1/b_UCSM2-1_ C-Integration_chapter_010.html#reference_FE5B914256CB4C47B30287D2F9CE3597

Software Distributions and Versions

The software distributions required versions are:

- Cloudera Enterprise, page 12
- Red Hat Enterprise Linux (RHEL), page 12

Cloudera Enterprise

Cloudera software for Cloudera Distribution for Apache Hadoop is v4.x (CDH4). For more information on Cloudera, see:

www.cloudera.com.

Red Hat Enterprise Linux (RHEL)

The operating system supported is Red Hat Enterprise Linux Server 6.2. For more information on the Linux support, see:

www.redhat.com.

Table 2 provides the software versions tested and validated for this model.

Layer	Components	Version or Release
Compute	Cisco UCS C240M3	1.4.7cc
Network	Cisco UCS 6296UP	UCS 2.1(1e)
	Cisco Nexus 2232PP	5.1(3)N2(2.11a)
	Cisco UCS VIC 1225 Firmware	2.1(1e)
	Cisco UCS VIC 1225 Driver	2.1.1.41
Storage	LSI 9266-8i Firmware	23.7.0-0039
	LSI 9266-8i Driver	06.504.01.00

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Table 2 Software Version Details

Layer	Components	Version or Release
Software	Red Hat Enterprise Linux Server	6.2 (x86_64)
	Cisco UCSM	2.1(1e)
	CDH	4.1.3 (x86_64)
	Cloudera Manager	4.5 (x86_64)

Table 2Software Version Details

Fabric Configuration

This section provides details for configuring a fully redundant, highly available configuration for a FlexPod Select for Hadoop. Follow these steps to configure Cisco 6296UP Fabric Interconnect.

- 1. Configure FI A
- 2. Configure FI B
- 3. Connect to IP address of FI A using web browser. Launch Cisco UCS Manger
- 4. Edit the chassis discovery policy.
- 5. Enable server and Uplink Ports
- 6. Create pools and polices for service profile template.
- 7. Create SP template, 16 profiles
- 8. Start discover process
- 9. Associate to server

Performing an Initial Setup of Cisco UCS 6296UP Fabric Interconnects

Follow these steps for initial setup of the Cisco UCS 6296 Fabric Interconnects:

Cisco UCS 6296 FI A

- 1. Connect to the console port on the first Cisco UCS 6296 Fabric Interconnect.
- 2. At the configuration method prompt, enter console.
- 3. If asked to either do a new setup or restore from backup, enter setup to continue.
- 4. Enter y to continue to set up a new fabric interconnect.
- 5. Enter y to enforce strong passwords.
- 6. Enter the password for the admin user.
- 7. Enter the same password again to confirm the password for the admin user.
- 8. When asked if this fabric interconnect is part of a cluster, enter y to continue.
- 9. Enter A for the switch fabric.
- **10**. Enter the cluster name for the system name.
- 11. Enter the Mgmt0 IPv4 address for management port on the fabric interconnect.
- 12. Enter the Mgmt0 IPv4 subnet mask for the management port on the fabric interconnect.

- **13.** Enter the IPv4 address of the default gateway.
- **14.** Enter the cluster IPv4 address.
- **15.** To configure DNS, enter y.
- **16.** Enter the DNS IPv4 address.
- 17. Enter y to set up the default domain name.
- 18. Enter the default domain name.
- **19.** Review the settings that were printed to the console, and if they are correct, enter **yes** to save the configuration.
- 20. Wait for the login prompt to make sure the configuration is saved successfully.

Cisco UCS 6296UP FI B

- 1. Connect to the console port on the second Cisco UCS 6296 Fabric Interconnect.
- 2. At the configuration method prompt, enter console.
- 3. The installer detects the presence of the partner fabric interconnect and adds this fabric interconnect to the cluster. Enter y to continue the installation.
- 4. Enter the admin password for the first fabric interconnects.
- 5. Enter the Mgmt0 IPv4 address for the management port on the subordinate fabric interconnect.
- 6. Enter y to save the configuration.
- 7. Wait for the login prompt to make sure the configuration is saved successfully.

For more information on configuring Cisco UCS 6200 Series Fabric Interconnect, see:

http://www.cisco.com/en/US/docs/unified_computing/ucs/sw/gui/config/guide/2.0/b_UCSM_GUI_Configuration_Guide_2_0_chapter_0100.html

Logging into Cisco UCS Manager

Follow these steps to log into Cisco UCS Manager:

- 1. Open a Web browser and type the Cisco UCS 6296UP Fabric Interconnect cluster address.
- 2. Select the Launch link to download the Cisco UCS Manager Software.
- 3. If a Security Alert dialog box appears, click Yes to accept the security certificate and continue.
- 4. In the Cisco UCS Manager launch page, click Launch UCS Manager.
- 5. When prompted, enter admin for the user name and enter the administrative password and click Login to log in to the Cisco UCS Manager GUI.

Upgrade Cisco UCS Manager Software to Version 2.1(1e)

This document assumes the use of UCS 2.1(1e). For more information on upgrading the software version to Cisco UCS 2.0 release, see:

http://www.cisco.com/en/US/docs/unified_computing/ucs/sw/upgrading/from2.0/to2.1/b_UpgradingCi scoUCSFrom2.0To2.1.pdf

This link provides you information on upgrading Cisco UCS Manager software and Cisco UCS 6296 Fabric Interconnect software to version 2.1(1e).



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Make sure the Cisco UCS C-Series version 2.1(1e) software bundle is loaded on the Fabric Interconnects.

Adding a Block of IP Addresses for KVM Console

Follow these steps to create a block of KVM IP addresses for server access in the Cisco UCS Manager GUI:

- 1. Select the LAN tab at the top in the left pane in the UCSM GUI.
- 2. Select Pools > IP Pool ext-mgmt as shown in Figure 4.

Figure 4 Management IP Pool in Cisco UCS Manager

Eisco Unified Computing System Manager - Neta Fault Summary	q	
	G S New - Qptions 0	Pending Activities Dentity
0 2 7 0	>> 🗐 LAN, 🚯 Pools, 🙏 root, 🎆 IA	P Pools + 🧱 IP Pool ext-mgmt
Equipment Servers LAN SAN VM Admin	General IP Addresses IP Blocks Events	
Filter: Al	Actions	Properties
+ -	👕 Delete	Name: ext-mgmt
	Create Block of IP Addresses	Description:
E LAN Cloud	Show Pool Usage	Size: 19
Appliances		Assigned: 16
Internal LAN Solicies		Assignment Order: 📀 Default 🔘 Sequential
Pools	L	
E-A root		
E- III Pools		
IP Pool ext-mgmt IP Pool isrsi-initiator-pool		
Sub-Organizations		

- **3.** Right-click the IP Pool ext-mgmt.
- 4. Select Create Block of IP Addresses. Create Block of IP Address window appears as shown in Figure 5.

Figure 5

🗼 Create Block of IP Addresses		×
Create a Block of IP Addresses		0
From: 0.0.0.0	Size:	1 🗮
Subnet Mask: 255.255.255.0	Default Gateway; 0.0.0.0	
Primary DNS: 0.0.0.0	Secondary DNS: 0.0.0.0	
		OK Cancel

Creating a Block of IP Addresses

5. Enter the starting IP address of the block and number of IPs needed as well as the subnet and gateway information.

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🜲 Create Block of IP Addresses		×
Create a Block of IP Addresses		0
From: 10.29.160.10	Size:	25
-	-	
Subnet Mask: 255.255.255.0	Default Gateway: 10.29.160.1	
	0	
Primary DNS- 0.0.0	Secondary DNS: 0.0.0.0	
Finaly Did. 1	Secondary DNS, January	

Figure 6 Entering the Block of IP Addresses

- 6. Click **OK** to create the IP block.
- 7. Click **OK** in the confirmation message box.

Editing the Chassis Discovery Policy

Setting the discovery policy now will simplify the addition of Cisco UCS B-Series Chassis in the future and additional fabric extenders for further C-Series connectivity.

To modify the chassis discovery policy, follow these steps:

1. Navigate to the Equipment tab in the left pane in the UCSM GUI.

- 2. In the right pane, select the Policies tab.
- 3. Under Global Policies, change the Chassis Discovery Policy to 8-link as shown in Figure 7.

t Summary	🕒 🕘 🗳 New 👻 🍃 Options 🛛 🕜 🕕 Pending Activities 🛛 🗿 Exit
🔕 🔻 🛆 🖉	
0 2 7 0	>> Big Equipment
ment Servers LAN SAN VM Admin	🗑 Main Topology View 🔤 Fabric Interconnects 🥪 Servers 🧹 Thermal 🆓 Decommissioned 🚠 Firmware Management 🔌 Policies
Filter All	Global Policies Autoconfig Policies Server Inheritance Policies Blade Server Discovery Policies SEL Policy Power Groups
Filter: All	Chassis/FEX Discovery Policy
Equipment	Action: 8 Link
	Link Grouping Preference: None Port Channel
E-M FEX	
E Servers	Rack Server Discovery Policy
Fabric Interconnects	Action: 📀 Immediate 🔿 User Acknowledged
	Sand Daliau (not set)
	Rack Management Connection Policy
	Asian G Sute Adrewledged, C Liter Adrewledged
	Action: 14 Auto Achiowieugeu 1 Oser Achiowieugeu
	Power Policy
	Redundancy: C Non Redundant C N+1 C Grid
	MAC Address Table Aging
	Aging Time: O Never (• Mode Default O other
	Clobal Power Allocation Policy
	Allocation Method: 🔘 Manual Blade Level Cap 💿 Policy Driven Chassis Group Cap

Figure 7 Editing the Chassis Discovery Policy

- 4. Click Save Changes in the bottom right corner in the Cisco UCSM GUI.
- 5. Click OK.

Enabling Server and Uplink Ports

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To enable the server ports and uplink ports, follow these steps:

- 1. Select the Equipment tab on the top left corner in the left pane in the UCSM GUI.
- 2. Select Equipment > Fabric Interconnects > Fabric Interconnect A (primary) > Fixed Module.
- 3. Expand the Unconfigured Ethernet Ports.
- 4. Select the number of ports that are connected to the Cisco Nexus 2232PP FEXs (8 per FEX), right-click them, and select **Reconfigure > Configure as a Server Port** as shown in Figure 8.

Fabric Interconnects Fabric Interconnect A (primary) Fixed Module Fixed Module Fixed Module Fixed Port 1 Fixed Port 2 Fixed 3	Admin State: Disabled ID User Label MAC Mode Port Type	: 24 Slot ID: 1 : : 54:7F:EE:A2:3B:FF : Access : Physical Role: Unconfigured
Port 4 Port 5 Port 5 Port 6 Port 7 Port 8 Port 9 Port 9 Port 10 Port 11 Port 12 Port 12 Port 12	Configure as Uplink Port Configure as FCoE Uplink Port Configure as FCoE Uplink Port Configure as Server Port Configure as FCoE Storage Port Configure as Appliance Port	

Figure 8 Enabling Server Ports

- Select port 1 that is connected to the Cisco Catalyst 2960-S switches, right-click them, and select Reconfigure > Configure as Uplink Port.
- 6. Select Show Interface and select 10GB for Uplink Connection.
- 7. A pop-up window appears to confirm your selection. Click Yes, then OK to continue.
- 8. Select Equipment > Fabric Interconnects > Fabric Interconnect B (subordinate) > Fixed Module.
- 9. Expand the Unconfigured Ethernet Ports.
- **10.** Select the number of ports that are connected to the Cisco Nexus 2232 FEXs (8 per FEX), right-click them, and select **Reconfigure > Configure as Server Port**.
- 11. A pop-up window appears to confirm your selection. Click Yes, then OK to continue.
- Select port 1 that is connected to the Cisco Catalyst 2960-S switches, right-click and select Reconfigure > Configure as Uplink Port.
- 13. Select Show Interface and select 10GB for Uplink Connection.
- 14. A pop-up window appears to confirm your selection. Click Yes, then OK to continue.

Equipment		E-			1	
- Back-Mounts		Port 1	1	1	54:7F:EE:A2:3B:E8	Network
EX Incomes		Port 2	1	2	54:7F:EE:A2:3B:E9	Appliance Storage
E Servers		Port 3	1	3	54:7F:EE:A2:3B:EA	Unconfigured
- Interconnects		Port 4	1	4	54:7E:EE:A2:3B:EB	Unconfigured
🖶 📼 Fabric Interconnect A (primary)		Port 5	1	5	54:7E:EE:A2:3B:EC	Unconfigured
E Fixed Module		Port 6	1	6	54:7E:EE:A2:3B:ED	Unconfigured
🖃 🚽 Ethernet Ports		Port 7	1	7	54.7E.EE.42.3B.EE	Unconfigured
		Port 9	1	9	54:7E:EE:A2:3B:EE	Unconfigured
Port 2		Port 0	1	0	E4:7E:EE:02:3B:E0	Unconfigured
Port 3		Port 9	1	9	54:7F:EE:A2:30:FU	Unconfigured
Port 4		Port 10	1	10	54:7F:EE:A2:3B:F1	Unconfigured
Port 6		Port II	1	11	54:7F:EE:#2:3B:F2	Unconfigured
Port 7		Port 12	1	12	54:7F:EE:A2:3B:F3	Unconfigured
Port 8		Port 13	1	13	54:7F:EE:A2:3B:F4	Unconfigured
Port 9		Port 14	1	14	54:7F:EE:A2:3B:F5	Unconfigured
Port 10			1	15	54:7F:EE:A2:3B:F6	Unconfigured
		-I Port 16	1	16	54:7F:EE:A2:3B:F7	Unconfigured
			1	17	54:7F:EE:A2:3B:F8	Unconfigured
			1	18	54:7F:EE:A2:3B:F9	Unconfigured
			1	19	54:7F:EE:A2:3B:FA	Unconfigured
			1	20	54:7F:EE:A2:3B:FB	Unconfigured
			1	21	54:7F:EE:A2:3B:FC	Unconfigured
		-I Port 22	1	22	54:7F:EE:A2:3B:FD	Unconfigured
Port 18		Port 23	1	23	54:7F:EE:A2:3B:FE	Unconfigured
Port 19		Port 24	1	24	54:7F:EE:A2:3B:FF	Unconfigured
Port 20		Port 25	1	25	54:7F:EE:A2:3C:00	Server
Port 21		Port 26	1	26	54:7F:EE:A2:3C:01	Server
Port 23		Port 27	1	27	54:7E:EE:A2:3C:02	Server
		Port 28	1	28	54:7E:EE:42:3C:03	Server
		Port 29	1	29	54:7E:EE:02:3C:04	Server
		Devt 20	1	20	E4.7E/EE:42/3C/0E	Server
		Port 30	1	30	E4.75-55-62:00-04	Convor
		Port 31	1	31	54:7F:EE:A2:5U:06	Server
			1	32	54:7F:EE:AZ:3C:07	berver
		<u>,</u>				
Port 32	-					

Figure 9 Window Showing Server Ports and Uplink Ports

Creating Pools for Service Profile Template

Creating an Organization

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Organizations are used as a means to organize and restrict access to various groups within the IT organization, thereby enabling multi-tenancy of the compute resources. This document does not assume the use of Organizations; however the necessary steps are provided for future reference.

Follow these steps to configure an organization in the Cisco UCS Manager GUI:

- 1. Click New on the top left corner in the right pane in the UCSM GUI.
- 2. Select Create Organization from the options.
- **3.** Enter a name for the organization.
- 4. (Optional) enter a description for the organization.
- 5. Click OK.
- 6. Click **OK** in the success message box.

Creating MAC Address Pools

Follow these steps to configure the necessary MAC address pools in the Cisco UCS Manager GUI:

- 1. Select the LAN tab in the left pane in the UCSM GUI.
- 2. Select **Pools** > **root**.
- 3. Right-click the MAC Pools under the root organization.
- 4. Select Create MAC Pool to create the MAC address pool.
- 5. Enter nosh for the name of the MAC pool.
- **6.** (Optional) enter a description of the MAC pool.
- 7. Click Next.
- 8. Click Add.
- 9. Specify a starting MAC address.
- **10.** Specify a size of the MAC address pool sufficient to support the available server resources. See Figure 10, Figure 11, and Figure 12.

Figure 10 Specifying the First MAC Address and Size

🌲 Create a Block of MAC Addresses		×
Create a Block of MAC Addresses		0
First MAC Address: 00:25:B5:00:00:00 To ensure uniqueness of MACs in the LAN fabric, you are strongly encouraged to use the following MAC prefix: 00:25:B5:xx:xx:xx	Size:	128
⇒[ок	Cancel

🌲 Create MAC Pool			×
Unified Co	omputing Syst	tem Mana	iger
Create MAC Pool	Add MAC Addresses		0
2. √ <u>Add MAC Addresses</u>	Name	From To D00:25:85:00:00 00:25:85:0	ए)0:00 ▲
	BP9 €	Delete	-
	< Prev	Next Finish	Cancel

Figure 11 Adding a Range of MAC Addresses

- **11.** Click **OK**.
- 12. Click Finish.
- **13**. Click **OK** in the success message box.





Configuring VLANs

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VLANs are configured as shown in Table 3.

VLAN	Fabric	NIC Port	Function	Failover
vlan160_mgmt	А	eth0	Management, User connectivity	Fabric failover to B
vlan12_HDFS	В	eth1	Hadoop	Fabric failover to A
vlan11_DATA	А	eth2	SAN/NAS access, ETL	Fabric failover to B

Table 3 VLAN Configuration

All of the VLANs created need to be trunked to the upstream distribution switch connecting the fabric interconnects. For this implementation vlan160_mgmt is configured for management access and user connectivity, vlan12_HDFS is configured for Hadoop interconnect traffic and vlan11_DATA is configured for optional SAN/NAS access, heavy ETL etc.

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Follow these steps to configure VLANs in the Cisco UCS Manager GUI:

- 1. Select the LAN tab in the left pane in the UCSM GUI.
- 2. Select LAN > VLANs.
- **3**. Right-click the VLANs under the root organization.
- 4. Select Create VLANs to create the VLAN.



Figure 13 Creating VLANs

- **5**. Enter vlan160_mgmt for the VLAN Name.
- 6. Select Common/Global for vlan160_mgmt.

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7. Enter 160 on VLAN IDs of the Create VLAN IDs.

Figure 14 Creating VLAN for Fabric A

VLAN Name/Prefix: Van 160_mgmt Multicast Policy Name: Create Multicast Policy Common/Global Fabric B Both Fabrics Configured Differently You are creating global VLANs that map to the same VLAN IDs in all available fabrics. Enter the range of VLAN IDs.(e.g., "2009-2019", "29,35,40-45", "23", "23,34-45") VLAN IDs: 160 Sharing Type: None	🖨 Create VLANs			×
VLAN Name/Prefx: Vlan 160_mgmt Multicast Policy Common/Global Fabric A Fabric B Both Fabrics Configured Differently You are creating global VLANs that map to the same VLAN IDs in all available fabrics. Enter the range of VLAN IDs.(e.g. 2009-2019", "29,35,40-45", "23", "23,34-45") VLAN IDs: [160] Sharing Type: None Primary Isolated	Create VLANs			0
VLAN Name/Prefix: Vlan160_mgmt Multicast Policy Name: <not set=""> Common/Global Fabric A Fabric B Both Fabrics Configured Differently You are creating global VLANs that map to the same VLAN IDs in all available fabrics. Enter the range of VLAN IDs.(e.g. "2009-2019", "29,35,40-45", "23", "23,34-45") VLAN IDs: 160 Sharing Type: None Primary Isolated</not>				
Multicast Policy Name: enot set> Create Multicast Policy Common/Global @ Fabric A @ Fabric B @ Both Fabrics Configured Differently You are creating global VLANs that map to the same VLAN IDs in all available fabrics. Enter the range of VLAN IDs.(e.g. "2009-2019", "29,35,40-45", "23", "23,34-45") VLAN IDs: 160 Sharing Type: None @ Primary @ Isolated	VLAN Name/Prefix: vlan160 mgmt			
Common/Global C Fabric A C Fabric B Both Fabrics Configured Differently You are creating global VLANs that map to the same VLAN IDs in all available fabrics. Enter the range of VLAN IDs.(e.g. "2009-2019", "29,35,40-45", "23", "23,34-45") VLAN IDs: 160 Sharing Type: None Primary Isolated	Multicast Policy Name: <not set=""></not>			
You are creating global YLANs that map to the same YLAN IDs in all available fabrics. Enter the range of YLAN IDs.(e.g. "2009-2019", "29,35,40-45", "23", "23,34-45") YLAN IDs: ISO Sharing Type: None Primary Isolated	Common/Global C Fabric A C Fabric B C Both Fabrics Configured Differently			
You are creating global VLAN Ibs. (e.g. "2009-2019", "29,35,40-45", "23", "23,34-45") VLAN Ibs: 160 Sharing Type: None Primary Isolated				
Enter the range of VLAN IDs. (e.g. "2009-2019", "29,35,40-45", "23", "23,34-45") VLAN IDs: 160 Sharing Type: Isolated	You are creating global VLANs that map to the same VLAN IDs in all available fabrics.			
Sharing Type: None Primary Isolated	Enter the range of VLAN IDs.(e.g. "2009-2019", "29,35,40-45", "23", "23,34-45")			
Sharing Type: One C Primary C Isolated	VLAN IDs: 160			
	Sharing Type: None O Primary O Isolated			
Check Overlap OK Cancel		Check Overlap	ОК	Cancel

- 8. Click **OK** and then, click **Finish**.
- 9. Click OK in the success message box.
- **10.** Select the LAN tab in the left pane again.
- 11. Select LAN > VLANs.
- **12.** Right-click the VLANs under the root organization.
- **13**. Select Create VLANs to create the VLAN.
- **14**. Enter vlan11_DATA for the VLAN Name.
- **15.** Select Common/Global for vlan11_DATA.
- **16.** Enter 11 on VLAN IDs of the Create VLAN IDs.

Create VLANs			×
Create VLANs			0
VLAN Name/Prefix: Vlan11_DATA .			
Multicast Policy Name: Knot set>			
Common/Global C Fabric A C Fabric B C Both Fabrics Configured Differently			
Very see we share which it is Attended and to the second OF ATT The is all an eligible failures			
Tou are creating global vLANS that map to the same vLAN LDS in all available rabits.			
Enter the range or VLAN LDS.(e.g. 2009-2019 ; 29,35,40-45 ; 23 ; 23,34-45)			
Sharing Type: • None C Primary C Isolated			
	Check Overlap	ОК	Cancel

Figure 15 Creating VLAN for Fabric B

- 17. Click **OK** and then, click **Finish**.
- 18. Click OK in the success message box.
- **19**. Select the LAN tab in the left pane again.
- **20.** Select LAN > VLANs.

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- **21**. Right-click the VLANs under the root organization.
- **22**. Select Create VLANs to create the VLAN.
- **23**. Enter vlan12_HDFS for the VLAN Name.
- **24**. Select Common/Global for the vlan12_HDFS.
- **25**. Enter 12 on VLAN IDs of the Create VLAN IDs.

Figure 16 Creating Global HDFS VLAN

reate VLANs		6
VLAN Name/Prefix: Vlan12_HDF5 ulticast Policy Name: Cnot set>		
	Check Overlap	cel

26. Click OK then click Finish.

Creating Server Pool

A server pool contains a set of servers. These servers typically share the same characteristics. Those characteristics can be their location in the chassis, or an attribute such as server type, amount of memory, local storage, type of CPU, or local drive configuration. You can manually assign a server to a server pool, or use server pool policies and server pool policy qualifications to automate the assignment.

Follow these steps to configure the server pool in the Cisco UCS Manager GUI:

- 1. Select the Servers tab in the left pane in the Cisco UCS Manager GUI.
- 2. Select **Pools** > **root**.
- **3.** Right-click the Server Pools.
- 4. Select Create Server Pool.
- 5. Enter ucs for the Server Pool Name.
- 6. (Optional) enter a description for the organization.

A Consta Company Band	
Unified (Computing System Manager
Create Server Pool	Set Name and Description @
 Y <u>Set Name and</u> <u>Description</u> 2. <u>Add Servers</u> 	
	Name: Ucs
	Description:
	< Prev Next > Finish Cancel

Figure 17 Creating Server Pool

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- 7. Click Next to add servers.
- 8. Select all the Cisco UCS C220M3 servers to be added to the nosh server pool. Click >> to add them to the pool.
- 9. Click Finish.
- 10. Click OK and then click Finish.

	Figure 18	Adding Server Pool	1			
📥 Create Server Pool						
Unified (Computi	ng System N	lana	ger		
Create Server Pool	Add Servers			-		
1. VSet Name and Description						
2. VAdd Servers						
	Servers			Pooled Servers		
	Cha Slot ID Rac	Use PID A A S C 🛱		Ch Slo Ra Us	s PID Ad Ad Serial	Cor 🖽
	1	UCSC-C2 U F 🔺				▲
	2	UCSC-C2 U F				
	3	UCSC-C2 U F				
	4	UCSC-C2 U F				
	5	UCSC-C2 U F				
	6	UCSC-C2 U F				
	7	UCSC-C2U F				
	8	UCSC-C2U F				
	9	UCSC-C2U F				
	11		>>			
	12					
	13	UCSC-C2U F	~~			
	14	UCSC-C2U F				
	15	UCSC-C2 U F				
	16	UCSC-C2 U F				
						-
	Details for rack-unit-4			Details		
	Madel Tree	0.0040 H00		Mardal.		
	Model: UCS	C-C24U-M3S		Model:		
	Serial Number: FCH	1618V0HA		Serial Number:		
	Vendor: Cisco	o Systems Inc		Vendor:		
			1	,		
				< Prev	Next > Finish	Cancel

Creating Policies for Service Profile Template

Creating Host Firmware Package Policy

Firmware management policies allow the administrator to select the corresponding packages for a given server configuration. These often include adapter, BIOS, board controller, FC adapters, HBA option ROM, and storage controller properties.

Follow these steps create a firmware management policy for a given server configuration in the Cisco UCS Manager GUI:

- 1. Select the Servers tab in the left pane in the UCSM GUI.
- 2. Select Policies > root.
- 3. Right-click Host Firmware Packages.
- 4. Select Create Host Firmware Package.
- 5. Enter ucs as the Host firmware package name.
- 6. Select Simple radio button to configure the Host Firmware package.
- 7. Select the appropriate Rack package that you have.
- 8. Click OK to complete creating the management firmware package.

9. Click OK.

🚖 Create Host Firmware Package		×
Create Host Firmware Pack	age	•
Name: ucs		
	How would you like to configure the Host Firmware Package? (Simple C Advanced	
Blade Package: Rack Package: 2:1(1e)		
	ОКСа	ncel

Figure 19 Creating Host Firmware Package

Creating QoS Policies

Follow these steps to create QoS policy for a given server configuration in the Cisco UCS Manager GUI:

BestEffort Policy

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- **1.** Select the LAN tab in the left pane in the UCSM GUI.
- 2. Select **Policies** > root.
- 3. Right-click QoS Policies and select Create QoS Policy.
- 4. Enter BestEffort as the name of the policy.
- 5. Select Best Effort for Priority from the drop down menu.
- 6. Keep the Burst (Bytes) field as default, which is 10240.
- 7. Keep the Rate (Kbps) field as default, which is line-rate.

8. Make sure the Host Control radio button is None.

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9. Click OK.

Figure 20 Creating QoS Policy - Be	estEffort
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Name: BestEffort Egress Priority: Best Effort Burst(Bytes): 10240 Rate(Kbps): line-rate Host Control: None C Full	Create QoS Policy Successfully created QOS Policy BestEffort. Show Navigator for QOS Policy BestEffort	×
--	--	---

10. In the pop-up window, click **OK** to complete the QoS policy creation.

Platinum Policy

- 1. Select the LAN tab in the left pane in the UCSM GUI.
- 2. Select Policies > root.
- 3. Right-click QoS Policies and select Create QoS Policy.
- 4. Enter Platinum as the name of the policy.
- 5. Select Platinum for Priority from the drop down menu.
- 6. Keep the Burst (Bytes) field as default, which is 10240.
- 7. Keep the Rate (Kbps) field as default, which is line-rate.
- 8. Make sure the Host Control radio button is None.
- 9. Click OK.
- **10**. In the pop-up window, click **OK** to complete the QoS policy creation.

Platinum		reate QoS Policy	×
jress		Successfully created QOS Po	olicy Platinum.
Priority: Platinum	-	Show Navigator for QO	5 Policy Platinum
urst(Bytes): 10240		OK	
Rate(Kbps): line-rate			
lost Control: 💿 None 🕥 Full			

Figure 21 Creating QoS Policy - Platinum

Setting Jumbo Frames

These steps provide details for setting Jumbo frames and enabling the quality of service in the Cisco UCS Fabric:

- 1. Select the Servers tab in the left pane in the UCSM GUI.
- 2. Select LAN Cloud > QoS System Class.
- **3.** In the right pane, select the General tab.
- 4. In the Platinum row, enter 9000 for MTU.
- 5. In the Best Effort row, enter 9000 for MTU.
- 6. Check the Enabled check box next to Platinum.

Figure 22

Setting Jumbo Frame in Cisco UCS Fabric

Fault Summary	G 🔘 🖬 New	- 🛛 🖓 Op	tions 🛛 🕜	Pen	ding Activities 📗 🔟 🖬	xit		
0 2 7 0	>> 🗐 LAN ' 🔿 L	AN Cloud 🕨	👬 QoS Sy	stem Class				
Equipment Servers LAN SAN VM Admin	General Events F	SM						
Filter: All 🔻	Priority	Enabled	CoS	Packet Drop	Weight	Weight (%)	мти	Multicast Optimized
± =	Platinum	V	5		10	9 0	9000	
	Gold		4	V	9	▼ N/A	normal 💌	
E-C LAN Cloud	Silver		2	V	8	▼ N/A	normal 💌	
Eag Fabric B	Bronze		1	V	7	▼ N/A	normal 💌	
LAN Pin Groups	Best Effort	N	Any		best-effort	• 9	9000 -	
Threshold Policies	Fibre Channel	V	3		none	v 1	fc 💌	N/A

- 7. Click Save Changes.
- 8. Click OK.

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Create a Local Disk Configuration Policy

Follow these steps to create local disk configuration in the Cisco UCS Manager GUI:

- 1. Select the Servers tab in the left pane in the UCSM GUI.
- 2. Select Policies > root.
- 3. Right-click Local Disk Config Policies.
- 4. Select Create Local Disk Configuration Policy.
- 5. Enter ucs as the local disk configuration policy name.
- 6. Change the Mode to Any Configuration. Uncheck the Protect Configuration check box.

Figure 23 Configuring Local Disk Policy

📥 Create Local Disk C	onfiguration Policy	X
Create Local	Disk Configuration Policy	0
	· · · · · · · · · · · · · · · · · · ·	
Name:		
Description:		
Mode:	Any Configuration	
Protect Configuration:		
the server. In that case, a configur disk configuration in tha	ration error will be raised when a new service profile is associated with that server if the local at profile is different.	
	OK Cancel	

7. Click **OK** to create the Local Disk Configuration Policy.

8. Click OK.

Create a Server BIOS Policy

The BIOS policy feature in Cisco UCS automates the BIOS configuration process.

The traditional method of setting the BIOS is manual and often error-prone. By creating a BIOS policy and assigning the policy to a server or group of servers, you can have the transparency in BIOS settings and configuration.

Follow these steps to create a server BIOS policy in the Cisco UCS Manager GUI:

- 1. Select the Servers tab in the left pane in the UCSM GUI.
- 2. Select Policies > root.
- 3. Right-click BIOS Policies.
- 4. Select Create BIOS Policy.
- 5. Enter ucs as the BIOS policy name.
- 6. Change the BIOS settings as per Figure 24, Figure 25, Figure 26, and Figure 27.
- 7. Click Finish to complete creating the BIOS policy.
- 8. Click OK.

Figure 24 Creating BIOS Policy

🌲 Create BIOS Policy	×						
Unified Computing System Manager							
Create BIOS Policy	Main @						
1. √ <u>Main</u> 2. □ <u>Processor</u> 3. □Intel Directed IO	Name: ucs						
4. D _{RAS Memory} 5. D <u>Serial Port</u>	Reboot on BIOS Settings Change:						
7. DPCI Configuration 8. DBoot Options	Post Error Pause: C disabled C enabled C Platform Default						
9. Server Management	Front Panel Lockout: C disabled C enabled C Platform Default						
	<pre></pre>						



,			195	
🚖 Create BIOS Policy				×
Unified C	omputing	System	Manage	r
Create BIOS Policy 1. Main 2. Processor 3. Intel Directed ID 4. RAS Memory 5. Serial Port 6. USB 7. PCI Configuration 8. Boot Options 9. Server Management	Intel Directed IO VT For Directed IO: Interrupt Remap: Coherency Support: ATS Support: Pass Through DMA Support:	disabled C enabled disabled C enabled	Platform Default Platform Default Platform Default Platform Default Platform Default	0
		_	< Prev Next >	Finish Cancel

Figure 26 Intel Direct IO Settings

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F	igure 27 Memory Settings	
🚔 Create BIO5 Policy		×
Unified C	omputing System Manager	
Create BIOS Policy	RAS Memory	0
\/Main \/Main \/Ynocessor \/Ynocessor \/\lambda Vectorsesor \/\lambda \Vec{Vectorsesor \\lambda \Vectorsesor	Memory RAS Config: maximum-performance NUMA: disabled Platform Default LV DDR Mode: power-saving-mode Platform Default	
	< Prev Next >	Finish Cancel

Creating Boot Policy

Follow these steps to create boot policies within the Cisco UCS Manager GUI:

1

- 1. Select the Servers tab in the left pane in the UCSM GUI.
- 2. Select **Policies** > **root**.
- **3.** Right-click the Boot Policies.
- 4. Select Create Boot Policy.
| 🌲 Cisco Unified Computing System Manager - Netapp | | | | |
|---|--|--------------------|----------------------|---|
| Fault Summary | | | | |
| | 🔾 🕥 🛄 New 🔭 🛃 Options 👘 🚺 | Pending Activities | | |
| 0 2 8 0 | >> 🥪 Servers ' 🔊 Policies ' 🛕 root ' 🚿 🕯 | oot Policies | | |
| Fourinment Servers LAN SAN VM Admin | Boot Policies Events | | | |
| Equipment and the set of reality | + - A Filter = Export Print | | | |
| Filter: All | | | the line been the | _ |
| ± = | Name | Order | ANIC/AHBA/IBC21 ANIC | |
| S Netapp3 | Boot Policy Netapp | | | |
| Netapp4 | E Deck Policy derauk | | | |
| Netapp5 | E Soot Policy diag | | | |
| Netapp6 | Boot Policy nosh | | | |
| Netapp7 | E→) Boot Policy utility | | | |
| Netapp8 | | | | |
| Netapp9 | | | | |
| Sub-Organizations | | | | |
| Service Profile Templates | | | | |
| Constant Template Matana | | | | |
| Service Template Netapp | | | | |
| Service Template Hosti | | | | |
| Sub-Organizations | | | | |
| Duricies | | | | |
| | | | | |
| Adapter Policies | | | | |
| H- S BIOS Defaults | | | | |
| BIOS Policies | | | | |
| Boot Policies | | | | |
| Boot Policies | | | | |
| IPMI Access Create Boot Policy | | | | |
| E S Local Disk Commy romans | | | | |
| | | | | |
| - S Management Firmware Packages | | | | |
| Sover Control Policies | | | | |
| Scrub Policies | | | | |
| Serial over LAN Policies | | | | |
| - Server Pool Policies | | | | |
| Server Pool Policy Qualifications | | | | |
| Threshold Policies | | | | |
| DCSI Authentication Profiles | | | | |
| VNIC/VHBA Placement Policies | | | | |
| -A Sub-Organizations | | | | |
| | | | | |

Figure 28 Creating Boot Policy

- **5**. Enter ucs as the boot policy name.
- **6.** (Optional) enter a description for the boot policy.
- 7. Keep the Reboot on Boot Order Change check box unchecked.
- 8. Expand Local Devices and select Add CD-ROM.
- 9. Expand Local Devices and select Add Local Disk.
- 10. Expand vNICs and select Add LAN Boot and enter eth0.
- **11.** Click **OK** to add the Boot Policy.
- 12. Click OK.

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	Figure 29	Creating B	oot Order			
🌲 Create Boot Policy						×
Create Boot Policy						0
Name: ucs						
Reboot on Boot Order Change:						
Enforce vNIC/vHBA/ISCSI Name:						
WARNINGS: The type (primary/secondary) does not in	ndicate a boot order presence.					
The effective order of boot devices withi If Enforce vNIC/vHBA/iSCSI Name is	n the same device class (LAN/St s selected and the vNIC/vHBA/iS	orage/iSCSI) is determined SCSI does not exist, a conf	by PCIe bus scan order. ig error will be reported.			
If it is not selected, the vNICs/vHBAs/iSC	SI are selected if they exist, ot	herwise the vNIC/vHBA/iS0	ISI with the lowest PCIe bus scan	order is used.		
Local Devices	Boot Order	1.2			_	
Add Local Disk	🛨 🖃 🕰 Filter 👄 Expo	rt 😸 Print	1	-		
Add CD-ROM	Name CD-ROM	Order 1	VNIC/VHBA/ISCSI VNIC	Туре	Lun ID	WWN C
Rear reppy	🖃 🛃 Storage	2				
vNICs	Local Disk	3				_
Add LAN Boot	LAN eth0		eth0	Primary		
vHBAs 🛞						
(@) Add SAN Boot						
Add SAN Boot Target						
ISESI VNIES						
Add iSCSI Boot						
						-1
			🔺 Move Up 🛛 🤝 Move Down	m Delete		
	L					
					0	K Cancel

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Creating Service Profile Template

To create a service profile template, follow these steps:

- 1. Select the Servers tab in the left pane in the UCSM GUI.
- 2. Select Policies > root.
- 3. Right-click root.
- 4. Select Create Service Profile Template.



Figure 30 Creating Service Profile Template

5. The Create Service Profile Template window appears.

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The following steps provide the detailed configuration procedure used to create a service profile template:

- a. Name the service profile template as ucs. Select the Updating Template radio button.
- **b.** In the UUID section, select Hardware Default as the UUID pool.



c. Click Next to continue to the next section.

Configuring Network Settings for the Template

In the Networking window, follow these steps to create vNICs:

- 1. Keep the Dynamic vNIC Connection Policy field as default.
- 2. Select the Expert radio button for the option How would you like to configure LAN connectivity?
- 3. Click Add to add a vNIC to the template.

	Figure 32	Adding vNICs			
📥 Create Service Profile Template	2				×
Unified C	Computing	g System Ma	nager		
Create Service Profile Template 1. <u>√Identify Service Profile</u> <u>Template</u> 2. <u>√Networking</u> 3. <u>Storage</u>	Networking Optionally specify LA	N configuration information.	Policy by default) 💌 💶 Great	re Dynamic vMIC Connection Policy	0
 Zoning vNIC/vHBA Placement Server Boot Order Maintenance Policy Server Assignment Operational Policies 	How would s	you like to configure LAN connectivity? I're vNICs that the server should use to conn	C Simple © Expert	C Use Connectivity Policy	
	Name	MAC Address	Fabric ID	Native VLAN	₽
					_
		Telete 👚	Hadd Add 2		
	Click Add to specify one or mo	re iSCSI vNICs that the server should use.			
	Name	Overlay vNIC Name	iSCSI Adapter Policy	MAC Address	₽
					×
		🛨 Add 🧃	Delete Modify		
			< Pr	ev Next > Finish	Cancel

- 4. The Create vNIC window displays. Name the vNIC as eth0.
- 5. Select nosh in the Mac Address Assignment pool.
- 6. Select the Fabric A radio button and check the Enable failover check box for the Fabric ID.
- 7. Check the vlan160_mgmt check box for VLANs and select the Native VLAN radio button.
- 8. Select MTU size as 1500.
- 9. Select adapter policy as Linux.
- **10.** Keep the Dynamic vNIC connection policy as <no set>.
- **11.** Select QoS Policy as BestEffort.
- **12**. Keep the Network Control Policy as Default.
- **13**. Click **OK**.

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amou ath0	MAC Address		
: vNIC Template:	MAC Address Assignn	nent: ucs(128/128)	
	🖶 Create MAC Poo	al and a second s	
Create vNIC Template	The MAC address wil	I be automatically assigned from the selected pool.	
ric ID: C Eabric A	Fabric B 🔽 Enable Fa	silover	
Select	Name	Native VLAN	
default		0	
vlan12_HDFS		0	
vlan160_mgmt		0	
E Linet Date		0	
Create VI (N			
Create VLAN MTU: 1500 Warning Make sure that the MTU h. corresponding to the Egre in Group: <not set=""> Dperational Parameter</not>	as the same value in th ss priority of the select	re Qo <u>S System Class</u> ted QoS Policy. AN Pin Group	
Create VLAN MTU: 1500 Warning Make sure that the MTU h. corresponding to the Egre n Group: <not set=""> Dperational Parameter apter Performance Pro-</not>	as the same value in th ss priority of the select The select Create L rs ofile	re QoS System Class ted QoS Policy. AN Pin Group	
Create VLAN MTU: 1500 Warning Make sure that the MTU h. corresponding to the Egre n Group: <not set=""> Dperational Parameter apter Performance Pro Adapter Pro</not>	as the same value in th ss priority of the select T Create L rs ofile olicy: Linux	The QoS System Class ted QoS Policy. AN Pin Group	
Create VLAN MTU: 1500 Warning Make sure that the MTU h. corresponding to the Egre in Group: <not set=""> Decrational Parameter Adapter Performance Pro Adapter Pro Nnamic vNIC Connection Pro</not>	as the same value in th ss priority of the select T Create L rs ofile olicy: Linux cnot set>	The QoS System Class Ted QoS Policy. AN Pin Group Create Ethernet Adapter Policy Create Ethernet Adapter Policy Create Dynamic VNIC Connection Policy	
Create VLAN MTU: 1500 Warning Make sure that the MTU h. corresponding to the Egre in Group: <not set=""> Decrational Parameter Adapter Performance Pre Adapter Performance Pre QoS Pi</not>	as the same value in th ss priority of the select TS ofile olicy: Linux olicy: Cnot set> olicy: BestEffort		

Figure 33 Creating Management vNIC

- 14. Click Add to add another vNIC to the template.
- 15. The Create vNIC window appears. Name the vNIC as eth1.
- **16.** Select ucs in the Mac Address Assignment pool.
- 17. Select the Fabric B radio button and check the Enable failover check box for the Fabric ID.
- **18.** Check the vlan12_HDFS check box for VLANs and select the **Native VLAN** radio button for Native VLAN.

- **19.** Select MTU size as 9000.
- **20.** Select Adapter Policy as Linux.
- 21. Keep the Dynamic vNIC Connection Policy as <not set>.
- **22.** Select QoS Policy to Platinum.
- 23. Keep the Network Control Policy as Default.

24. Click OK.

and the second sec	1AC Address		
ame: etn1 : vNIC Template: 🔲	MAC Address Assignment: (ucs(128/128)	
	🛨 Create MAC Pool		
Create vNIC Template	The MAC address will be au	utomatically assigned from the selected pool.	
Caline Ca			
oric ID: C Fabric A 💽 F	abric B V Enable Failover		
VLANs Select	Name	Native VI AN	
default	Name		
Vlan12 HDF5	ľ	· · · · · · · · · · · · · · · · · · ·	
vlan160_mgmt	E	0	
vlan11_DATA		C	
Concerto III ANI			
MTU: 9000			
Warning			
irunning	s the same value in the OoS	System Class	
Make sure that the MTU ha	a main site of the and aster d O a	C Dellevi	
Make sure that the MTU ha corresponding to the Egres	s priority of the selected Qo	S Policy.	
Make sure that the MTU hat corresponding to the Egres	s priority of the selected Qo	i Group	
Make sure that the MTU ha corresponding to the Egres n Group: <not set=""></not>	s priority of the selected Qo Create LAN Pin	S Policy.	1
Make sure that the MTU ha corresponding to the Egres n Group: <not set=""> Operational Parameter</not>	s priority of the selected Qo Create LAN Pin	s Policy.	
Wake sure that the MTU ha corresponding to the Egres n Group: <not set=""> Operational Parameter: apter Performance Pro</not>	s priority of the selected Qo Create LAN Pin	s Policy.	
Adde sure that the MTU ha corresponding to the Egres n Group: <not set=""> Operational Parameter apter Performance Pro Adapter Po</not>	s priority of the selected Qo Create LAN Pin file icy: Linux	S Policy.	
Make sure that the MTU ha corresponding to the Egres in Group: <not set=""> Operational Parameter apter Performance Pro Adapter Po mamic vNIC Connection Po</not>	s priority of the selected Qo Create LAN Pin file licy: Linux icy: <not set=""></not>	S Policy. Group Group Group Grout Create Ethernet Adapter Policy Grout Create Dynamic vNIC Connection Policy	
Make sure that the MTU ha corresponding to the Egres in Group: <not set=""> Dperational Parameter lapter Performance Pro Adapter Po ynamic vNIC Connection Po OoS Po</not>	s priority of the selected Qo Create LAN Pin file licy: Linux licy: rootset licy: Platinum	S Policy. Group Create Ethernet Adapter Policy Create Dynamic vNIC Connection Policy Create OoS Policy Create OoS Policy	1

Figure 34 Configuring vNIC eth1

- 25. Click Add to add another vNIC to the template.
- **26.** The Create vNIC window appears. Name the vNIC as eth2.
- 27. Select ucs in the Mac Address Assignment pool.
- 28. Select the Fabric A radio button and check the Enable failover check box for the Fabric ID.
- 29. Check the vlan11_DATA check box for VLANs and select the Native VLAN radio button.
- **30.** Select MTU size as 9000.
- **31**. Select adapter policy as Linux.
- **32.** Keep the Dynamic vNIC Connection Policy as <no set>.
- **33.** Select QoS Policy as Platinum.

I

34. Keep the Network Control Policy as Default.

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35. Click OK.

eate v	/NIC									
	_		MAC Ad	dress						
me: eth: 0	2	_	Mociad	dress Assignment:	ucs(128(128)					
	nplate: 📕		nec eu	uross Assignment.	000(120/120)					
			E ca	eate MAC Pool						
Create vi	NIC Template		The MA	C address will be a	utomatically assi	gned from	the selected	i pool.		
		ia P. 🗖 Eachla	Enilouer							
nc ID: 19	Fabric A Fabr	IC B JV ENADIE	Fallover							
VLANs										
Select	1	lame		Nativ	/e VLAN	E\$				
	default vlan11 DATA				0 0	<u> </u>				
	vlan12_HDFS				0					
Γ	vlan160_mgmt				0	-				
MTU: Warning Make sure correspon n Group:	9000 that the MTU has th ding to the Egress pr <not set=""></not>	e same value in iority of the sel	the <u>QoS</u> ected QoS e LAN Pin	<u>System Class</u> i Policy. Group						
peratio	nal Parameters					8				
pter Pe	rformance Profile									
	Adapter Policy:	Linux	-	🕂 Create Ether	net Adapter Polic	y				
namic vNI	C Connection Policy:	<pre>0 <not set=""></not></pre>	-	🛨 Create Dynar	nic vNIC Connect	ion Policy				
	QoS Policy:	Platinum	-	🗄 Create QoS F	olicy					
	twork Coptrol Policy:	default	-	+ Create Netwo	ork Control Policy					
Nel	concront oney.	<u>0</u>								

Figure 35 Configuring vNIC eth2

36. Click **Next** to continue to the next section.

Configuring Storage Policy for the Template

In the Storage window, follow these steps to configure storage:

- 1. Select ucs for the local disk configuration policy.
- 2. Select the **No vHBAs** radio button for the option How would you like to configure SAN connectivity?

Figure 36 Storage Settings

I

Γ

📥 Create Service Profile Templa	te	×
Unified	Computing System Manager	
Create Service Profile Template	Storage Optionally specify disk policies and SAN configuration information.	0
1 V_Interview Profile 1 Implate 2 √ Networking 3 √ Storage 4 Zoning 5 √ NIC/VHBA Placement 6 Server Boot Order 7 Double Date	Select a local disk configuration policy. Local Storage: Mode: Any Configuration Protect Configuration: No Protect Configuration: No If Protect Configuration: No	-
8. Server Assignment 9. Operational Policies	In that case, a configuration error will be raised when a new service profile is associated with How would you like to configure SAN connectivity? C Simple C Expert No vHBAS C Use Connectivity Policy This server associated with this service profile will not be connected to a storage area network.	
		<u>ب</u>
	< Prev Next > Finish Cance	el

- 3. Click Next to continue to the next section.
- 4. Click Next in the Zoning Window to go to the next section.



Configuring vNIC/vHBA Placement for the Template

In the vNIC/vHBA Placement Section, follow these steps to configure placement policy:

- 1. Select the Default Placement Policy option for Select Placement field.
- 2. Select eth0, eth1, and eth2 assign the vNICs in the following order:
 - eth0
 - eth1
 - eth2
- 3. Review the table to make sure that all of the vNICs were assigned in the appropriate order.

Unified Computing System Manager Create Service Profile Template 1. √ Identify Service Profile Specify how vNICs and vHBAs are placed on physical network adapters 2. √ Identify Service Profile Specify how vNICs and vHBAs are placed on physical network adapters 3. √ Service Mathematic Placement 4. √ Contral Service Root Circler 5. √ WIC VHBA Placement Select Placement: Let System Perform Placement © 6. ○ Service Root Circler Select Placement: Let System Perform Placement © 7. ○ Operational Policies: System will perform automatic placement of WICs and vHBAs based on PCI order. 9. ○ Operational Policies: Name	0
Create Service Profile Template INIC/VHBA Placement 1. √Identify Service Profile Template Specify how vNICs and vHBAs are placed on physical network adapters 2. √Networking NUC/VHBA Placement specifies how vNICs and vHBAs are placed on physical network adapters (mezzanine) 3. √Zorada NUC/VHBA Placement very. 5. √vNIC/vHBA Placement: Select Placement: 6. Server Boot Order. Select Placement: 9. Operational Policies System will perform automatic placement of vNICs and vHBAs based on PCI order. 9. Operational Policies Name Address Order • vVIC eth1 Derived • wVIC eth1 Derived	0
Name Address Order ID Image: State of the state of	
-	
vNIC eth1 Derived 2	
Move up V Move Down Delete C* Reorder Modhy	
< Prev Next > Finish C	ncel

Figure 38 Creating vNIC and vHBA Policy

4. Click Next to continue to the next section.

Configuring Server Boot Order for the Template

In the Server Boot Order Section, follow these steps to set the boot order for servers:

- 1. Select ucs for the Boot Policy Name field.
- 2. Check the Reboot on Boot Order Change check box.
- **3.** Check the Enforce vNIC/vHBA/iSCSI Name check box.
- 4. Review the table to make sure that all of the boot devices were created and identified. Verify that the boot devices are in the correct boot sequence.
- 5. Click OK.

ſ

	Figure 39	Creating Bo	oot Policy			
🚔 Create Boot Policy						ľ
Create Boot Policy						¥۵
Name: UCS Description: Reboot on Boot Order Change: Enforce vNIC/vHBA/ISCSI Name: WARNINGS: The type (primary/secondary) does not in the effective order of boot devices with	ndicate a boot order presence n the same device class (LAN)	, storage/ISCSI) is determined	by PCIe bus scan order.			
If Enforce vNIC/vHBA/iSCSI Name is If it is not selected, the vNICs/vHBAs/iSC Local Devices	s selected and the vNIC/vHBA SI are selected if they exist, v Boot Order	/ISCSI does not exist, a conf otherwise the vNIC/vHBA/IS(ig error will be reported. ISI with the lowest PCIe bus scan	order is used.		
Add Local Disk Add CD-ROM Add Floppy		ort 🕞 Print Order 1 2	VNIC/VHBA/ISCSI VNIC	Туре	Lun ID	WWN (D)
VNICS 🛞	E Local Disk	3	eth0	Primary		
VHBAS 😵						
			🔺 Move Up 🛛 🔻 Move Down	👕 Delete		×
,					C	K Cancel

1

6. Click Next to continue to the next section.

Configuring Maintenance Policy for the Template

In the Maintenance Policy window, follow these steps to apply maintenance policy:

- 1. Keep the Maintenance Policy at no policy used by default.
- 2. Click Next to continue to the next section.

Configuring Server Assignment for the Template

In the Server Assignment window, follow these steps to assign servers to the pool:

- 1. Select ucs for the Pool Assignment field.
- 2. Keep the Server Pool Qualification field at default.
- **3**. Select nosh for the Host Firmware Package.

Figure 40 Server Assignment Create Service Profile Template х **Unified Computing System Manager** 0 Server Assignment Create Service Profile Template Optionally specify a server pool for this service profile template. 1. √<u>Identify Service Profile</u> Template 2. Vetworking - -🗄 Create Server Pool Pool Assignment: ucs 3. √<u>Storage</u> 4. √<u>Zoning</u> Select the power state to be applied when this profile is associated with the server. 5. VVNIC/VHBA Placement 6. √<u>Server Boot Order</u> 7. VMaintenance Policy 🖲 Up 🔿 Down 8. VServer Assignment 9. Doperational Policies The service profile template will be associated with one of the servers in the selected pool. If desired, you can specify an additional server pool policy qualification that the selected server must meet. To do so, select the qualification from the list. Server Pool Qualification: <not set> -Restrict Migration: 🔲 Firmware Management (BIOS, Disk Controller, Adapter) 8 If you select a host firmware policy for this service profile, the profile will update the firmware on the server that it is associated with. Otherwise the system uses the firmware already installed on the associated server. Host Firmware: UCS -🛨 Create Host Firmware Package < Prev Next > Finish Cancel

4. Click Next to continue to the next section.

Configuring Operational Policies for the Template

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In the Operational Policies window, follow these steps:

1. Select ucs in the BIOS Policy field.

	Figure 41	Creating Operational Policies		
🗼 Create Service Profile Templa	te			×
Unified	Comput	ing System Manage	r	
Create Service Profile Template 1. $\sqrt{Identify Service Profile}$ Template 2. $\sqrt{Networking}$ 3. $\sqrt{Storage}$ 4. $\sqrt{2coning}$ 5. $\sqrt{NIC/VHBA Placement}$ 6. $\sqrt{Server Boot Order}$ 7. $\sqrt{Maintenance Policy}$ 8. $\sqrt{Server Assignment}$ 9. $\sqrt{Operational Policies}$	Operational Optionally spe BIOS Configuratio If you want to over BIOS Policy: UCS External IPMI Ma Management IP A Monitoring Config Power Control Pol Scrub Policy	Policies actify information that affects how the system operates. In ride the default BIOS settings, select a BIOS policy that will be associat Create BIOS Policy aggement Configuration Address uration (Thresholds) icy Configuration Ut Create Scrub Policy	ted with this service profile	•
			< Prev Next >	Finish Cancel

1

- 2. Click **Finish** to create the Service Profile template.
- 3. Click **OK** in the pop-up window to exit the wizard.

Select the Servers tab in the left pane in the UCSM GUI.

- 1. Select Service Profile Templates > root.
- 2. Right-click the root.
- 3. Select Create Service Profile Template.

Fault Summary		G 🕘 🗉	New 🔹 🏹 Options 🛛 😮 🕕	Pending Activities	
		>> 🥪 Serve	rs 🕨 🎹 Service Profile Templates 🕨	toot	
Equipment Servers LA		General Sub	-Organizations Service Profiles Poo	ls Policies FC Zones Faults Events	
Eilten All					
		-Fault Su	mmary	Properties	
± =			V 🛆 🗛	Name: root	
⊕ 😳 Netap	μ3 p4		0 0 0	Description:	
🕀 🖑 Netap	p5	Actions		Level: ROOC	
🕂 🤝 Netap	рь p7	Cre	eate Organization		
🕀 📑 Netap	p8	🗧 🔁 Cre	eate Service Profile (expert)		
⊕ 😇 Netap h Sub-O	p9 rganizations	Cri	eate Service Profiles From Template		
🖃 📊 Service Profile	Templates	The Cre	eate Service Profile		
	Show Navigator		t Fault Suppression		
± 1	Create Organization				
	Create Service Profile (expert)		а наше эпфризории		
A A A A A A A A A A A A A A A A A A A	Create Service Profiles From Template		pression Task Properties		
Policies	Create Service Profile		te		
<u> </u>	Create Service Profile Template				
	Start Fault Suppression				
÷-5	Stop Fault Suppression				
	Сору	Ctrl+C	-		
±-5	Copy XML	Ctrl+L			
E-S	Delete	Ctrl+D			
E S Power	Control Policies				
E Scrub	Policies				
Serial	over LAN Policies r Pool Policies				
t∎ 🛒 Server	Pool Policy Qualifications				
iscsi /	Authentication Profiles				
S vNIC/	VHBA Placement Policies				
E- ⊕ Pools	rganizations				
l i Yan					

Figure 42 Creating Service Profile

4. The Create Service Profile from Template window appears.

Figure 43

Creating Service Profile from Template

📥 Create Service Profiles From Template	×				
Create Service Profiles From Template					
Naming Prefix: ucs Number: 16					
ОК	Cancel				

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- 5. Now connect the power cable to the servers.
- 6. Servers will the be discovered by UCS Manager.
- 7. Association of Service Profile will take place automatically.
- 8. The final Cisco UCS Manager window is shown in Figure 44.

	() () () N	ew 👻 🛃 Qoti	ons 🤪 🕕	Pending Activities	O Exit								
	AB COLOR												
0 2 8 0	>> BBrdnbwe	nt • 🐲 Rack-Mi	unts · Servers										
upment Servers LAN SAN VM Advin	Servers												
	🛃 Filter 👄 Ex	port 📄 Print											
Filter: Al	Name	Ourral Statur	P1D	Model	I ker Label	Corner	Memory	Adapteur	NICe	HRAC	Operability	Downer State	Arros Stal
	Secure 1	* ok	1105C C240 M25	Circo LICS C240 M2	0001 00001	14	262144	Hoopters	2	0	* Operating	* 00	According
85 Faringent	Server 1	1 OK	0050-0240-455	Cisco DCS C240 M3		10	202144	:	2	6	Operable	1 (n)	Associat
B Equipment	Server 2	TOK	0050-0240-0135	CBC0 UC3 C240 M3		10	202111	1	2	0	T Operable	T On	T Associa
Charles Marinte	Server 3	TOK	UCSC+C240-M55	CISCO UCS C240 M3		16	262144	1	2	0	T Operable	TON	T Associat
E FEY	Server 4	1 Ok	UCSC+C240-M35	Cisco UCS C240 M3		16	262144	1	2	0	1 Operable	1 On	1 Associal
G. BR FFY 1	Server 5	1 Ok	UCSC-C240-M3S	CISCO UCS C240 M3		16	262144	1	2	0	1 Operable	1 On	1 Associa
P B FEX 2	Server 6	1 Ok	UCSC-C240-M35	Cisco UCS C240 M3	1	16	262144	1	2	0	1 Operable	1 On	1 Associa
P	Server 7	1 Ok	UCSC-C240-M3S	Cisco UCS C240 M3		16	262144	1	2	0	1 Operable	1 On	1 Associa
E Server 1	Server 8	1 Ok	UCSC+C240-M35	Cisco UCS C240 M3	1.0	16	262144	1	2	0	1 Operable	1 On	1 Associa
E Server 2	Server 9	1 Ok	UCSC-C240-M3S	Cisco UCS C240 M3		16	262144	1	2	0	1 Operable	1 On	1 Associa
😥 🐨 Server 3	Server 10	1 Ok	UCSC-C240-M35	Cisco UCS C240 M3		16	262144	1	2	0	1 Operable	1 On	1 Associa
E Server 4	Server 11	1 Ok	UCSC-C240-M35	Cisco UCS C240 M3		16	262144	1	2	0	1 Operable	1 On	1 Associa
🕀 🛷 Server S	Server 12	1 Ok	UCSC-C240-M35	Cisco UCS C240 M3		16	262144	1	2	0	1 Operable	1 On	1 Associa
🕀 🗇 Server 6	Server 13	t ok	UCSC-C240-M35	Cisco UCS C240 M3		16	262144	1	2	0	1 Operable	1 Cn	1 Associa
🗈 🐟 Server 7	Server 14	t Ok	UCSC+C240-M35	Cisco UCS C240 M3		16	262144	1	2	0	1 Operable	t On	+ Associal
Server 8	Server 15	t ok	UCSC-C240-M3S	Cisco LICS C240 M3		16	262144	1	2	0	Operable	1 00	Associat
E Server 9	Canver 16	A OL	UCSC-C240-M25	Circle UCS C240 M2		16	262144		2	0	* Operable	• On	Associat
E Server 10	Server 10	I OK	0030-0240-035	0000000000000000		10	202111	•	14	P	I Operable	1 00	A350000
E Server 11													
Server 12													
E Server 13													
berver 14													
E Server 15													

Figure 44 UCS Manager Showing Sixteen Nodes

Configuring Disk Drives for OS

As mentioned above, the focus of this CVD is the High Performance Configuration featuring 24 1TB SFF disk drives. The disk drives are configured as individual RAID0 volumes with 1MB strip size. Read ahead cache is enabled and write cache is enabled while battery is present. The first disk drive is used for operating system and remaining 23 disk drives are using for HDFS as described in the following sections.



Fabric Interconnects

In the case of High Capacity Configuration featuring 12 3TB LFF disk drives, the disk drives are configured as individual RAID0 volumes with 1MB strip size. Read ahead cached is enabled and write cache is enabled while battery is present. Two partitions of 1TB and 2TB are created on the first disk drive, the 1TB partition is used for operating system and the 2TB partition is used for HDFS along with disk drives 2 through 12.

There are several ways to configure RAID: using LSI WebBIOS Configuration Utility embedded in the MegaRAID BIOS, booting DOS and running MegaCLI commands, using Linux based MegaCLI commands, or using third party tools that have MegaCLI integrated. For this deployment, the first disk drive is configured using LSI WebBIOS Configuration Utility and rest is configured using Linux based MegaCLI commands after the OS is installed.

Follow these steps to create RAID0 on the first disk drive to install the operating system:

1. Once the server has booted and the MegaRAID Controller has been detected, the following will appear on the screen:

I

- Press <Ctrl><H> for WebBIOS.
- Press Ctrl+H immediately.
- The Adapter Selection window appears.
- 2. Click Start to continue.

	Bus No.	Device No.	Туре	Firmware Pkg. Version
. 9	130	0	LSI MegaRAID SAS 9266-8i	23-7-0-0039
		,	[Start]	,

Figure 45 RAID Configuration for LSI MegaRAID SAS Controllers

3. Click Configuration Wizard.

4. In the configure wizard window, select the configuration type as Clear Configuration and click **Next** to clear the existing configuration.

Figure 46 Clearing Existing Configuration

	LSI
es you through the steps for configuring the MegaRAID atly. The steps are as follows:	
Group drives into Drive Groups.	
s Define virtual drives using those drive groups.	
Preview configuration before it is saved.	
configuration type:	
Allows you to clear existing configuration only.	
Clears the existing configuration. If you have any existing in the earlier defined drives, the data will be lost.	data
X Cancel with	Next
	es you through the steps for configuring the MegaRAID itly. The steps are as follows: Group drives into Drive Groups. > Define virtual drives using those drive groups. Preview configuration before it is saved. configuration type: Allows you to clear existing configuration only. Clears the existing configuration. If you have any existing in the earlier defined drives, the data will be lost.

Γ

- 5. Click Yes when asked to confirm clear configuration.
- 6. In the Physical View, make sure all the drives are Unconfigured Good.
- 7. Click Configuration Wizard.

Figure 47 Confirming Clearance of the previous Configuration on the Controller

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iegaRAID BIOS Config Utility Confirm Page	LSI
You have chosen to clear the configuration. This will destroy all virtual drives. All data on all virtual drives will be lost.	
Are you sure you want to clear the configuration?	

8. In the configure wizard window, select the configuration type as New Configuration and click Next.

nega	RAID BIOS Config Utilit	y Configuration Wizard
Cont sys	figuration Wizard guid tem easily and efficier	es you through the steps for configuring the MegaRAID tly. The steps are as follows:
l. Dr	ive Group definitions	Group drives into Drive Groups.
. Vi	rtual Drive definitions	Define virtual drives using those drive groups.
s. Co	nfiguration Preview	Preview configuration before it is saved.
Plea	se choose appropriate o	onfiguration type:
0	Clear Configuration	Allows you to clear existing configuration only.
ſ	Ngw Configuration	Clears the existing configuration. If you have any existing data in the earlier defined drives, the data will be lost.
0	<u>∦</u> dd Configuration	Retains the old configuration and then adds new drives to the configuration. This is the safest operation as it does not result in any data loss.
		X Cancel IN Next

- **9.** Select the configuration method to be Manual Configuration to have control over all attributes of the new storage configuration such as drive groups, virtual drives, and to set their parameters.
- 10. Click Next.

Γ

Figure 49 Selecting Manual Configuration

Mega	RAID BIOS Config Utility C	Configuration Wizard			LSIN
Sel	ect Configuration Method :				
•	Manual Configuration Manually create drive gr	roups and virtual driv	es and set their	parameters a	s desired.
C	Automatic Configuration Automatically create th	n e most efficient confiq	juration.		
	<u>R</u> edundancy:	Redundancy when pos	sible	۷	
			X Cancel		⊪ } <u>N</u> ext

11. The Drive Group Definition window appears. In this window select the two drives to create drive groups.

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12. Click **Add to Array** to move the drives to a proposed drive group configuration in the Drive Groups pane. Click **Accept DG** and then, click **Next**.

R: gaRAID BIUS Config Utility Config Wizard –	Drive Group Definition			
Drive Group Definition: To add drives to Drive Group,hold Control key while selectin Unconf Good drives and click on Add to Array. Then Accept Dri Group. Drive addition can be undone by selecting the Reclaim button.				
Drives	Drive <u>G</u> roups			
UCS 240 (32), Connector: Port 0 Slot: 1, SATA, HDD, 930.390 GB, Slot: 2, SATA, HDD, 930.390 GB, Slot: 3, SATA, HDD, 930.390 GB, Slot: 4, SATA, HDD, 930.390 GB, Slot: 5, SATA, HDD, 930.390 GB, Slot: 6, SATA, HDD, 930.390 GB,	Drive Group0			
<u> À</u> dd To Array	🖡 Accept DG 👚 Reclaim			
	X Cancel 🐠 Back 🕪 Next			

Figure 50 Moving Drives to Drive Groups

13. In the Span definitions Window, Click **Add to SPAN** and then, click **Next**.

Span Definition:	To add array hole t drop-down.Click or span.Array Hole ad Reclaim button.	to a Span, select an array hole fro n Add To Span. Array hole will be add dition can be undone by selecting	m the ded to t the
Array <u>₩</u> ith Fre	e Space	Span	
🖄 Àdd to	SPAN	↑ Reclaim	

Figure 51 Adding Arrayhole to Span

- **14.** In Virtual Drive definitions window, follow these steps to configure read normal and write through modes:
 - a. Click UpdateSize.
 - **a.** Change Strip Size to 1MB. A larger strip size produces higher read performance.
 - **b.** From the read Policy drop down list, choose Always Read Ahead.
 - c. From the Write Policy drop down list, choose Write Back with BBU.
 - d. Make Sure RAID Level is set to RAID0.
 - e. Click Accept to accept the changes to the virtual drive definitions.
 - f. Click Next.

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iegaRAID BIOS Co	onfig Utility Config Wizard	- Virtual Drive Definition
RAID Level	RAIDO	<u>V</u> irtual Drives
Strip Size	1 MB	
Access Policy	RW	-
Read Policy	Always Read Ahead	-
Write Policy	Vrite Back with BBU	-
IQ Policy	Direct 💌	-
Drive Cache	Unchanged 🖉	Next LD, Possible RAID Levels
Disable B <u>G</u> I	No	- R01930-390 GB
Select Size	930-390 GB	Update Size
		t Reclaim
		🗙 Cancel 🛛 🗰 Back 🖬 Mext

15. After you finish the virtual drive definitions, click Next. The Configuration Preview window appears showing VD0.

1

- 16. Review the virtual drive configuration in the Configuration Preview window and click Accept to save the configuration.
- 17. Click Yes to save the configuration.
- 18. In the managing SSD Caching Window, Click Cancel.

It is possible to enable SSD caching on the following new virtual drives-			
⊻irtual Drive:			
Virtual Drive	SSD Caching		
7			
□ <u>A</u> 11			
	Enable [Cancel]		

Figure 53 SSD Caching on the Created Virtual Drive

19. Click **Yes**. When asked to confirm to initialize.

MegaRAID BIOS Config Utility Confirm Page	LSI2
All data on the new Virtual Drives will be lost. Want to Initialize?	
	,

Figure 54 Confirmation to Initialize

- **20.** Set VD0 as the Boot Drive and click Go.
- 21. Click Home.

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22. Review the Configuration and Click Exit.

Virtual Drives:
 Fast Initialize Slow Initialize Check Consistency Properties Set Boot Drive (current= NONE) Go E Reset

Figure 55 Setting the Virtual Drive as Boot Drive

Installing Red Hat Enterprise Linux Server 6.2 using KVM

There are multiple methods to install Red Hat Linux operating system. The installation procedure described in this deployment guide uses KVM console and virtual media from Cisco UCS Manager.

To open the KVM console, follow these steps:

1. Log in to the Cisco UCS 6296 Fabric Interconnect and launch the Cisco UCS Manager application.

- 2. Select Equipment tab.
- 3. In the navigation pane expand Rack-mount and then Servers.
- 4. Right-click on the server and select KVM Console.



Figure 56 Launching KVM Console

5. In the KVM window, select the Virtual Media tab.

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FS / Park -16 -	KVM Console							
Help		-						
loot Server 🔳	Shutdown Ser	ver 🧕 Reset						
Console Samuer		~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~						
Virtual Media								
1								
Mapped	Read Only	Drive					 	na
		A: - Floppy						EXIC
		G: - Removable	e Disk				Crea	te Image
	M	E: - CD/DVD					Add	Image
		D: - CD/DVD					Remov	ve Image
							De	tais ±
etails arget Drive	Mapped 1	0	Read Bytes	Write Bytes	Duration		_	
etails arget Drive rtual CD/DVD	Mapped 1 Not mapp	o ed	Read Bytes	Write Bytes	Duration	[8 Reset
etails Farget Drive Intual CD/DVD emovable Disk.	Mapped 1 Not mapp Not mapp	io ed ed	Read Bytes	Write Bytes	Duration			B Reset
etails 'arget Drive irtual CD/DVD emovable Disk. loppy	Mapped 1 Not mapp Not mapp Not mapp	io ed ed ed	Read Bytes	Write Bytes	Duration		05	B Reset
etails 'arget Drive irtual CD/DVD emovable Disk loppy	Mapped 1 Not mapp Not mapp	io ed ed	Read Bytes	Write Bytes	Duration		US	B Reset
etails (arget Drive ritual CD/DVD emovable Disk loppy	Mapped 1 Not mapp Not mapp	io ed ed	Read Bytes	Write Bytes	Duration	ſ	US	8 Reset
etails farget Drive intual CD/DVD semovable Disk loppy	Mapped 1 Not mapp Not mapp	io ed ed	Read Bytes	Write Bytes	Duration	ſ	US	B Reset
etails arget Drive irtual CD/DVD emovable Disk loppy	Mapped 1 Not mapp Not mapp Not mapp	io ed ed	Read Bytes	Write Bytes	Duration		US	8 Reset
etails 'arget Drive irtual CD/DVD emovable Disk loppy	Mapped 1 Not mapp Not mapp	io ed ed	Read Bytes	Write Bytes	Duration	ſ		8 Reset

Figure 57 Adding ISO Image

6. Click Add Image in the window that appeared.

7. Browse to the Red Hat Enterprise Linux Server 6.2 installer ISO image file.



The Red Hat Enterprise Linux 6.2 DVD is assumed to be on the client machine.

1

8. Click **Open** to add the image to the list of virtual media.

🛓 Open					×
Look in:	📃 Desktop		-	1 📂 🛄 📰	
Recent Items Recen	Computer Network Libraries Administra	ator x86_64			
	, File name:	RHEL_6.2 x86_64.iso			Open
Network	Files of type:	Disk image file (*.iso, *.img)		•	Cancel

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Figure 58 Selecting the Red Hat Enterprise Linux ISO Image

9. Check the check box for Mapped, next to the entry corresponding to the image you just added.

Task User							
Mapped	Read Only	Drive					Exit
		🛃 A: - Floppy					Create Image
		🖃 G: - Removable D	Xisik				Create Image
	M	E: - CD/DVD					Add Image
		🙆 D: - CD/DVD					Remove Image
		🛃 C:\Users\Adminis	trator\Deskto	p\RHEL_6.2 x86	64.iso - I		Details ±
etails							
etails arget Drive	Mapped	То	Read Bytes	Write Bytes	Duration		
etails arget Drive rtual CD/DVD	Mapped	To Sers\Administrator\ '	Read Bytes 98304	Write Bytes	Duration 00:00:08		US8 Reset
etails 'arget Drive irtual CD/DVD emovable Disk	Mapped Critu Not mapp	To [sers\Administrator\ 1	Read Bytes 98304	Write Bytes 0	Duration 00:00:08		USB Reset
etails arget Drive rtual CD/DVD emovable Disk. loppy	Mapped C:\U Not mapp Not mapp	To sers\Administrator\ • sed sed	Read Bytes 98304	Write Bytes	Duration 00:00:08		USB Reset
etails arget Drive irtual CD/DVD emovable Disk oppy	Mapped (2) Not mapp Not mapp	To Sers\Administrator\ ' Sed	Read Bytes 98304	Write Bytes	Duration 00:00:08		USB Reset
atails arget Drive rtual CD/DVD emovable Disk oppy	Mapped Criu Not mapp Not mapp	To [sers\Administrator\ \ sed sed	Read Bytes 98304	Write Bytes 0	Duration 00:00:08		USB Reset
stalls arget Drive rtual CD/DVD emovable Disk oppy	Mapped Critu Not mapp Not mapp	To Sers\Administrator\ 1 Sers\Administrator	Read Bytes 98304	Write Bytes O	Duration 00:00:08		USB Reset

Figure 59 Mapping the ISO Image

- 10. In the KVM window, select the KVM tab to monitor during boot.
- 11. In the KVM window, select the Boot Server button in the upper left corner.
- 12. Click OK.
- **13.** Click **OK** to reboot the system.
- **14.** On reboot, the machine detects the presence of the Red Hat Enterprise Linux Server 6.2 install media.

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15. Select the Install or Upgrade an Existing System option.



Figure 60 Selecting the RHEL Installation Option

- 16. Skip the Media test as we are installing from ISO Image, click Next to continue.
- 17. Select Language for the Installation and click Next.
- 18. Select Basic Storage Devices and click Next.

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	Figure 61	Selecting Storag	e Device Type	
What type of devices will your inst	allation involve?			
Basic Storage Devices Installs or upgrades to typical type this is probably it.	s of storage devices. If you're r	not sure which option is right for you,		
Specialized Storage Devic Installs or upgrades to enterprise of you to add FCoE / ISCSI / zFCP disk	es levices such as Storage Area Ne s and to filter out devices the in	etworks (SANs). This option will allow staller should ignore.		
			e Back	: Next

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19. Select Fresh Installation and click **Next**.

Cisco UCS Common Platform Architecture (CPA) for Big Data with Cloudera

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- 20. Enter the Host name of the server and click Configure Network.
- **21**. Network Connections window appears.
- 22. In the Network Connections window, Select the tab Wired.
- 23. Select the interface System eth0, and click Edit.
- 24. Editing System eth0 window appears.
- **25**. Check the Connect automatically check box.
- 26. For the field Method, select Manual from the drop down list.
- 27. Click Add and enter IP Address, Netmask and Gateway.
- **28**. For this solution we have used the following:
 - a. IP Address: 10.29.160.53
 - **b.** Netmask: 255.255.255.0
 - **c.** Gateway: 10.29.160.1
- **29.** (Optional) Add DNS servers.
- 30. Click Apply.

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			Editing eth0
			Connection name: etho
			Connect automatically
Netwo	rk Connections		Wired 802.1x Security IPv4 Settings IPv6 Settings
Wired Wireless	Mobile Broadband	VPN SDSL	Method: Manual C
Name	Last Used	Add	Addresses
System eth0	never	Edit	Address Netmask Gateway Add
System eth1	never	Contain	10.29.160.53 22.255.255.0 10.29.160.1 Delete
			DNS servers:
			Search domains:
		Close	DHCP client ID:
			Require IPv4 addressing for this connection to complete
			Boutes
			Available to all users Cancel Apply

1

- **31**. Repeat the steps 24 to 30 for system eth1 with the following:
 - **a.** IP Address: 192.168.12.11
 - **b.** Netmask: 255.255.255.0

			Editing eth	
			Connection name: eth1	
			Connect automatically	
Notw	ork Connections		Wired 802.1x Security IPv4 Settings IPv6 Settings	
neen	ork connections		Helbert Henry	
Wired Wireless	Mobile Broadband	VPN P DSL	Method: Manual	Ç
Name	Last Used	Add	Addresses	
System eth0	never	Edit	Address Netmask Gateway Ad	1
System eth1	never		192.168.12.11 255.255.255.0	
system etn2	never	Delete	- Level	~
			DNS servers:	-
			Search domains:	-
	· · · · · · · · · · · · · · · · · · ·		generiounans.	_
		⊆lose	DHCP client ID:	
			Require IPv4 addressing for this connection to com	plet
			Boute	
			Ausilable to all users	nhu
			Diversion and a service A	bulk

- **32**. Repeat the steps 24 to 30 for system eth2 with the following:
 - **a.** IP Address: 192.168.11.11
 - **b.** Netmask: 255.255.255.0



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Table 4 lists the IP addresses of the cluster nodes.

- **33**. Select the Appropriate Time Zone and click **Next**.
- 34. Enter the root Password and click Next.
- 35. Select Use All Space and Click Next.

Figure 65

Selecting RHEL Install Type

Wh	ich typ	e of installation would you like?	
۲		Use All Space Removes all partitions on the selected device(s). This includes partitions created by other operating systems.	
		Tip: This option will remove data from the selected device(s). Make sure you have backups.	
0		Replace Existing Linux System(s) Removes only Linux partitions (created from a previous Linux installation). This does not remove other partitions you may have on your storage device(s) (such as VFAT or FAT32).	
		TIP: This option will remove data from the selected device(s). Make sure you have backups.	
0		Shrink Current System Shrinks existing partitions to create free space for the default layout.	
0		Use Free Space Retains your current data and partitions and uses only the unpartitioned space on the selected device (s), assuming you have enough free space available.	
0	2	Create Custom Layout Manually create your own custom layout on the selected device(s) using our partitioning tool.	
	Encryp	t system	
	Review	and modify partitioning layout	
			♦ Back

- **36.** Select an appropriate boot drive.
- 37. Click Write changes to the disks and then, click Next.

Figure 66

Writing Partitioning Options into the Disk



38. Select Basic Server Installation and Click Next.

Figure 67	Selecting RHEL Installation Option
-----------	------------------------------------

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The default installation of Red Hat Enterprise Linux is a basic server install. You can optionally select a different set of software now.	
Basic Server	
O Database Server	
O Web Server	
O Identity Management Server	
 Virtualization Host 	
O Desktop	
 Software Development Workstation 	
O Minimal	
Please select any additional repositories that you want to use for software installation.	
	-
Load Balancer	
✓ Red Hat Enterprise Linux	~
Add additional software repositories	
You can further customize the software selection now, or after install via the software management application.	
Customize later Customize now	
costonize fater O Zastonize now	
	◆ <u>B</u> ack ◆ <u>N</u> ext

39. After the installer is finished loading, press **Enter** to continue with the install.

Figure 68 Installation Process in Progress



40. Once the installation is complete, reboot the system.

Repeat steps (step1 to 40) to install Red Hat Linux on Servers 2 through 16.

۵, Note

The OS installation and configuration of the nodes that is mentioned above can be automated through PXE boot or third party tools.

The hostnames and their corresponding IP addresses are shown in Table 4.

Table 4 Host Names and IP Addresses

Host Name	eth0	eth1	eth2
rhel1	10.29.160.53	192.168.12.11	192.168.11.11
rhel2	10.29.160.54	192.168.12.12	192.168.11.12
rhel3	10.29.160.55	192.168.12.13	192.168.11.13
rhel4	10.29.160.56	192.168.12.14	192.168.11.14
rhel5	10.29.160.57	192.168.12.15	192.168.11.15
rhel6	10.29.160.58	192.168.12.16	192.168.11.16
rhel7	10.29.160.59	192.168.12.17	192.168.11.17
rhel8	10.29.160.60	192.168.12.18	192.168.11.18
rhel9	10.29.160.61	192.168.12.19	192.168.11.19
rhel10	10.29.160.62	192.168.12.20	192.168.11.20
rhel11	10.29.160.63	192.168.12.21	192.168.11.21
Host Name	eth0	eth1	eth2
-----------	--------------	---------------	---------------
rhel12	10.29.160.64	192.168.12.22	192.168.11.22
rhel13	10.29.160.65	192.168.12.23	192.168.11.23
rhel14	10.29.160.66	192.168.12.24	192.168.11.24
rhel15	10.29.160.67	192.168.12.25	192.168.11.25
rhel16	10.29.160.68	192.168.12.26	192.168.11.26

Table 4 Host Names and IP Addresses

Post OS Install Configuration

Choose one of the nodes of the cluster or a separate node as Admin Node for management such as installing Cloudera Manager (to install Hadoop), parallel shell, creating a local Red Hat repo and others. In this document, we use rhell for this suppose.

Setting Up Password-less Login

To manage all of the clusters nodes from the admin node we need to setup password-less login. It assists in automating common tasks with Parallel-SSH (pssh) and shell-scripts without having to use passwords.

Once Red Hat Linux is installed across all the nodes in the cluster, follow the steps below in order to enable password less login across all the nodes.

1. Login to the Admin Node (rhel1)

ssh 10.29.160.53

2. Run the ssh-keygen command to create both public and private keys on the admin node.

Figure 69 Create Public and Private Keys

```
[root@rhel1 ~]# ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa):
Created directory '/root/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /root/.ssh/id_rsa.
Your public key has been saved in /root/.ssh/id_rsa.pub.
The key fingerprint is:
ab:4e:78:10:54:81:4e:04:8d:af:4f:a4:b2:c4:bb:88 root@rhel1
The key's randomart image is:
+--[ RSA 2048]----+
| .=ooo. |
| ..+ |
| +. |
| +. |
| ..+ S |
|.oo .o . |
|.oo .o . |
|.oo .o . |
|.oo .o . |
|+. .o . |
|E. .o | |
```

3. Then run the following command from the admin node to copy the public key id_rsa.pub to all the nodes of the cluster. **ssh-copy-id** appends the keys to the remote-host's .ssh/authorized_key.

```
for IP in {53..68}; do echo -n "$IP -> "; ssh-copy-id -i ~/.ssh/id_rsa.pub
10.29.160.$IP; done
```

Enter yes for Are you sure you want to continue connecting (yes/no)?

Enter the password of the remote host.

Installing and Configuring Parallel Shell

Parallel-SSH

Parallel SSH is used to run commands on several hosts at the same time. It takes a file of hostnames and a bunch of common ssh parameters as parameters, executes the given command in parallel on the nodes specified.

1. From the system that is connected to the Internet, download pssh.

wget https://parallel-ssh.googlecode.com/files/pssh-2.3.1.tar.gz

Figure 70 Command to Download pssh

scp pssh-2.3.1.tar.gz rhel1:/root

2. Copy pssh-2.3.1.tar.gz to the Admin Node

ssh rhel1
tar xzf pssh-2.3.1.tar.gz
cd pssh-2.3.1
python setup.py install

Figure 71 Command to Copy pssh to Admin Node

```
[root@redhat ~]# scp pssh-2.3.1.tar.gz rhel1:/root
The authenticity of host 'rhell (10.29.160.53)' can't be established.
RSA key fingerprint is 25:15:c9:7d:e0:db:78:2c:0d:ce:e5:2d:e3:e2:5e:44.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'rhell' (RSA) to the list of known hosts.
root@rhel1's password:
pssh-2.3.1.tar.gz
[root@redhat ~]# ssh rhel1
root@rhel1's password:
Last login: Wed Apr 24 09:06:38 2013 from 10.29.160.90
[root@rhel1 ~]# tar xzf pssh-2.3.1.tar.gz
[root@rhel1 ~]# cd pssh-2.3.1
[root@rhel1 pssh-2.3.1]# python setup.py install
running install
running build
running build py
running build scripts
running install_lib
running install_scripts
changing mode of /usr/bin/pslurp to 755
changing mode of /usr/bin/pnuke to 755
changing mode of /usr/bin/prsync to 755
changing mode of /usr/bin/pscp to 755
changing mode of /usr/bin/pssh-askpass to 755
changing mode of /usr/bin/pssh to 755
running install_data
running install_egg_info
Removing /usr/lib/python2.6/site-packages/pssh-2.3.1-py2.6.egg-info
Writing /usr/lib/python2.6/site-packages/pssh-2.3.1-py2.6.egg-info
```

- 3. Extract and Install pssh on the Admin node.
- 4. Create a host file containing the IP addresses of all the nodes in the cluster. This file is passed as a parameter to pssh to identify the nodes to run the commands on.



You can have multiple files based on roles such as datanodes, zookeepernodes, allnodes etc

```
vi /root/allnodes
# This file contains ip address of all nodes of the cluster
#used by parallel-shell (pssh). For Details man pssh
10.29.160.53
10.29.160.54
10.29.160.55
10.29.160.56
10.29.160.57
10.29.160.58
10.29.160.59
10.29.160.60
10.29.160.61
10.29.160.62
10.29.160.63
10.29.160.64
10.29.160.65
10.29.160.66
10.29.160.67
10.29.160.68
```

Configuring /etc/hosts

Follow these steps to create the host file across all the nodes in the cluster:

1. Populate the host file with IP addresses and corresponding hostnames on the Admin node (rhell).

```
vi /etc/hosts
127.0.0.1 localhost localhost.localdomain localhost4 localhost4.localdomain4
::1 localhost localhost.localdomain localhost6 localhost6.localdomain6
10.29.160.53 rhel1
10.29.160.54 rhel2
10.29.160.55 rhel3
10.29.160.56 rhel4
10.29.160.57 rhel5
10.29.160.58 rhel6
10.29.160.59 rhel7
10.29.160.60 rhel8
10.29.160.61 rhel9
10.29.160.62 rhel10
10.29.160.63 rhel11
10.29.160.64 rhel12
10.29.160.65 rhel13
10.29.160.66 rhel14
10.29.160.67 rhel15
10.29.160.68 rhel16
```

2. Deploy /etc/hosts from the admin node (rhel1) to all the nodes via the following pscp command:

pscp -h /root/allnodes /etc/hosts /etc/hosts

Figure 72 Command to Deploy /etc/hosts to All the Nodes

<pre>[root@rhel1 ~]# pscp -h /root/allnodes /etc/hosts /etc/hosts</pre>
[1] 11:40:27 [SUCCESS] 10.29.160.53
[2] 11:40:27 [SUCCESS] 10.29.160.55
[3] 11:40:27 [SUCCESS] 10.29.160.58
[4] 11:40:27 [SUCCESS] 10.29.160.56
[5] 11:40:27 [SUCCESS] 10.29.160.57
[6] 11:40:27 [SUCCESS] 10.29.160.54
[7] 11:40:27 [SUCCESS] 10.29.160.61
[8] 11:40:27 [SUCCESS] 10.29.160.66
[9] 11:40:27 [SUCCESS] 10.29.160.64
[10] 11:40:27 [SUCCESS] 10.29.160.68
[11] 11:40:27 [SUCCESS] 10.29.160.59
[12] 11:40:27 [SUCCESS] 10.29.160.62
[13] 11:40:27 [SUCCESS] 10.29.160.65
[14] 11:40:27 [SUCCESS] 10.29.160.67
[15] 11:40:27 [SUCCESS] 10.29.160.60
[16] 11:40:27 [SUCCESS] 10.29.160.63

Create Local Redhat Repo

If your infrastructure node and your cluster nodes have Internet access, you may be able to skip this section.

To create a repository using RHEL DVD or ISO on the admin node (in this deployment rhel1 is used for this purpose), create a directory with all the required RPMs, run the createrepo command and then publish the resulting repository on a website.

I

1. On the Admin node (rhel1) create a directory that would contain the repository.

```
mkdir -p /var/www/html/rhelrepo
```

- 2. Copy the contents of the Red Hat DVD to /var/www/html/rhelrepo
- **3.** Alternatively, if you have access to a Red Hat ISO Image, Copy the ISO file to the admin node (rhel1).

scp rhel-server-6.2-x86_64-dvd.iso rhel1:/root

Here we assume you have the Red Hat ISO file located in your present working directory.

mkdir -p /mnt/rheliso

mount -t iso9660 -o loop /root/rhel-server-6.2-x86_64-dvd.iso /mnt/rheliso/

4. Next, copy the contents of the ISO to the /var/www/html/rhelrepo directory

cp -r /mnt/rheliso/* /var/www/html/rhelrepo

5. Now on rhell create a .repo file to enable the use of the yum command.

```
vi /var/www/html/rhelrepo/rheliso.repo
[rhel6.2]
name=Red Hat Enterprise Linux 6.2
baseurl=http://10.29.160.53/rhelrepo
gpgcheck=0
enabled=1
```

Note

Based on this repo file yum requires httpd to be running on rhell for other nodes to access the repository. Steps to install and configure httpd are in the following section.

6. Copy the rheliso.repo to all the nodes of the cluster.

pscp -h /root/allnodes /var/www/html/rhelrepo/rheliso.repo /etc/yum.repos.d/

Figure 73 Command to Copy RHEL ISO to All the Nodes

<pre>[root@rhel1 ~]# pscp -h /root/allnodes</pre>	/var/www/html/rhelrepo/rheliso.rep
<pre>> /etc/yum.repos.d/</pre>	
[1] 15:00:09 [SUCCESS] 10.29.160.57	
[2] 15:00:09 [SUCCESS] 10.29.160.54	
[3] 15:00:09 [SUCCESS] 10.29.160.53	
[4] 15:00:09 [SUCCESS] 10.29.160.56	
[5] 15:00:09 [SUCCESS] 10.29.160.58	
[6] 15:00:09 [SUCCESS] 10.29.160.55	
[7] 15:00:09 [SUCCESS] 10.29.160.60	
[8] 15:00:09 [SUCCESS] 10.29.160.59	
[9] 15:00:09 [SUCCESS] 10.29.160.65	
[10] 15:00:09 [SUCCESS] 10.29.160.64	
[11] 15:00:09 [SUCCESS] 10.29.160.61	
[12] 15:00:09 [SUCCESS] 10.29.160.67	
[13] 15:00:09 [SUCCESS] 10.29.160.62	
[14] 15:00:09 [SUCCESS] 10.29.160.63	
[15] 15:00:09 [SUCCESS] 10.29.160.66	
[16] 15:00:09 [SUCCESS] 10.29.160.68	

7. To make use of repository files on rhel1 without httpd, edit the baseurl of repo file /etc/yum.repos.d/rheliso.repo to point repository location in the file system.

vi /etc/yum.repos.d/rheliso.repo
[rhel6.2]
name=Red Hat Enterprise Linux 6.2
baseurl=file:///var/www/html/rhelrepo

gpgcheck=0 enabled=1

8. pssh -h /root/allnodes "yum clean all".

Figure 74 Running Yum to Clean All the Nodes

[rod	ot@rhel1 ~	-]# pssh -h	/root/allnodes	''Yum	clean	all"
[1]	12:14:09	[SUCCESS]	10.29.160.55			
[2]	12:14:09	[SUCCESS]	10.29.160.53			
[3]	12:14:09	[SUCCESS]	10.29.160.57			
[4]	12:14:09	[SUCCESS]	10.29.160.54			
[5]	12:14:09	[SUCCESS]	10.29.160.62			
[6]	12:14:09	[SUCCESS]	10.29.160.59			
[7]	12:14:09	[SUCCESS]	10.29.160.56			
[8]	12:14:09	[SUCCESS]	10.29.160.58			
[9]	12:14:09	[SUCCESS]	10.29.160.61			
[10]	12:14:09	[SUCCESS]	10.29.160.65			
[11]	12:14:09	[SUCCESS]	10.29.160.60			
[12]	12:14:09	[SUCCESS]	10.29.160.68			
[13]	12:14:09	[SUCCESS]	10.29.160.63			
[14]	12:14:09	[SUCCESS]	10.29.160.64			
[15]	12:14:10	[SUCCESS]	10.29.160.66			
[16]	12:14:10	[SUCCESS]	10.29.160.67			

9. Creating the Red Hat Repository Database.

Install the createrepo package. Use it to regenerate the repository database(s) for the local copy of the RHEL DVD contents. Then purge the yum caches.

```
yum -y install createrepo
cd /var/www/html/rhelrepo
createrepo .
yum clean all
```



```
[root@rhel1 rhelrepo]# createrepo .
    368/3596 - Packages/pygobject2-doc-2.20.0-5.el6.x86_64.rpm
iso-8859-1 encoding on Ville Skyttä <ville.skytta@iki.fi> - 2.8.2-2
3596/3596 - Packages/lohit-bengali-fonts-2.4.3-6.el6.noarch.rpm
Saving Primary metadata
Saving file lists metadata
Saving other metadata
```

Upgrading LSI driver

The latest LSI driver is required for performance and bug fixes. The latest drivers can be downloaded from the link below:

http://software.cisco.com/download/release.html?mdfid=284296254&flowid=31743&softwareid=2838 53158&release=1.5.1&relind=AVAILABLE&rellifecycle=&reltype=latest In the ISO image, the required driver kmod-megaraid_sas-v06.504.01.00.rpm can be located at ucs-cxxx-drivers.1.5.1\Linux\Storage\LSI\92xx\RHEL\RHEL6.2

Figure 76 Command to Download and Transfer Drivers to the Admin Node

[root@redhat ~]# scp kmod* rhel1:/root/ kmod-megaraid_sas-debug-v06.504.01.00_100% 306KB 306.4KB/s 00:00 kmod-megaraid_sas-v06.504.01.00_rhel6. 100% 302KB 301.5KB/s 00:00

From a node connected to the Internet, download and transfer kmod-megaraid_sas-v06.504.01.00.rpm to rhel1 (admin node). Install the rpm on all nodes of the cluster using the following pssh commands. For this example the rpm is assumed to be in present working directory of rhel1.

pscp -h /root/allnodes kmod-megaraid_sas-v06.504.01.00_rhel6.2-2.x86_64.rpm /root/

pscp -h /root/allnodes kmod-megaraid sas-v06.504.01.00 rhel6.2root@rhel1 ~]# x86_64.rpm /root/ 15:46:54 [SUCCESS] 10.29.160.53 10.29.160.64 15:46:54 [SUCCESS] 10.29.160.55 SUCCESS] 3 15:46:5415:46:54 SUCCESS] 10.29.160.56 4 10.29.160.60 5 15:46:54 [SUCCESS] SUCCESS1 10.29.160.58 15:46:54 6 15:46:54 [SUCCESS] 10.29.160.59 7 10.29.160.54 15:46:54 [SUCCESS] 8 15:46:54 [SUCCESS] 10.29.160.57 91 101 15:46:54 [SUCCESS] 10.29.160.61 15:46:54 [SUCCESS] 10.29.160.63 11 15:46:54 [SUCCESS] 10.29.160.66 12] 15:46:54 SUCCESS1 10.29.160.62 13 15:46:54 SUCCESS 10.29.160.65 14 15:46:54 [SUCCESS] 10.29.160.67 15 15:46:54 SUCCESS 10.29.160.68 16

Figure 77 Copy rpm on All the Nodes

pssh -h /root/allnodes "rpm -ivh kmod-megaraid_sas-v06.504.01.00_rhel6.2-2.x86_64.rpm"

Figure 78 Install rpm on All the Nodes

[root@rhel1 ~]# pssh -h /root/allnodes	"rpm -ivh kmod-megaraid_sas-v06.504.01.0
0 rhel6.2-2.x86 64.rpm"	
[1] 15:49:11 [SUCCESS] 10.29.160.53	
[2] 15:49:13 [SUCCESS] 10.29.160.67	
[3] 15:49:13 [SUCCESS] 10.29.160.54	
[4] 15:49:13 [SUCCESS] 10.29.160.58	
[5] 15:49:13 [SUCCESS] 10.29.160.62	
[6] 15:49:13 [SUCCESS] 10.29.160.60	
[7] 15:49:13 [SUCCESS] 10.29.160.65	
[8] 15:49:13 [SUCCESS] 10.29.160.57	
[9] 15:49:13 [SUCCESS] 10.29.160.61	
[10] 15:49:13 [SUCCESS] 10.29.160.66	
[11] 15:49:13 [SUCCESS] 10.29.160.64	
[12] 15:49:13 [SUCCESS] 10.29.160.56	
[13] 15:49:13 [SUCCESS] 10.29.160.55	
[14] 15:49:14 [SUCCESS] 10.29.160.59	
[15] 15:49:14 [SUCCESS] 10.29.160.63	
[16] 15:49:16 [SUCCESS] 10.29.160.68	

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Configuring NTP

The Network Time Protocol (NTP) is used to synchronize the time of all the nodes within the cluster using the admin node. The Network Time Protocol daemon (ntpd) sets and maintains the system time of day in synchronism with the timeserver located in the admin node. Configuring NTP is critical for any Hadoop Cluster.

1. Configure /etc/ntp.conf on the admin node with the following contents:

```
vi /etc/ntp.conf
driftfile /var/lib/ntp/drift
restrict 127.0.0.1
restrict -6 ::1
server 127.127.1.0
fudge 127.127.1.0 stratum 10
includefile /etc/ntp/crypto/pw
keys /etc/ntp/keys
```

2. Create /root/ntp.conf on the admin node and copy it to all nodes.

```
vi /root/ntp.conf
server 10.29.160.53
driftfile /var/lib/ntp/drift
restrict 127.0.0.1
restrict -6 ::1
includefile /etc/ntp/crypto/pw
keys /etc/ntp/keys
```

3. Copy ntp.conf file from the admin node to /etc of all the nodes by executing the following command in the admin node (rhel1).

for SERVER in {54..68}; do scp /root/ntp.conf 10.29.160.\$SERVER:/etc/ntp.conf; done

۵,

```
Note
```

Do not use pssh /root/allnodes command without editing the host file allnodes as it overwrites /etc/ntp.conf from the admin node.

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Figure 79 Command to Copy ntp.conf to All the Nodes

[root@rhel1	~]# :	for	SERVER	in	{5468};	do	scp	/root/ntp.conf	10.29.16	0.\$SEE	RVER:/etc	/ntp.conf;	done
ntp.conf										100%	142	0.1KB/s	00:00
ntp.conf										100%	142	0.1KB/s	00:00
ntp.conf										100%	142	0.1KB/s	00:00
ntp.conf										100%	142	0.1KB/s	00:00
ntp.conf										100%	142	0.1KB/s	00:00
ntp.conf										100%	142	0.1KB/s	00:00
ntp.conf										100%	142	0.1KB/s	00:00
ntp.conf										100%	142	0.1KB/s	00:00
ntp.conf										100%	142	0.1KB/s	00:00
ntp.conf										100%	142	0.1KB/s	00:00
ntp.conf										100%	142	0.1KB/s	00:00
ntp.conf										100%	142	0.1KB/s	00:00
ntp.conf										100%	142	0.1KB/s	00:00
ntp.conf										100%	142	0.1KB/s	00:00
ntp.conf										100%	142	0.1KB/s	00:00

4. Restart NTP daemon on all the nodes.

pssh -h /root/allnodes "service ntpd restart"

[root@rhel1 ~]# pssh -h /root/allnodes "service ntpd restart"
[1] 13:38:55 [SUCCESS] 10.29.160.54
[2] 13:38:55 [SUCCESS] 10.29.160.53
[3] 13:38:55 [SUCCESS] 10.29.160.56
[4] 13:38:55 [SUCCESS] 10.29.160.57
[5] 13:38:55 [SUCCESS] 10.29.160.55
[6] 13:38:55 [SUCCESS] 10.29.160.58
[7] 13:38:55 [SUCCESS] 10.29.160.60
[8] 13:38:55 [SUCCESS] 10.29.160.59
[9] 13:38:55 [SUCCESS] 10.29.160.64
[10] 13:38:55 [SUCCESS] 10.29.160.62
[11] 13:38:55 [SUCCESS] 10.29.160.61
[12] 13:38:55 [SUCCESS] 10.29.160.66
[13] 13:38:55 [SUCCESS] 10.29.160.63
[14] 13:38:55 [SUCCESS] 10.29.160.65
[15] 13:38:55 [SUCCESS] 10.29.160.67
[16] 13:38:55 [SUCCESS] 10.29.160.68

Figure 80 Command to Restart NTP Daemon on All the Nodes

5. Ensure that the NTP daemon restarts after the reboot.

pssh -h /root/allnodes "chkconfig ntpd on"

[roo	ot@rhel1	~]# pssh -h	/root/allnodes	"chkconfig	ntpd on"
[1]	13:52:55	[SUCCESS]	10.29.160.54		
[2]	13:52:55	[SUCCESS]	10.29.160.55		
[3]	13:52:55	[SUCCESS]	10.29.160.57		
[4]	13:52:55	[SUCCESS]	10.29.160.56		
[5]	13:52:55	[SUCCESS]	10.29.160.60		
[6]	13:52:55	[SUCCESS]	10.29.160.61		
[7]	13:52:55	[SUCCESS]	10.29.160.58		
[8]	13:52:55	[SUCCESS]	10.29.160.53		
[9]	13:52:55	[SUCCESS]	10.29.160.59		
[10]	13:52:5	5 [SUCCESS]	10.29.160.63		
[11]	13:52:5	5 [SUCCESS]	10.29.160.62		
[12]	13:52:5	5 [SUCCESS]	10.29.160.64		
[13]	13:52:5	5 [SUCCESS]	10.29.160.65		
[14]	13:52:5	5 [SUCCESS]	10.29.160.67		
[15]	13:52:5	5 [SUCCESS]	10.29.160.66		
[16]	13:52:5	5 [SUCCESS]	10.29.160.68		

Figure 81 Command to Check NTP Daemon Status

Installing httpd

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Follow these steps to install httpd on the admin node to host repositories.

1. The Red Hat repository is hosted using HTTP on the admin node.; this machine is accessible by all the hosts in the cluster.

yum -y install httpd

- 2. Add ServerName and make the necessary changes to the server configuration file.
 - vi /etc/httpd/conf/httpd.conf ServerName 10.29.160.53:80



3. Ensure httpd is able to read the repofiles

chcon -R -t httpd_sys_content_t /var/www/html/rhelrepo
4. Start httpd

service httpd start chkconfig httpd on

Installing xfsprogs

Install xfsprogs on all the nodes for xfs filesystem.

pssh -h /root/allnodes "yum -y install xfsprogs"

Figure 83	Command to Install xfsprogs
-----------	-----------------------------

[roc	t@rhel1	~]# pssh -	h /root/allnodes	"Yum -Y	install	xfsprogs"
[1]	12:26:34	4 [SUCCESS]	10.29.160.57			
[2]	12:26:35	5 [SUCCESS]	10.29.160.56			
[3]	12:26:35	5 [SUCCESS]	10.29.160.53			
[4]	12:26:35	5 [SUCCESS]	10.29.160.59			
[5]	12:26:35	5 [SUCCESS]	10.29.160.61			
[6]	12:26:35	5 [SUCCESS]	10.29.160.63			
[7]	12:26:35	5 [SUCCESS]	10.29.160.54			
[8]	12:26:35	5 [SUCCESS]	10.29.160.62			
[9]	12:26:35	5 [SUCCESS]	10.29.160.66			
[10]	12:26:3	35 SUCCESS] 10.29.160.60			
[11]	12:26:3	35 [SUCCESS] 10.29.160.68			
[12]	12:26:3	35 [SUCCESS] 10.29.160.58			
[13]	12:26:3	35 [SUCCESS] 10.29.160.64			
[14]	12:26:3	35 [SUCCESS] 10.29.160.55			
[15]	12:26:3	35 [SUCCESS] 10.29.160.65			
[16]	12:26:3	35 [SUCCESS] 10.29.160.67			

Configuring Disk Drives for Data

In the section titled Configuring RAID on First Disk Drive for OS describes the steps to configure the first disk drive for the operating system. Remaining disk drives can also be configured similarly or using MegaCli as described below.

1. From the LSI website: www.lsi.com/support/Pages/Download-Results.aspx?keyword=9266-8i download MegaCli and its dependencies and transfer to Admin node.

```
scp /root/MegaCli64 rhel1:/root/
scp /root/Lib_Utils-1.00-08.noarch.rpm rhel1:/root/
scp /root/Lib_Utils2-1.00-01.noarch.rpm rhel1:/root/
```

2. Copy all three files to all the nodes using the following commands:

pscp -h /root/allnodes /root/MegaCli64 /root/

Figure 84 Command to Copy MegaCli

<pre>[root@rhel1 ~]# pscp -h /root/allnodes /root/MegaCli64 /root/</pre>
[1] 13:00:40 [SUCCESS] 10.29.160.53
[2] 13:00:40 [SUCCESS] 10.29.160.61
[3] 13:00:40 [SUCCESS] 10.29.160.58
[4] 13:00:40 [SUCCESS] 10.29.160.62
[5] 13:00:40 [SUCCESS] 10.29.160.56
[6] 13:00:40 [SUCCESS] 10.29.160.57
[7] 13:00:40 [SUCCESS] 10.29.160.66
[8] 13:00:40 [SUCCESS] 10.29.160.59
[9] 13:00:40 [SUCCESS] 10.29.160.60
[10] 13:00:40 [SUCCESS] 10.29.160.55
[11] 13:00:40 [SUCCESS] 10.29.160.68
[12] 13:00:40 [SUCCESS] 10.29.160.54
[13] 13:00:40 [SUCCESS] 10.29.160.63
[14] 13:00:40 [SUCCESS] 10.29.160.64
[15] 13:00:40 [SUCCESS] 10.29.160.65
[16] 13:00:40 [SUCCESS] 10.29.160.67

pscp -h /root/allnodes /root/Lib_Utils* /root/

ncies
1

<pre>[root@rhel1 ~]# pscp -h /root/allnodes /root/Lib_Utils* /root/</pre>
[1] 13:01:26 [SUCCESS] 10.29.160.53
[2] 13:01:26 [SUCCESS] 10.29.160.58
[3] 13:01:26 [SUCCESS] 10.29.160.59
[4] 13:01:26 [SUCCESS] 10.29.160.60
[5] 13:01:26 [SUCCESS] 10.29.160.67
[6] 13:01:26 [SUCCESS] 10.29.160.63
[7] 13:01:26 [SUCCESS] 10.29.160.61
[8] 13:01:26 [SUCCESS] 10.29.160.57
[9] 13:01:26 [SUCCESS] 10.29.160.54
[10] 13:01:26 [SUCCESS] 10.29.160.56
[11] 13:01:26 [SUCCESS] 10.29.160.62
[12] 13:01:26 [SUCCESS] 10.29.160.55
[13] 13:01:26 [SUCCESS] 10.29.160.64
[14] 13:01:26 [SUCCESS] 10.29.160.66
[15] 13:01:26 [SUCCESS] 10.29.160.65
[16] 13:01:26 [SUCCESS] 10.29.160.68

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3. Run the following command to install the rpms on all the nodes:

pssh -h /root/allnodes "rpm -ivh Lib_Utils*"

	3		
coot@rhel1 ~]# p	ssh -h /root/all	nodes "rpm -ivh	Lib Vtils*"
] 13:02:05 [SUC	CESS] 10.29.160.	64	
2] 13:02:05 [SUC	CESS] 10.29.160.	62	
] 13:02:05 [SUC	CESS] 10.29.160.	57	
] 13:02:05 [SUC	CESS] 10.29.160.	66	
3] 13:02:05 [SUC	CESS] 10.29.160.	58	
3] 13:02:05 [SUC	CESS] 10.29.160.	59	
] 13:02:05 [SUC	CESS] 10.29.160.	54	
3] 13:02:05 [SUC	CESS] 10.29.160.	67	
] 13:02:05 [SUC	CESS] 10.29.160.	60	
0] 13:02:05 [SU	CCESS] 10.29.160	.65	
1] 13:02:05 [SU	CCESS] 10.29.160	.56	
2] 13:02:05 [SU	CCESS] 10.29.160	.55	
3] 13:02:05 [SU	CCESS] 10.29.160	.63	
4] 13:02:05 [SU	CCESS] 10.29.160	.61	
5] 13:02:05 [SU	CCESS] 10.29.160	.68	
6] 13:02:05 [SU	CCESS] 10.29.160	.53	

Figure 86 Command to Install rpm on All the Nodes

4. Issue the following command from the admin node to create the virtual drives with RAID 0 configurations on all the nodes (rhel1-16).

```
pssh -h /root/allnodes "./MegaCli64 -cfgeachdskraid0 WB RA direct NoCachedBadBBU
strpsz1024 -a0"
WB: Write back
RA: Read ahead
Direct: Reads are not buffered in cache memory
NoCachedBadBBU: Do not write cache when the BBU is bad
strpsz1024: Strip Size of 1024K
```

```
Note
```

The command above will not override existing configurations. To clear and reconfigure existing configurations refer to Embedded MegaRAID Software Users Guide available at www.lsi.com.

Configuring File System

Follow these steps to configure the file system for CDH:

1. On the Admin node, create a file containing the following script.

To create partition tables and file systems on the local disks supplied to each of the nodes, run the following script as the root user on each node.

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```
vi /root/driveconf.sh
#!/bin/bash
disks_count=`lsblk -id | grep sd | wc -l`
if [ $disks_count -eq 24 ]; then
    echo "Found 24 disks"
else
    echo "Found $disks_count disks. Expecting 24. Exiting .. "
    exit 1
fi
[[ "-x" == "${1}" ]] && set -x && set -v && shift 1
for X in /sys/class/scsi_host/host?/scan
do
echo '- - -' > ${X}
done
for X in /dev/sd?
do
echo $X
```

```
if [[ -b ${X} && `/sbin/parted -s ${X} print quit |/bin/grep -c boot` -ne 0 ]]
then
echo "$X bootable - skipping."
continue
else
Y=${X##*/}1
/sbin/parted -s ${X} mklabel gpt quit
/sbin/parted -s ${X} mkpart 1 6144s 100% quit
/sbin/mkfs.xfs -f -q -l size=65536b,lazy-count=1,su=256k -d sunit=1024,swidth=6144
-r extsize=256k -L ${Y} ${X}1
(( $? )) && continue
/bin/mkdir -p /CDH/${Y}
(( $? )) && continue
/bin/mount -t xfs -o allocsize=128m, noatime, nobarrier, nodiratime ${X}1
/CDH/${Y}
(( $? )) && continue
echo "LABEL=${Y} /CDH/${Y} xfs allocsize=128m,noatime,nobarrier,nodiratime 0 0" >>
/etc/fstab
fi
done
```

2. Run the following command to copy driveconf.sh to all the nodes:

pscp -h /root/allnodes /root/driveconf.sh /root/

<pre>[root@rhel1 ~]# pscp -h /root/allnodes</pre>	/root/driveconf.sh /root/
[1] 16:12:42 [SUCCESS] 10.29.160.53	
[2] 16:12:42 [SUCCESS] 10.29.160.60	
[3] 16:12:42 [SUCCESS] 10.29.160.57	
[4] 16:12:42 [SUCCESS] 10.29.160.59	
[5] 16:12:42 [SUCCESS] 10.29.160.58	
[6] 16:12:42 [SUCCESS] 10.29.160.54	
[7] 16:12:42 [SUCCESS] 10.29.160.56	
[8] 16:12:42 [SUCCESS] 10.29.160.61	
[9] 16:12:42 [SUCCESS] 10.29.160.55	
[10] 16:12:42 [SUCCESS] 10.29.160.63	
[11] 16:12:42 [SUCCESS] 10.29.160.65	
[12] 16:12:42 [SUCCESS] 10.29.160.62	
[13] 16:12:42 [SUCCESS] 10.29.160.64	
[14] 16:12:42 [SUCCESS] 10.29.160.66	
[15] 16:12:42 [SUCCESS] 10.29.160.67	
[16] 16:12:42 [SUCCESS] 10.29.160.68	

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Figure 87 Command to Copy driveconf.sh

3. Run the following command from the admin node to run the script across all the other nodes:

pssh -h /root/allnodes "./driveconf.sh"

-	iguio co	nannig	antocomg.on on the the trea
[root@rhel1 ~]# pss	h -h /root/a	llnodes	"./driveconf.sh"
[1] 16:15:24 [SUCCE	SS] 10.29.160	.67	
[2] 16:15:24 [SUCCE	ss] 10.29.160	.54	
[3] 16:15:24 [SUCCE	SS] 10.29.160	.63	
[4] 16:15:24 [SUCCE	SS] 10.29.160	.66	
[5] 16:15:24 [SUCCE	SS] 10.29.160	.65	
[6] 16:15:24 [SUCCE	ss] 10.29.160	.62	
[7] 16:15:24 [SUCCE	SS] 10.29.160	.61	
[8] 16:15:24 [SUCCE	SS] 10.29.160	.60	
[9] 16:15:24 [SUCCE	SS] 10.29.160	.59	
[10] 16:15:24 [SUCC	ESS] 10.29.16	0.58	
[11] 16:15:24 [SUCC	ESS] 10.29.16	0.57	
[12] 16:15:24 [SUCC	ESS] 10.29.16	0.64	
[13] 16:15:25 [SUCC	ESS] 10.29.16	0.56	
[14] 16:15:25 [SUCC	ESS] 10.29.16	0.55	
[15] 16:15:25 [SUCC	ESS] 10.29.16	0.53	
[16] 16:15:35 [SUCC	ESS] 10.29.16	0.68	

Figure 88 Running driveconfig.sh on All the Nodes

Prerequisites for CDH

Following prerequisites are required for installing CDH:

- Disable SELinux, page 86
- Disabling iptables, page 87
- Download and Configure Cloudera Repo, page 88
- Oracle JDK Installation, page 92

Disable SELinux

Cloudera Hadoop Installation requires all the nodes to disable SELinux. This will completely disable all SELinux functions including file and process labeling. This can be done by editing /etc/selinux/config and changing the SELINUX line to SELINUX=disabled.

```
pssh -h /root/allnodes "sed -i 's/enforcing/disabled/g' /etc/selinux/config "
pssh -h /root/allnodes "setenforce 0"
```



The above command may fail if SELinux is already disabled.

[roc	ot@rhel1 ~]# pssh -	h /root/allnodes	"sed -i	's/enforcing/disabled/g'	/etc/selinux/config"
[1]	14:07:40	[SUCCESS]	10.29.160.53			
[2]	14:07:40	[SUCCESS]	10.29.160.54			
[3]	14:07:40	[SUCCESS]	10.29.160.57			
[4]	14:07:40	[SUCCESS]	10.29.160.55			
[5]	14:07:40	[SUCCESS]	10.29.160.56			
[6]	14:07:40	[SUCCESS]	10.29.160.59			
[7]	14:07:40	[SUCCESS]	10.29.160.58			
[8]	14:07:40	[SUCCESS]	10.29.160.63			
[9]	14:07:40	[SUCCESS]	10.29.160.61			
[10]	14:07:40	[SUCCESS	10.29.160.60			
[11]	14:07:40	[SUCCESS	10.29.160.66			
[12]	14:07:40	[SUCCESS	10.29.160.67			
[13]	14:07:40	[SUCCESS	10.29.160.62			
[14]	14:07:40	[SUCCESS	10.29.160.65			
[15]	14:07:40	[SUCCESS	10.29.160.64			
[16]	14:07:40	SUCCESS	10.29.160.68			

Figure 89 Command to Disable SELinux

Disabling iptables

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To disable the Linux firewall, run the following commands on all nodes:

pssh -h /root/allnodes "service iptables stop"

[roo	ot@rhel1	~]# pssh -h	n /root/allnodes	"service	iptables	stop"
[1]	14:13:25	[SUCCESS]	10.29.160.54			-
[2]	14:13:25	[SUCCESS]	10.29.160.55			
[3]	14:13:25	[SUCCESS]	10.29.160.57			
[4]	14:13:25	[SUCCESS]	10.29.160.59			
[5]	14:13:25	[SUCCESS]	10.29.160.56			
[6]	14:13:25	[SUCCESS]	10.29.160.62			
[7]	14:13:25	[SUCCESS]	10.29.160.60			
[8]	14:13:25	[SUCCESS]	10.29.160.66			
[9]	14:13:25	[SUCCESS]	10.29.160.61			
[10]	14:13:2	5 [SUCCESS]	10.29.160.63			
[11]	14:13:2	5 [SUCCESS]	10.29.160.67			
[12]	14:13:2	5 [SUCCESS]	10.29.160.58			
[13]	14:13:2	5 [SUCCESS]	10.29.160.53			
[14]	14:13:2	5 [SUCCESS]	10.29.160.68			
[15]	14:13:2	5 [SUCCESS]	10.29.160.65			
[16]	14:13:2	5 [SUCCESS]	10.29.160.64			

Figure 90 Command to Disable Linux Firewall

pssh -h /root/allnodes "chkconfig iptables off"

[roo	ot@rhel1	~]# pssh -	h /root/allnodes	"chkconfig	iptables	off"
[1]	14:13:2	5 [SUCCESS]	10.29.160.54			
[2]	14:13:2	5 [SUCCESS]	10.29.160.55			
[3]	14:13:2	5 [SUCCESS]	10.29.160.57			
[4]	14:13:2	5 [SUCCESS]	10.29.160.59			
[5]	14:13:2	5 [SUCCESS]	10.29.160.56			
[6]	14:13:2	5 [SUCCESS]	10.29.160.62			
[7]	14:13:2	5 [SUCCESS]	10.29.160.60			
[8]	14:13:2	5 [SUCCESS]	10.29.160.66			
[9]	14:13:2	5 [SUCCESS]	10.29.160.61			
[10]	14:13:	25 [SUCCESS	10.29.160.63			
[11]	14:13:	25 [SUCCESS	10.29.160.67			
[12]	14:13:	25 [SUCCESS	10.29.160.58			
[13]	14:13:	25 [SUCCESS	10.29.160.53			
[14]	14:13:	25 [SUCCESS	10.29.160.68			
[15]	14:13:	25 [SUCCESS	10.29.160.65			
[16]	14:13:	25 [SUCCESS	10.29.160.64			

Figure 91 Command to Check the Linux Firewall Status

Download and Configure Cloudera Repo

CDH can be installed in many ways. Method 1 demonstrates the installation of CDH4 using Cloudera Manager when all the hosts of the cluster have an Internet connection. Method 2 demonstrates the installation of CDH4 if the cluster has no connectivity to the Internet.

Figure 92 Downloading and Executing Cloudera Manager

curl -0 http://archive.cloudera.com/cm4/installer/latest/cloudera-manager-installer.bin

% Total % Received % Xferd Average Speed Time Time Time Current Dload Upload Total Spent Left Speed 100 489k 100 489k 0 0 255k 0 0:00:01 0:00:01 --:-- 258k # chmod +x cloudera-manager-installer.bin # ./cloudera-manager-installer.bin

- Method 1—The easiest way to install the CDH4 is through Cloudera Manager. If all the hosts in the cluster are connected to the Internet, download the latest version of Cloudera Manager from the Cloudera website to the admin node and execute it.
- **Method 2**—If all the hosts are not connected to the internet we use local repository to install CDH4. We first need to create a directory with all the required rpms, run the createrepo command, and then publish the resulting repository on a website. We use the Admin node to host the repository.

Run the following commands from the admin node:

1. Create the directories within the admin node.

mkdir -p /var/www/html/clouderarepo/

2. Download the Cloudera Software Repos.

From a host connected to the Internet, download the Cloudera Software Repo as shown below and transfer it to the admin node.

3. Download Cloudera Manager Repository from the system connected to the Internet.

```
mkdir -p /tmp/clouderarepo/
cd /tmp/clouderarepo/
wget http://archive.cloudera.com/cm4/redhat/6/x86_64/cm/cloudera-manager.repo
reposync --config=./cloudera-manager.repo --repoid=cloudera-manager
```



Figure 93 Downloading Cloudera Manager Repository

4. Download the Cloudera Manager Installer.

cd /tmp/clouderarepo/ wget http://archive.cloudera.com/cm4/installer/latest/cloudera-manager-installer.bin





5. Download the CDH4 Repository

cd /tmp/clouderarepo/

wget http://archive.cloudera.com/cdh4/redhat/6/x86_64/cdh/cloudera-cdh4.repo reposync --config=./cloudera-cdh4.repo --repoid=cloudera-cdh4

Figure 95 Downloading CDH4 Repository



6. Download Impala Repository.

```
cd /tmp/clouderarepo/
   wget
http://archive.cloudera.com/impala/redhat/6/x86_64/impala/cloudera-impala.repo
   reposync --config=./cloudera-impala.repo --repoid=cloudera-impala
```



7. Copy the repository directory to the admin node

scp -r /tmp/clouderarepo/ rhel1:/var/www/html

Figure 97 Copying Cloudera Repository to the Admin Node

[root@redhat clouderarepo]# scp -r /tmp/clouderarepo/ rhel1:/var/www/html/				
root@rhell's password:				
cloudera-cdh4.repo	100%	232	0.2KB/s	00:00
hadoop-mapreduce-2.0.0+960-1.cdh4.2.1.p0.9.el6.x86_64.rpm	100%	9891KB	9.7MB/s	00:00
hue-beeswax-2.2.0+194-1.cdh4.2.1.p0.8.el6.x86_64.rpm	100%	654KB	654.3KB/s	00:00
hue-impala-2.2.0+194-1.cdh4.2.1.p0.8.el6.x86_64.rpm	100%	19KB	19.0KB/s	00:00
hadoop-2.0.0+960-1.cdh4.2.1.p0.9.el6.x86_64.rpm	100%	16MB	15.8MB/s	00:01
hadoop-libhdfs-2.0.0+960-1.cdh4.2.1.p0.9.e16.x86_64.rpm	100%	26KB	26.0KB/s	00:00
hadoop-hdfs-datanode-2.0.0+960-1.cdh4.2.1.p0.9.el6.x86_64.rpm	100%	5224	5.1KB/s	00:00
hadoop-doc-2.0.0+960-1.cdh4.2.1.p0.9.el6.x86_64.rpm	100%	4096KB	4.0MB/s	00:00
hadoop-hdfs-secondarynamenode-2.0.0+960-1.cdh4.2.1.p0.9.el6.x86_64.rpm	100%	4964	4.9KB/s	00:00
hue-jobsub-2.2.0+194-1.cdh4.2.1.p0.8.el6.x86_64.rpm	100%	208KB	207.8KB/s	00:00
hbase-0.94.2+218-1.cdh4.2.1.p0.8.el6.x86_64.rpm	100%	36MB	36.5MB/s	00:00
hue-about-2.2.0+194-1.cdh4.2.1.p0.8.el6.x86_64.rpm	100%	16KB	16.0KB/s	00:00
hbase-thrift-0.94.2+218-1.cdh4.2.1.p0.8.el6.x86_64.rpm	100%	5316	5.2KB/s	00:00
hue-help-2.2.0+194-1.cdh4.2.1.p0.8.el6.x86 64.rpm	100%	14KB	14.2KB/s	00:00

8. On admin node (rhel1) run create repo command.

cd /var/www/html/clouderarepo/

createrepo --baseurl http://10.29.160.53/clouderarepo/cloudera-manager/
/var/www/html/clouderarepo/cloudera-manager

createrepo --baseurl http://10.29.160.53/clouderarepo/cloudera-cdh4
/var/www/html/clouderarepo/cloudera-cdh4

createrepo --baseurl http://10.29.160.53/clouderarepo/cloudera-impala
/var/www/html/clouderarepo/cloudera-impala





Visit http://10.29.160.53/clouderarepo to verify the files.

9. Create the Cloudera Manager repo file with following contents:

```
vi /var/www/html/clouderarepo/cloudera-manager/cm.repo
[cloudera-manager]
name=Cloudera Manager
baseurl=http://10.29.160.53/clouderarepo/cloudera-manager/
gpgcheck = 0
```

10. Create the Hadoop repo file with following contents:

```
vi /var/www/html/clouderarepo/cloudera-cdh4/ch.repo
[cloudera-cdh4]
name=Cloudera's Distribution for Hadoop, Version 4
baseurl= http://10.29.160.53/clouderarepo/cloudera-cdh4
gpgcheck = 0
```

11. Create the Cloudera Impala repo file with following contents:

vi /var/www/html/clouderarepo/cloudera-impala/ci.repo
[cloudera-impala]
name=Impala
baseurl= http://10.29.160.53/clouderarepo/cloudera-impala
gpgcheck = 0

Copy the file cm.repo, ch.repo, ci.repo into /etc/yum.repos.d/ on the admin node to enable it to find the packages that are locally hosted.

```
cp /var/www/html/clouderarepo/cloudera-manager/cm.repo /etc/yum.repos.d/
cp /var/www/html/clouderarepo/cloudera-cdh4/ch.repo /etc/yum.repos.d/
cp /var/www/html/clouderarepo/cloudera-impala/ci.repo /etc/yum.repos.d/
```

Figure 99 Copying .repo Files on the Admin Node

```
[root@rhel1 yum.repos.d]# cp /var/www/html/clouderarepo/cloudera-manager/cm.repo
etc/yum.repos.d/
[root@rhel1 yum.repos.d]# cp /var/www/html/clouderarepo/cloudera-cdh4/ch.repo /et
c/yum.repos.d/
[root@rhel1 yum.repos.d]# cp /var/www/html/clouderarepo/cloudera-impala/ci.repo /
etc/yum.repos.d/
```

The contents of the repo files are:

Copy the file cm.repo, ch.repo, ci.repo to /etc/yum.repos.d/ of all the nodes of the cluster from the admin node.

pscp -h /root/allnodes /etc/yum.repos.d/c* /etc/yum.repos.d/

Figure 100 Copying .repo Files on All the Nodes

[root@rhel1 yum.repos.d]# ls
ch.repo ci.repo cm.repo rheliso.repo
[root@rhel1 yum.repos.d]# cat cm.repo
[cloudera-manager]
name=Cloudera Manager
baseurl=http://10.29.160.53/clouderarepo/cloudera-manager/
gpgcheck = 0
[root@rhel1 yum.repos.d]# cat ch.repo
[cloudera-cdh4]
name=Cloudera's Distribution for Hadoop, Version 4
baseurl= http://10.29.160.53/clouderarepo/cloudera-cdh4
gpgcheck = 0
[root@rhel1 yum.repos.d]# cat cm.repo
[cloudera-manager]
name=Cloudera Manager
baseurl=http://10.29.160.53/clouderarepo/cloudera-manager/
gpgcheck = 0
[root@rhel1 yum.repos.d]# cat rheliso.repo
[rhel6.2]
name=Red Hat Enterprise Linux 6.2
baseurl=http://10.29.160.53/rhelrepo
gpgcheck=0
enabled=1

Oracle JDK Installation

From the system connected to the Internet, using a web browser, download the latest version of Java JDK 6 and copy it to /root/ on rhel1

scp jdk-6u37-linux-x64-rpm.bin rhel1:/root/

From rhel1, copy jdk-6u37-linux-x64-rpm.bin to all nodes of the cluster.

pscp -h /root/allnodes /root/jdk-6u37-linux-x64-rpm.bin /root/

Install JDK6 on all the nodes by logging into each node and executing the following command from /root/.

sh jdk-6u37-linux-x64-rpm.bin -noregister

Figure 101 Verify Java Installation on All the Nodes



Installing Cloudera Manager

Cloudera Manager, an end to end management application, is used to install and configure CDH. During CDH Installation, Cloudera Manager's Wizard will help to install Hadoop services on all nodes using the following procedure:

- Discovery of the cluster nodes
- Configure the Cloudera parcel or package repositories
- Install Hadoop, Cloudera Manager Agent (CMA) and Impala on all the cluster nodes.
- Install the Oracle JDK if it is not already installed across all the cluster nodes.
- Assign various services to nodes.
- Start the Hadoop services.

Follow these steps to install Cloudera Manager:

1. Change the permission of Cloudera Manager Installer on the admin node.

```
cd /var/www/html/clouderarepo
chmod 777 cloudera-manager-installer.bin
```

Figure 102 Starting Cloudera Manager Installer

```
[root@rhel1 cloudera-manager]# ls
cloudera-manager-installer.bin cm.repo repodata RPMS
[root@rhel1 cloudera-manager]# ./cloudera-manager-installer.bin <mark>_</mark>_____
```

2. Execute the following command in the admin node (rhel1) to start Cloudera Manager Installer.

```
cd /var/www/html/clouderarepo/cloudera-manager
./cloudera-manager-installer.bin
```

3. This displays the Cloudera Manager Read Me file. Click Next.

Figure 103 Cloudera Manager Installer

era Manager		
	Ciculara Magaer IPANT	
	The Cloudera Manager Installer enables you to install Cloudera Manager and I	
	bootstrap an entire CDH cluster (up to 50 nodes in the Free Edition),	
	requiring only that you have SSH access to your cluster's machines, and	
	Chuc chose indificies have internet access.	
	The Cloudera Manager Installer will automatically:	
	* Detect the exception system on the Clauders Manager back	
	 Detect the operating system on the Cloudera Manager nost Install the package repository for Cloudera Manager and the Java Runtime I 	
	Environment (JRE)	
	 Install the JRE if it's not already installed 	
	Install and configure an embedded PostgreSQL database	
	* Install and run the clouderd Manager Server	
	Once server installation is complete, you can browse to Cloudera Manager's I	
	web interface and use the cluster installation wizard to set up your CDH	
	cluster.	
	Cloudera Manager supports the following 64-bit operating systems:	
	Bod Mat Estamping Linux E (Undets 7 on Jatan secondard)	
	Red Hat Enterprise Linux 6 (Update 2 or later recommended)	
	* Oracle Enterprise Linux 5 (Update 6 recommended)	
	CentOS 5 (Update 7 or later recommended)	
	 CentOS 6 (Update 2 or later recommended) SUSE Linux Enterprise Server 11 (Service Back 1 or later required) 	
	* Ubuntu 10.04 LTS	
	Ubuntu 12.04 LTS	
	* Debian 6.0	
	< Cancel > < Next >	

- 4. Click Next in the End User License agreement page.
- 5. Click Yes in the license agreement confirmation page.
- 6. Click Yes in the Oracle Binary Code License Agreement for the Java SE Platform Products page.

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Figure 104 Accepting the Oracle Binary Code License Agreement



7. Wait for the installer to install the packages needed for Cloudera Manager.



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8. Save the url displayed http://10.29.160.53:7180. You will need this url to access Cloudera Manager. If you are unable to connect to the server, check to see if iptables and SELinux are disabled.

	Figure 106	Cloudera Manager URL
O O	2. root@Infrast	ructure:/var/www/html/Cloudera/manager-4.1.3 (ssh)
Point your web browser to (Note that the hostname m connecting, make sure you	http://10.29.160.53:7180/. Log in t ay be incorrect. If the url does not have disabled firewalls, like iptab	to Cloudera Manager with the username and password set to 'admin' to continue installation. work, try the hostname you use when remotely connecting to this machine.) If you have trouble les.

1

9. Click OK.



Figure 107 Cloudera Manager is Installed on the Cluster

10. Once the installation of Cloudera Manager is complete. Install CDH4 using the Cloudera Manager web interface.

Installing Cloudera Enterprise Core (CDH4)

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To install Cloudera Enterprise Core, follow these steps:

1. Access the Cloudera Manager using the URL displayed by the Installer, http://10.29.160.53:7180.

🕹 Mozilla Firefox Start Page	+									
10.29.160.53:7180						▽ → 🚼 - @	oogle	٩	A	
4			6						moz	zilla
	Goog	tt's easy Choose f	to customize y	your Firefox exa	ictly the way you	Search want it.				
L	•	Q	<u>.</u>	Ō	ä					

Figure 108 Starting Cloudera Manager

2. Login to the Cloudera Manager. Enter "admin" for both the Username and Password fields.

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	Figure 109	Cioudera manager Login page				
Firefox 🔻						
C Login - Cloudera Manager (Free Edition	n) +					
I 10.29.160.53:7180/cmf/login;	jsessionid=1una5f7urxp7w1x	0s21597fmkl	☆ マ C 🛃 - Google	٩	A	•
	(FREE EDITION)			Support P	Portal	Help
		Login				
		Username:				
		admin				
	_	Password:		_		
		Remember me on this computer.				
		Login				

Figure 109 Cloudera Manager Login page

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3. Click Just Install the Latest Free Edition.

Fig	ure 110	Installing Clo	udera Manager						
Firefox -								-	
C Thank you for choosing Cloudera Manager a	. +								
II.29.160.53:7180/cmf/express-wizt	rd/welcome			☆ ⊽ ৫ 🔧	≠ Goog	le	٩	Â	
cloudera MANAGER (FRI	E EDITION)								¢
Thank you for choos (CDH). This installer will deploy the for Apache Hadoop (Map Apache Hase Apache Hase Apache ZooKeeper Apache Cooze Hue (Apache licensed Apache Flume NG Cloudera Impala (Apa You are using Cloudera Mana on the Help link above.	Upgrade to You are currently Cloudera Manage • Service status • Activity monito • Log search an • Global time ci • Configuration • Support for Ke To upgrade now, I Upload a Ne Upload Lice	the full version of running Cloudera Manager er will allow this wizard to ir s and health summaries oring nd management ontrol for historical diagnosis i versioning and history erberos upload a license below. ew License Browse_ nse and Upgrade to the Fu	f Cloudera Manag Free Edition. Upgrading tr sstall and configure all feat s	er o the full version o ures such as: e Latest Free Editi	X f	Apache	Hadoop		
10.29.160.53:7180/cmf/express-wizard/welcome	a.						Cont	nue	

- 4. Click **Continue** in the confirmation page.
- **5.** Specify the hosts that are part of the cluster using their IP addresses or hostname. The figure below shows use of a pattern to specify ip-address range.

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192.168.12.[11-26]

6. After the IP addresses are entered, click Search.

Figure 111 Searching for Cluster Nodes

Specify hosts for your CDH cluster installation.

Hint: Search for hostnames and/or IP addresses using patterns @.		
192.168.12.[11-26]		
	SSH Port:	22 Q Search

7. Cloudera Manager will "discover" the nodes in the cluster. Verify that all desired nodes have been found and selected for installation.

8. Click Install CDH On Selected Host. CDH is Cloudera Distribution for Apache Hadoop.

Sp	ecify hosts fo	or vour CDH clu	uster install	ation.		
	,	,				
н	int: Search for hos	tnames and/or IP add	Iresses using <u>pat</u>	terns @ .		
			1	6 hosts scanned, 16 n	unning SSH. Q Ne	w Search
	Expanded Query	Hostname (FQDN)	IP Address	Currently Managed	Result	
V	192.168.12.11	rhel1	192.168.12.11	No	✓ Host ready: 0 ms	response time.
2	192.168.12.12	rhel2	192.168.12.12	No	🗸 Host ready: 1 ms	response time.
	192.168.12.13	rhel3	192.168.12.13	No	🗸 Host ready: 1 ms	response time.
1	192.168.12.14	rhel4	192.168.12.14	No	🗸 Host ready: 1 ms	response time.
~	192.168.12.15	rhel5	192.168.12.15	No	🗸 Host ready: 1 ms	response time.
•	192.168.12.16	rhel6	192.168.12.16	No	🗸 Host ready: 2 ms	response time.
•	192.168.12.17	rhel7	192.168.12.17	No	🗸 Host ready: 1 ms	response time.
√	192.168.12.18	rhel8	192.168.12.18	No	🗸 Host ready: 1 ms	response time.
•	192.168.12.19	rhel9	192.168.12.19	No	🗸 Host ready: 2 ms	response time.
•	192.168.12.20	rhel10	192.168.12.20	No	🗸 Host ready: 1 ms	response time.
•	192.168.12.21	rhel11	192.168.12.21	No	🗸 Host ready: 1 ms	response time.
~	192.168.12.22	rhel12	192.168.12.22	No	🗸 Host ready: 2 ms	response time.
•	192.168.12.23	rhel13	192.168.12.23	No	🗸 Host ready: 1 ms	response time.
•	192.168.12.24	rhel14	192.168.12.24	No	🗸 Host ready: 1 ms	response time.
•	192.168.12.25	rhel15	192.168.12.25	No	🗸 Host ready: 1 ms	response time.
2	192.168.12.26	rhel16	192.168.12.26	No	🗸 Host ready: 1 ms	response time.

Figure 112 Verifying and Selecting the Hosts

- 9. For the method of installation, select the Use Package radio button.
- 10. For the CDH version, select the CDH4 radio button.
- **11.** For the specific release of CDH you want to install in your hosts, select Custom Repository radio button.
- **12.** Enter the following URL for the repository within the admin node. http://10.29.160.53/clouderarepo/cloudera-cdh4/
- 13. For the specific Impala release, select the Custom Repository radio button.
- Enter the following URL for the repository within the admin node. http://10.29.160.53/clouderarepo/cloudera-impala
- 15. For the specific release of Cloudera Manager, select the Custom Repository radio button.
- **16.** Enter the URL for the repository within the admin node. http://10.29.160.53/clouderarepo/cloudera-manager/

	12345
	http://archive.cloudera.com/debian/archive.key
	Example for Ubuntu or other Debian based distributions:
	http://archive.cloudera.com/redhat/cdh/RPM-GPG-KEY-cloudera
	Example for SLES, Redhat or other RPM based distributions:
nternet access).	Custom GPG Key URL:
Enter a custom URL for	the location of the GPG signing key (applies to all custom repositories and without
	deb http://archive.cloudera.com/cm4/ubuntu/lucid/amd64/cm/ lucid-cm4 contrib
	Example for Ubuntu or other Debian based distributions:
	http://archive.cloudera.com/cm4/redhat/5/x86_64/cm/4/
	Example for SLES, Redhat or other RPM based distributions:
	http://10.29.160.53/clouderarepo/cloudera-manager/
	 Custom Repository
	C Matched release for this Cloudera Manager server
select the specific re	elease of the Cloudera Manager Agent you want to install on your hosts.
	Note: Impala is supported only on CDH 4.1 or later deployments.
	nttp://10.29.160.53/clouderarepo/cloudera-impala
	http://10.09.160.53/claudergrapp/clauderg.impain
	Custom Repository C. None
	C Latest Release of Impala
Select the specific relea	ase of Impala you want to install on your hosts.
	<pre>deb http://archive.cloudera.com/cdh4/ubuntu/lucid/amd64/cdh/_lucid-cdh4 contrib</pre>
	Example for Ubuntu or other Debian based distributions:
	http://archive.cloudera.com/cdh4/redhat/5/x86_64/cdh/4/
	Example for SLES, Redhat or other RPM based distributions:
	http://10.29.160.53/clouderarepo/cloudera-cdh4/
	© Custom Repository
	O CDH 4.0.0
	C CDH 4.0.1
	C CDH 4.1.0
	O CDH 4.1.1
	O CDH 4.1.2
	C CDH 4.1.4
	O CDH 4.2.0
	O CDH 4.2.1
	C Latest Release of CDH4
select the specific re	elease of CDH you want to install on your hosts.
	O CDH3
	© CDH4
select the version of	C Ose Parceis (Recommended)
	C Lise Barcels (Becommended)
	💌 Use Packages 🔮

Figure 113 Selecting the CDH Version

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17. Provide SSH login credentials for the cluster and click **Start Installation**.

|--|

Provide SSH login	credentials.		
Root access to your hosts as another user with pass	is required to install the Cloudera packages. This installer will conne word-less sudo privileges to become root.	ct to your hosts via SSH and log in either directly as root	or
Login to all hosts as:	© root C Another User:		
You may connect via pass	word or public-key authentication for the user selected above.		
Authentication Method:	€ All hosts accept same password C All hosts accept same private key		
Enter Password:	•••••		
Confirm Password:	•••••		
SSH Port:	22		
Number of simultaneous installations:	10 (Running a large number of installations at once can consume large	amounts of network bandwidth and other system resourc	es)

- **18.** Make sure the installation across all the hosts is complete.
- **19.** After the installation is complete, click **Continue.**

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10.29.160.53:7180/cmf/	/express-wizard/wizard#step=in	stallStep	Cric Cric Cric Coogle	٩
ð manager (fr	REE EDITION)	-	Su	ipport Help
Cluster Install	ation			
Installation comple	eted successfully.			
16 of 16 host(s) corr	pleted successfully.			
Hostname	IP Address	Progress	Status	
rhel1	192.168.12.11		Installation completed successfully.	<u>Details</u> @
rhel2	192.168.12.12		Installation completed successfully.	Details @
rhel3	192.168.12.13		Installation completed successfully.	<u>Details</u> @
rhel4	192.168.12.14		Installation completed successfully.	Details @
rhel5	192.168.12.15		Installation completed successfully.	Details @
rhel6	192.168.12.16		Installation completed successfully.	Details @
rhel7	192.168.12.17		Installation completed successfully.	Details @
rhel8	192.168.12.18		Installation completed successfully.	Details @
rhel9	192.168.12.19		Installation completed successfully.	Details @
rhel10	192.168.12.20		Installation completed successfully.	Details @
rhel11	192.168.12.21		Installation completed successfully.	<u>Details</u> @
rhel12	192.168.12.22		Installation completed successfully.	<u>Details</u> 🗗
rhel13	192.168.12.23		Installation completed successfully.	<u>Details</u> Ø
rhel14	192.168.12.24		Installation completed successfully.	Details @
rhel15	192.168.12.25		Installation completed successfully.	Details @
		_		

ure 115 Installation in Progress

20. Wait for Cloudera Manager to inspect the hosts on which it has just performed the installation.

1

Figure 116	Inspecting Hosts				
Firefox 🔻					_ 🗆 ×
C Inspect hosts for correctness - Cloudera Ma +					
Interstation of the second	ië	☆ マ C 🚼 - 60	ogle	<mark>م</mark>	
cloudera MANAGER (FREE EDITION)		91	Support Help	👤 admin	• •
Inspect hosts for correctness					
	Inspecting hoststhis could take a minute.				
	5.8				
			Skip	lost Inspecto	

L

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21. Review and verify the summary. Click **Continue**.

	Figure 117	Inspecting Hosts f	for Correctness Part1	
	ress-wizard/wizard#step=hostInspectorSte	p		ু ∞ ৫
cloudera MANAGER (FF	REE EDITION)			
Cl	uster Installation			
Ins	pect hosts for correctness	C Run Again		
Vali	idations			
1	Inspector ran on all 16 hosts.			
1	Individual hosts resolved their own	hostnames correctly.		
1	No errors were found while looking	for conflicting init scripts.		
1	No errors were found while checking	ng /etc/hosts.		
1	All hosts resolved localhost to 127.	.0.0.1.		
1	All hosts checked resolved each ot	her's hostnames correctly.		
1	Host clocks are approximately in sy	ync (within ten minutes).		
1	Host time zones are consistent acr	ross the cluster.		
1	No users or groups are missing.			
1	No kernel versions that are known	to be bad are running.		
1	0 hosts are running CDH3 and 16	hosts are running CDH4.		
1	All checked hosts are running the s	same version of components.		
1	All checked Cloudera Management	t Daemons versions are consistent with the	server.	
1	All checked Cloudera Management	t Agents versions are consistent with the ser	rver.	
Ver	rsion Summary			
Gr	oup 1 (CDH4)			
Но	osts			
rhe	el1, rhel10, rhel11, rhel12, rhel13, rhel1	14, rhel15, rhel16, rhel2, rhel3, rhel4, rhel5, r	rhel6, rhel7, rhel8, rhel9	
Co	omponent	Version	CDH Versio	n
	N Back		12345	

1

No kernel versions that are known to	he had are running						
O hosts are running CDH3 and 16 ho	ste are running CDH4						
All checked hosts are running the sa	All checked hosts are running the same version of components.						
All checked Clouders Management E	aemons versions are consistent with the server						
 All checked Cloudera Management A 	cents versions are consistent with the server.						
Version Summary							
Group 1 (CDH4)							
Hosts							
rhel1, rhel10, rhel11, rhel12, rhel13, rhel14	rhel15, rhel16, rhel2, rhel3, rhel4, rhel5, rhel6, rhel7, rhel8, rhe	919					
Component	Version	CDH Version					
Impala	0.7	Not applicable					
HDFS (CDH4 only)	2.0.0+960	CDH4					
Hue Plugins	2.2.0+194	CDH4					
MapReduce 2 (CDH4 only)	2.0.0+960	CDH4					
HBase	0.94.2+218	CDH4					
Oozie	3.3.0+79	CDH4					
Yarn (CDH4 only)	2.0.0+960	CDH4					
Zookeeper	3.4.5+16	CDH4					
Hue	2.2.0+194	CDH4					
MapReduce 1 (CDH4 only)	0.20.2+1359	CDH4					
Pig	0.10.0+510	CDH4					
HttpFS (CDH4 only)	2.0.0+960	CDH4					
Hadoop	2.0.0+960	CDH4					
Hive	0.10.0+78	CDH4					
Flume NG	1.3.0+96	CDH4					
Cloudera Manager Management Daemons	4.5.1	Not applicable					
Cloudera Manager Agent	4.5.1	Not applicable					

Figure 118 Inspecting Hosts for Correctness Part2

Γ

22. select services that need to be started on the cluster.



Choose the CDH4 services that you want to install on your cluster.



23. This is one of the critical steps in the installation. Inspect and customize the role assignments of all the nodes based on your requirements and click **Continue**.

Inspect Role Assignments
Figure 120 Reviewing

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Reviewing the Role Assignments Part1

<form> 10 2 10 10 20 10 10 20 10 20 10 20 10 10 10 10 10 10 10 10 10 10 10 10 10</form>	efox 🔪 💽 Inspect role assig	nments - Ck	oudera Manage.	+															L
	10.29.160.53:7180/cmf/exp	ess-wizard/s	select-hosts									⊂ C	Social Coogle				P 4	*	
<text></text>	Idera MANAGER	(FREE	EDITION))		_				_	_					Support -	Help *	👤 admi	n
Note that it is the service here is break like are not valid candidates, these include hosts that are: unheating, members of other clusters, and/or which have an incompatible version of CDH installed on them. Southwey wersion of CDH installed on them. Hase Marking of Mar		You ca	ect role a	the role as	signments for nance of you	or your new cluster he ur services. Cloudera	ere, but no does not i	te that if a recommen	ssignments ar d altering assi	e made incorrectly, s gnments unless you	such as assigning t I have specific requ	oo many roles irements, suci	to a single h as having	host, this o pre-select	can ed a specific				
image image <t< td=""><td></td><td>The ho</td><td>ost list prese batible versio</td><td>nted here is on of CDH is</td><td>s prefiltered Istalled on t</td><td>to remove hosts which hem.</td><td>h are not v</td><td>/alid candi</td><td>dates; these ir</td><td>nclude hosts that are</td><td>e: unhealthy, memb</td><td>ers of other cl</td><td>usters, and/</td><td>or which h</td><td>ave an</td><td></td><td></td><td></td><td></td></t<>		The ho	ost list prese batible versio	nted here is on of CDH is	s prefiltered Istalled on t	to remove hosts which hem.	h are not v	/alid candi	dates; these ir	nclude hosts that are	e: unhealthy, memb	ers of other cl	usters, and/	or which h	ave an				
Simon Simon <th< td=""><td></td><td></td><td>ZooKeeper</td><td>HDFS</td><td></td><td></td><td></td><td>HBase</td><td></td><td></td><td></td><td>MapReduce</td><td></td><td>Hive</td><td></td><td></td><td></td><td></td><td></td></th<>			ZooKeeper	HDFS				HBase				MapReduce		Hive					
nell □			Server All None	DataNode All None	NameNode	SecondaryNameNode	HttpFS All None	Master All None	RegionServer All None	HBase REST Server	HBase Thrift Server All None	TaskTracker All None	JobTracker	Gateway All None	Hive Metastor All None				
net10 C <td></td> <td>rhel1</td> <td></td> <td></td> <td>e</td> <td>C</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>۲</td> <td>V</td> <td></td> <td></td> <td></td> <td></td> <td></td>		rhel1			e	C							۲	V					
netili p p c c p <td></td> <td>rhel10</td> <td></td> <td>Ы</td> <td>0</td> <td>c</td> <td></td> <td></td> <td>1</td> <td></td> <td></td> <td>4</td> <td>0</td> <td>V</td> <td></td> <td></td> <td></td> <td></td> <td></td>		rhel10		Ы	0	c			1			4	0	V					
neti2 0 <td></td> <td>rhei11</td> <td></td> <td>9</td> <td>с</td> <td>с</td> <td></td> <td></td> <td>5</td> <td></td> <td></td> <td>T</td> <td>с</td> <td>V</td> <td></td> <td></td> <td></td> <td></td> <td></td>		rhei11		9	с	с			5			T	с	V					
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neiliii R C C R </td <td></td> <td>rhel13</td> <td></td> <td>4</td> <td>0</td> <td>c</td> <td></td> <td></td> <td>1</td> <td></td> <td></td> <td>T</td> <td>c</td> <td>V</td> <td></td> <td></td> <td></td> <td></td> <td></td>		rhel13		4	0	c			1			T	c	V					
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neted pr pr c c pr pr <t< td=""><td></td><td>rhel3</td><td>V</td><td>R</td><td>0</td><td>с</td><td></td><td>V</td><td>Y</td><td></td><td></td><td>L</td><td>0</td><td>V</td><td></td><td></td><td></td><td></td><td></td></t<>		rhel3	V	R	0	с		V	Y			L	0	V					
net8 R C C C R C		rhel4	V	9	с	c		V	v			S	с	V					
Image: Second		rhel5	V	R	с	c		M	•				0	V					
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I N O N O N O N O N O N O N O N O N O N		rhel7		R	0	c			5			4	c	V					
		rhel8		R	0	c			V			T	0	V					
4]F		rhel9		R	0	c			5			5	c	V					
		•													<u>)</u>				

Figure 121 Reviewing the Role Assignments Part2

Firefox C Inspect role assignment	nents - Cloud	dera Manage +														- 8 ×
♦ 10.29.160.53:7180/cml/expres	s-wizard/sei	ect-hosts								☆ v	C ^e Google			ρ.	F 🕯	•
cloudera MANAGER (FREE E	DITION)	-				-			_			Support -	Help -	👤 admi	• • •
	Inspe	ct role assign	ments													
	You can significar host for :	customize the role ntly impact the perfo a specific role.	assignments for you ormance of your serv	r new cluster vices. Cloude	here, but no ra does not	ite that if a recommen	ssignments are made d altering assignment	incorrectly, s s unless you	uch as assigr have specific	ning too many ro requirements, s	les to a single host, this c such as having pre-selecte	an d a specific				
	The host incompa	t list presented here tible version of CDF	e is prefiltered to rem I installed on them.	iove hosts w	hich are not	valid candi	dates; these include h	osts that are	: unhealthy, r	nembers of othe	r clusters, and/or which ha	ive an				
				MapReduce		Hive			Oozie	Impala		Hue				
	inServer	HBase REST Server	HBase Thrift Server All None	TaskTracker All None	JobTracker	Gateway All None	Hive Metastore Server	HiveServer2	Oozie Server	Impala Daemon All None	Impala StateStore Daemon	Hue Server				
					۹	R	ম		•		۹	e				
	4			V	0	5			0	V	0	0				
	4			2	0	₹			0	V	c	0				
	2			•	0	1			0	2	c	0				
	R			2	с	V			0	V	с	с				
	V			M	0	7			0	2	c	0				
	v			2	с	7			0	2	с	c				
	R			2	0	5			0	V	с	0				
	R				0	5			0		с	c				
	2			4	0	4			0	V	c	0				
	R			5	c	5			0	V	с	с				
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	1			V	0	7			0	V	c	- C				
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	•				_							•				
	N Ba	ck										Continue				

Scaling the Cluster

The role assignment recommendation above is for clusters of up to 16 servers. For clusters of 16 to 64 nodes the recommendation is to dedicate one server for name node and a second server for secondary name node and job tracker. For larger clusters larger than 64 nodes the recommendation is to dedicate one server each for name node, secondary name node and job tracker.

- 1. Select the Use Embedded Database radio button.
- 2. Click Test Connection and click Continue.

Figure	122	Database Setup
--------	-----	----------------

Database Setup				
On this page you configure and test database Database section of the <u>Installation Guide</u> ď .	connections. If using custom databases, cre	ate the databases first accordi	ng to the installing and (Configuring an External
When using the Embedded Database, passwo	rds are auto generated. Please copy them d	lown.		
• Use Embedded	Database			
C Use Custom Dat	abases			
Hive			🗸 Skipped	. Will create database in later step
Database Host Name:	Database Type:	Database Name :	Username:	Password:
rhel1:7432	PostgreSQL	hive	hive	p09MaGRbeb

N Back	Test Connection	Continue
		2

3. Review and customize the configuration changes based on your requirements

Figure 123 Re

Reviewing the Configuration Changes Part1

Review configuration changes

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Group 😧	Parameter	Recommended Value	Description
Service hbase1			
Service-Wide	HDFS Root Directory* hbase.rootdir	/hbase default value	The HDFS directory shared by HBase RegionServers.
Service hdfs1			
DataNode (Base) Show Members @	DataNode Data Directory* dfs.datanode.data.dir	/CDH/sdb1/dfs/dn	 Comma-delimited list of directories on the local file system where the DataNode stores HDFS block data.
		/CDH/sdc1/dfs/dn	 directories should be mounted using the noatime directories should be mounted using the noatime option and the disks should be configured using JBOD
		/CDH/sdd1/dfs/dn	AID is not recommended.
		/CDH/sde1/dfs/dn	0 0
		/CDH/sdf1/dfs/dn	0 0
		/CDH/sdg1/dfs/dn	0 0
		/CDH/sdh1/dfs/dn	0 0
		/CDH/sdi1/dfs/dn	0 0
		/CDH/sdj1/dfs/dn	0 0
		/CDH/sdk1/dfs/dn	0 0
		/CDH/sdl1/dfs/dn	0 0
		/CDH/sdm1/dfs/dn	0 0

Figure 124

Reviewing the Configuration Changes Part2

		Reset to empty default value 🐄		
DataNode (Base) Show Members (P	DataNode Failed Volumes Tolerated dfs.datanode.failed.volumes.tolerated	11 Reset to the default value: 0. *		The number of volumes that are allowed to fail before a DataNode stops offering service. By default, any volume failure will cause a DataNode to shutdown.
NameNode (Base) Show Members @	NameNode Data Directories* dfs.namenode.name.dir	/CDH/sdc1/dfs/nn /CDH/sdd1/dfs/nn Reset to empty default value *	0 0	Determines where on the local file system the NameNode should store the name table (fsimage). For redundancy, enter a comma-delimited list of directories to replicate the name table in all of the directories. Typical values are /data/N/dfs/nn where N=13.
SecondaryNameNode (Base) Show Members @	HDFS Checkpoint Directory* dfs.namenode.checkpoint.dir	/CDH/sdb1/dfs/snn Reset to empty default value *	0	Determines where on the local file system the DFS SecondaryNameNode should store the temporary images to merge. For redundancy, enter a comma- delimited list of directories to replicate the image in all of the directories. Typical values are /data/N/dfs/snn for N = 1, 2, 3
Service hive1				
Service-Wide	Hive Warehouse Directory hive.metastore.warehouse.dir	/user/hive/warehouse default value		Hive warehouse directory is the location in HDFS where Hive's tables are stored. Note that Hive's default value for its warehouse directory is 'Juser/hive/warehouse'.
Hive Metastore Server (Base) Show Members @	Hive Metastore Server Port hive.metastore.port	9083 default value		Port on which Hive Metastore Server will listen for connections.
Service mapreduce1				
JobTracker (Base) Show Members @	JobTracker Local Data Directory* mapred.local.dir	/CDH/sdc1/mapred/jt	0	Directory on the local filesystem where the JobTracker stores job configuration data. Directories that do not
		Reset to empty default value		exist are ignored. A single directory is sufficient; a list of multiple directories will not cause problems.
TaskTracker (Base) Show Members @	TaskTracker Local Data Directory List* mapred.local.dir	Reset to empty default value * /CDH/sdb1/mapred/local		exist are ignored. A single directory is sufficient; a list of multiple directories will not cause problems. List of directories on the local filesystem where a TaskTracker stores intermediate data files. To spread disk IVO, enter a comma-separated list of directories on
TaskTracker (Base) Show Members @	TaskTracker Local Data Directory List ^a mapred.local.dir	Reset to empty default value * /CDH/sdb1/mapred/local /CDH/sdc1/mapred/local	00	exist are ignored. A single directory is sufficient, a list of multiple directories will not cause problems. List of directories on the local filesystem where a Task/Tracker stores intermediate data files. To spread disk I/O, enter a comma-separated list of directories on different devices. Directories that do not exist are immored. Trucci values are in directories on the store of the s
TaskTracker (Base) Show Members @	TaskTracker Local Data Directory List* mapred local dir	Reset to empty default value * /CDH/sdb1/mapred/local /CDH/sdb1/mapred/local /CDH/sdb1/mapred/local	0 0 0 0	exist are ignored. A single directory is sufficient, a list of multiple directories will not cause problems. List of directories on the local filesystem where a TaskTracker stores intermediate data files. To spread disk I/O, enter a comma-separated list of directories on different devices. Directories that do not exist are ignored. Typical values are /data/N/mapred/local for N = 1, 2, 3
TaskTracker (Base) Show Members ம	TaskTracker Local Data Directory List* mapred local dir	Reset to empty default value * /CDH/sdb1/mapred/local /CDH/sdb1/mapred/local /CDH/sdb1/mapred/local /CDH/sdb1/mapred/local	0 0 0 0 0 0	exist are ignored. A single directory is sufficient, a list of multiple directories will not cause problems. List of directories on the local filesystem where a TaskTracker stores intermediate data files. To spread disk I/O, enter a comma-separated list of directories on different devices. Directories that do not exist are ignored. Typical values are /data/N/mapredilocal for N = 1, 2, 3
TaskTracker (Base) Show Members @	TaskTracker Local Data Directory List* mapred local dir	Reset to empty default value * /CDH/sdb1/mapred/local /CDH/sdb1/mapred/local /CDH/sdd1/mapred/local /CDH/sdb1/mapred/local /CDH/sdb1/mapred/local /CDH/sdb1/mapred/local		exist are ignored. A single directory is sufficient, a list of multiple directories will not cause problems. List of directories on the local filesystem where a TaskTracker stores intermediate data files. To spread disk VO, enter a comma-separated list of directories on different devices. Directories that do not exist are ignored. Typical values are /data/N/mapred/local for N = 1, 2, 3

		/CDH/sdk1/mapred/local	0 0	
		/CDH/sdl1/mapred/local	0 0	
		/CDH/sdm1/mapred/local	0 0	
		/CDH/sdn1/mapred/local	0 0	
		/CDH/sdo1/mapred/local	0 0	
		/CDH/sdp1/mapred/local	0 0	
		/CDH/sdq1/mapred/local	0 0	
		/CDH/sdr1/mapred/local	0 0	
		/CDH/sds1/mapred/local	0 0	
		/CDH/sdt1/mapred/local	0 0	
		/CDH/sdu1/mapred/local	0 0	
		/CDH/sdv1/mapred/local	0 0	
		/CDH/sdw1/mapred/local	0 0	
		/CDH/sdx1/mapred/local	0 0	
		Reset to empty default value 🕈		
Service oozie1				
Oozie Server (Base) Show Members @	Oozie Server Data Directory	/var/lib/oozie/data default value	Directory where the Oozie Server v applicable when using Derby as th	vill place its data. Only ne database type.
Service zookeeper1				
Server (Base) Show Members @	Data Directory dataDir	/var/lib/zookeeper default value	The disk location that ZooKeeperv database snapshots.	vill use to store its
Server (Base) Show Members @	Transaction Log Directory dataLogDir	/var/lib/zookeeper default value	The disk location that ZooKeeperv transaction logs.	vill use to store its
H Back				Continue

Figure 125 Reviewing the Configuration Changes Part3

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4. Click **Continue** to start running the cluster services.

Figure 126

Starting the Cluster Services

Starting your cluster services.

Corr	Completed 18 of 18 steps.							
~	Walting for ZooKeeper Service to initialize Finished walting							
~	Starting ZooKeeper Service Service started successfully.							
~	Checking if the name directories of the NameNode are empty. Formatting HDFS only if empty. Sucessfully formatted NameNode.							
~	Starting HDFS Service Service started successfully.							
~	Creating HDFS /hmp directory Successfully created HDFS directory /tmp.							
~	Creating HBase root directory Successfully created HBase root directory.							
~	Starting HBase Service Service started, but only 17/18 roles started							
~	Starting MapReduce Service Service started successfully.							
~	Creating Hive Metastore Database Created Hive Metastore Database.							
~	Creating Hive Metastore Database Tables Created Hive Metastore Database Tables successfully.							
~	Creating Hive warehouse directory Successfully created Hive warehouse directory.							
1	Starting Hive Service Service started successfully.							
1	Creating Oozie database							
	Continue							

5. Hadoop services are installed, configured and now running on all the nodes of the cluster. Click **Continue** to complete the installation.

Figure 127 Installation Completion

10.29.160.53:7180/cmf/express-wizard/finish

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cloudera MANAGER (FREE EDITION)

Congratulations!

The Hadoop services are installed, configured, and running on your cluster.

6. Cloudera Manager will now show the status of all Hadoop services running on the cluster.

THEIDA									- 0
All Services - Cloudera	Manager (Free	Edition) +						_	
• 3 10.29.160.53	7180/cmf/servi	ces/status		<u>수</u>	⊽ C' <mark>8</mark> • 0	Soogle	۶	•	
cloudera м	ANAGER	(FREE ED	DITION)	Search	> :	i ៧ G	Support-	Heip -	L admin 🗸
rvices Hosts					*	¥			
All Services									
Cluster 1 - Cl	OH4							I A	ctions 🕶
Name		Health	Role Counts						
H <u>hbase1</u> ▼	✓ <u>Starte</u>	ed 🗸 Good	15 RegionServer	rs, <u>3 Masters</u>				I Ac	tions 🕶
B hdfs1 ▼	✓ <u>Starte</u>	ed 🗸 Good	<u>1 SecondaryNarr</u>	neNode, <u>1 NameNode, 15</u>	DataNodes			I Ac	tions 🕶
😵 <u>hive1</u> 🕶	🗸 <u>Starte</u>	ed 🗸 <u>Good</u>	<u>1 Hive Metastore</u>	Server, <u>16 Gateways</u>				I Ac	tions 🕶
	✓ <u>Starte</u>	ed 🗸 Good	1 Beeswax Serve	er, <u>1 Hue Server</u>				I Ac	tions 🕶
₿ <u>hue1</u> ▼		ed 🧹 Good	<u>15 Impala Daem</u>	ons, <u>1 Impala StateStore</u>	<u>Daemon</u>			I Ac	tions 🕶
<u>hue1</u> ▼ <u>impala1</u> ▼	✓ Starte								tions 🕶
hue1 impala1 impreduce1	✓ Starte ✓ Starte	ed 🗸 <u>Good</u>	<u>1 JobTracker, 15</u>	TaskTrackers				III AC	ererite
hue1 • impala1 • impaleduce1 • oozie1 •	 ✓ <u>Starte</u> ✓ <u>Starte</u> ✓ <u>Starte</u> 	ed 🗸 <u>Good</u> ed 🗸 <u>Good</u>	<u>1 JobTracker, 15</u> <u>1 Oozie Server</u>	TaskTrackers				I Ac	tions -

Conclusion

Cisco UCS Common Platform Architecture for Big Data offers a comprehensive stack for enterprise Big Data deployments. Together, Cisco and Cloudera are well positioned to help organizations exploit the valuable business insights found in all their data, regardless of whether it's structured, semi structured or unstructured. The solution offers industry-leading performance, scalability and advanced management capabilities while reducing the risks involved in Big Data deployments.

The rack level configuration detailed in the document can be extended to multiple rack scale. Up to 160 servers (10 racks) can be supported with no additional switching in a single UCS domain. Each additional rack requires two Cisco Nexus 2232PP 10GigE Fabric Extenders and 16 Cisco UCS C240 M3 Rack-Mount Servers. Scaling beyond 10 racks (160 servers) can be implemented by interconnecting multiple UCS domains using Nexus 6000/7000 Series switches, scalable to thousands of servers and to hundreds of petabytes storage, and managed from a single pane using UCS Central.

Bill of Materials

See Table 5 and Table 6 provides BOM for the high performance rack and high capacity rack configuration respectively, Table 7 provides BOM for rack and PDU. Table 8 and Table 9 provide BOM for RHEL and Cloudera software components used in the deployment model.

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Table 5 BOM for High Performance Rack

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Part Number	Description	Quantity
UCS-EZ-BD-HP	High Performance Rack	1
UCS-EZ-INFRA-FI96	UCS 6296 FI w/ 18p LIC, Cables Bundle	2 (included)
N2K-UCS2232PF	Nexus 2232PP with 16 FET (2 AC PS, 1 FAN (Std Airflow)	2 (included)
UCS-EZ-C240-2665	UCS C240 M3 SFF w/ 2665, 16x16GB, VIC 1225, 2PS	16 (included)
SFP-H10GB-CU3M=	10GBASE-CU SFP+ Cable 3 Meter	28 (included)

Table 6 BOM for High Capacity Rack

Part Number	Description	Quantity
UCS-EZ-BD-HC	High Capacity Rack	1
UCS-EZ-INFRA-FI96	UCS 6296 FI w/ 18p LIC, Cables Bundle	2 (included)
N2K-UCS2232PF	Nexus 2232PP with 16 FET (2 AC PS, 1 FAN (Std Airflow)	2 (included)
UCS-EZ-C240-2640	UCS C240 M3 LFF w/ 2640, 16x16GB, VIC 1225, 2PS	16 (included)
SFP-H10GB-CU3M=	10GBASE-CU SFP+ Cable 3 Meter	28 (included)

Table 7BOM for Rack and PDUs

Part Number	Description	Quantity
RACK-UCS2	Cisco R42610 standard rack w/side panels	1
RP208-30-1P-U-2=	Cisco RP208-30-U-2 Single Phase PDU 20x C13 4x C19 (Country Specific)	2
CON-UCW3-RPDUX	UC PLUS 24X7X4 Cisco RP208-30-U-X Single Phase PDU 2x (Country Specific)	2

Table 8 Red Hat Enterprise Linux License

Red Hat Enterprise Linux	Description	Quantity
RHEL-2S-1G-3A	Red Hat Enterprise Linux	16
CON-ISV1-RH2S1G1A	Support for Red Hat Enterprise Linux	16

1

Table 9 Cloudera Software License

Software	Description	Quantity
CECO-2407	Cloudera Enterprise Core CDH	16